Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents—Payment Reform

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EVALUATION OF THE INITIATIVE TO REDUCE AVOIDABLE HOSPITALIZATIONS AMONG NURSING FACILITY RESIDENTS—PAYMENT REFORM

Project Directors: Zhanlian Feng and Galina Khatutsky
Senior Scientific Advisor: Melvin J. Ingber
Associate Project Directors: Lawren Bercaw and Micah Segelman
Project Manager: Mildred Gapara
Project Coordinator: Helena Voltmer

Prepared by (*Section leads in bold)**:**

Jennifer Frank*	Jessica M. Jones
Angela Gasdaska*	Yevgeniya Kaganova
Kristie A. Porter*	Marianne Kluckman
John Robst*	Molly Knowles
Denise Tyler*	Cleo Kordomenos
Joyce M. Wang*	Abbie Levinson
Sarah Arnold	Qinghua Li
Nicole M. Coomer	Rebekah MacKinnon
Emily Costilow	Natalie Mulmule
Ira Dave	Madeline Murray
Anne Deutsch	Ryan Nguyen
Terry Eng	Sachin Peddada
Abigail Ferrell	Chris Saur
Douglas Fletcher	Nolan Sroczynski
Miku Fujita	Guadalupe Suarez
Dhwani Hariharan	Alison Vadnais
Benjamin Huber	Nan Tracy Zheng
Caroline B. Husick	Patti J. Zoromski

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APPENDIX A
PRIMARY DATA COLLECTION METHODS AND ANALYSES

A.1   Introduction

Our primary data collection approach for NFI 2 was comprehensive, multimethod, and efficient. It included a series of site visits to each Enhanced Care and Coordination Provider (ECCP) and a selection of their partnering facilities, both those facilities carrying over from the NFI 1 clinical intervention with the additional payment incentive, Clinical + Payment (C+P), and new facilities participating only with the payment incentive, Payment-Only (P-O). We also conducted annual telephone interviews with a selection of participating facilities; a survey of nursing facility administrators; a survey of participating practitioners (physicians, advanced practice registered nurses [APRNs], and physician assistants); and a series of interviews with key stakeholders from each of the ECCP states. When appropriate, we included additional primary sources, such as NFI 2 reports shared by ECCPs, minutes from ECCP workgroup calls, tools or templates shared by facilities, and NFI 2-relevant news media.

A.2   Primary Data Collection Purpose and Schedule

All primary data collection efforts—site visits, telephone interviews, surveys, stakeholder interviews, and other primary source collection—complement each other. Analyses of the data and documents collected during ECCP and participating facility site visits and telephone interviews provided a better understanding of how the NFI 2 payment incentive was implemented, how it actually worked on the ground, and how NFI 1 clinical and educational interventions in C+P facilities were evolving when combined with the NFI 2 payment incentive. Survey data provided standardized information about participating practitioners' buy-in and operational issues related to the payment incentive implementation, neither of which could be gleaned from the secondary data analyses. The survey also provided quantifiable information on the payment incentive implementation in participating nursing facilities.

We conducted key stakeholder interviews to understand recent NFI 2-related state activities, state and federal reforms, and state or local changes to usual care practices in ECCP states. These interviews also served to expand our understanding of the context within which NFI 2 was implemented. We included additional policy review and media analyses, when appropriate, to provide context for both administrative data analyses findings and findings from site visits and other primary data sources. Together, these data described the factors affecting NFI 2 implementation across and within ECCPs.

Because of the COVID-19 pandemic in 2020, we consulted with CMS and pivoted primary data collection efforts in the final year of the Initiative. We completed all planned telephone interviews with facilities between January and February 2020, before the pandemic had impacted most

participating facilities. Rather than conducting in-person facility and ECCP site visits in 2020, we completed a media review, documenting the effects of the pandemic on ECCP states and participating facilities. We also tracked relevant federal and state policy changes that directly affected nursing facility practices in the ECCP states during the pandemic. In the last months of the Initiative, we completed capstone telephone interviews with ECCP leaders to ascertain their overall thoughts on NFI 2 successes and challenges.

We collected primary data in all Initiative years. **Figure A-1** is a flowchart of our NFI 2 primary data collection efforts across years.

Figure A-1.   Primary data collection flowchart

	Baseline	Year 1	Year 2	Year 3	Year 4
Site Visits/ In-person Interviews		Clinical + Payment facility staff and ECCP			
		Payment-Only facility staff		Payment-Only facility staff	
Surveys			Practitioner	Practitioner	
			Administrator	Administrator	
			Administrator	Administrator	
Telephone Interviews		Clinical + Payment facility staff			
		Payment-Only facility staff			
		Stakeholders			
		ECCP			
		Media analysis and policy nreview			

NOTES: C+P (BLUE) = clinical and educational intervention and payment incentive facilities; P-O (GREEN) = payment incentive facilities only; Practitioners (GRAY) = physicians, advanced practice registered nurses (APRNs), and physician assistants participating in both C+P and P-O facilities. Stakeholders (PEACH) = state administrators and policymakers interviewed about state policy and environmental changes.

A.3   Facility Site Visit and Telephone Interview Task Overview

Site visits and telephone interviews served as a means of collecting primary data to evaluate NFI 2 implementation and outcomes for C+P and P-O facilities. We sought to understand the context in which each ECCP delivered NFI 2 efforts toward improving resident health outcomes and reducing overall health care spending. In addition, NFI 2 site visits and telephone interviews explored the billing processes and financial components for the P-O facilities and practitioners, while also

exploring how the financial components and focus on the specific six qualifying conditions affected care management and related practices in the participating facilities.

As shown in *Figure A-1*, in Initiative Years 1, 2, and 3, we conducted site visits to C+P facilities to understand their experiences with NFI 2. In Years 1 and 3 of implementation, we also conducted site visits to the P-O facilities. Because implementation of the payment incentive alone did not involve all staff levels and was not as all-encompassing as the clinical/educational interventions in NFI 1, we conducted only two rounds of site visits to P-O facilities. This reduced burden on both ECCPs and facilities by limiting the number of in-person visits we conducted in NFI 2. The first set of P-O site visits focused on implementation, and the second site visits concentrated on financial outcomes, operational issues, leadership buy-in, and successes and challenges of the payment incentive. The second site visits also focused on Initiative sustainability and scalability. For each ECCP, we visited four to nine facilities during each site visit.

A team of three RTI staff, consisting of a senior state evaluation team lead with NFI 1 site visit leadership experience and two supporting staff members, conducted each site visit. This team structure allowed us to capture detailed notes to inform later analyses, while generating assessments of engagement and other key domains. Site visits typically lasted between 4 and 9 days and included two components: (1) *ECCP component*—a visit to the ECCP headquarters and interviews with key ECCP leadership and other staff, and (2) *facility component*—a visit to participating facilities to interview facility staff and, if in a C+P facility, the ECCP nurse.

Table A-1 highlights how we used the site visits, facility telephone interviews, key stakeholder interviews, and surveys to address five critical data collection domains.

Table A-1.   Primary data collection domains

Primary Data Collection Domains	Primary Data Collection Method						Intervention Facilities	
	Site Visits	Telephone Interviews	NFA Survey	Practitioner Survey	Stakeholder Interviews	COVID-19 Policy and Media Analysis	Payment-Only	Clinical + Payment
ECCPs, Participating Facilities, and Partnering Practitioners								
ECCP level (characteristics, management, support)	●						●	●
NFI 2 implementation	●	●	●	●			●	●
Evolution of NFI 1 to NFI 2	●	●						●
Care transitions to/from hospitals and community	●	●					●	●
Engagement of facilities and practitioners with the Initiative	●	●	●	●			●	●

(continued)

Table A-1.   Primary data collection domains (continued)

Primary Data Collection Domains	Primary Data Collection Method						Intervention Facilities	
	Site Visits	Telephone Interviews	NFA Survey	Practitioner Survey	Stakeholder Interviews	COVID-19 Policy and Media Analysis	Payment-Only	Clinical + Payment
Practitioner training and support	●			●			●	●
Overall support for NFI 2 for facilities and practitioners (including training)	●	●	●	●			●	●
Financial impact on facilities	●	●	●				●	●
Financial impact on practitioners				●			●	●
Infrastructure and IT	●	●					●	●
Experience with new billing codes for facilities and practitioners	●	●	●	●			●	●
Involvement/partnership with hospitals, hospices, and other agencies	●	●			●		●	●
Resident enrollment in NFI 2	●	●	●	●			●	●
Initiative successes and implementation challenges	●	●	●	●		●	●	●
Initiative sustainability, lessons learned	●	●	●	●			●	●
Shared Learning Activities								
Participation levels	●	●					●	●
Structure and activities	●	●					●	●
Impact	●	●					●	●
Initiative Impact/Consequences/Spillover Effect								
Practitioner level	●			●			●	●
Facility level	●	●	●				●	●
Resident level	●	●					●	●
Initiative Attrition								
ECCP level (characteristics, reasons)	●							●
Practitioner level (characteristics, reasons)	●	●					●	●
Facility level (characteristics, reasons)	●	●					●	●
Resident attrition	●	●					●	●
Policy Development								
Policy environment in the state, including recent health reforms	●				●	●	●	●
Other CMS demonstrations operating in the Initiative areas	●				●		●	●
ACOs that include major area hospitals/state innovation models	●				●		●	●

ACOs = Accountable Care Organizations; CMS = Centers for Medicare & Medicaid Services; ECCP = Enhanced Care and Coordination Providers; NFA = nursing facility administrator; IT= Information Technology.

We prepared a variety of materials annually to ensure that the site visits and telephone interviews provide nuanced information about Initiative implementation in the least burdensome manner possible. These materials, described in *Table A-2*, helped facilities understand our evaluation design and purpose of our data collection efforts. They also helped our data collection team select facilities for site visits and collect and summarize standardized data across site visits and telephone interviews. In addition, many of these materials were shared with CMS, ensuring that RTI and the implementation contractor coordinated project activities each year.

Table A-2.   Annual site visit and telephone interview materials

Materials	Purpose	Month Updated Annually	Recipients
Exit Interview Tracker	Tracks facility dropouts and indicates whether RTI was successful in completing an exit interview with facilities.	Throughout the project	RTI
Facility Characteristics Spreadsheet	Provides characteristics of each participating facility (e.g., ownership type, bed size, special populations, quality of care, urban/rural status, racial makeup, number of eligible residents) to guide site visit selection.	January	RTI
State Maps	Provide geographic distribution of participating facilities to guide site visit selection.	February	RTI
Site Visit Master List	Tracks CMS, SSS/T, and RTI site visits to all participating facilities across all Initiative years. Helps reduce burden on facilities by ensuring facilities are not visited multiple times within short periods.	February	CMS, SSS-T, RTI
Protocols	Require minor revisions each year to reflect new topics of interest.	February/March	CMS, SSS-T, RTI
Project Description and Confidentiality Statement	Summarizes RTI's evaluation and confidentiality procedures for interviewees. Very minor revisions required each year.	March	CMS, SSS-T, ECCPs, participating facilities
Saturation Matrix	Helps determine if telephone interview saturation has been reached. For more information, see *Section A.3.3*.	March	RTI
Telephone Interview and Site Visit Scheduling Templates	Announce upcoming data collection activities to ECCPs and facilities. Templates/scripts include: ■ Telephone interview scheduling script ■ Script to explain confidentiality procedures to interviewees ■ Email to ECCP announcing forthcoming telephone interviews ■ Email to ECCP announcing site visit dates and facility selection ■ Email to ECCP to encourage facility and Practitioner Survey engagement ■ Email to facilities to announce and schedule site visits.	March	CMS, RTI, ECCPs, participating facilities

(continued)

Table A-2.   Annual site visit and telephone interview materials (continued)

Materials	Purpose	Month Updated Annually	Recipients
Interview Debrief Documents	Guide data collection team debriefs after interviews. Includes a document that helps teams summarizing select standardized data elements across interviews (e.g., number of claims submitted by facility, number of participating practitioners, prevalence of managed care, perceived effectiveness of the Initiative).	March	RTI
Interview Checklist	Helps data collection teams ensure that all applicable primary data collection domains are covered during telephone and site visit interviews.	April/May	RTI
Interview Findings Summary	Summarizes findings by ECCP from telephone and site visit interviews. Included in annual reports and used to guide debriefs with CMS.	June–December	CMS

A.3.1   ECCP Component

During site visits, we interviewed all key staff in each ECCP, including facility-based ECCP staff in each facility we visited. For ECCPs, interview length depended on the staff type and the availability of the interviewee, with interviews ranging from 10 to 90 minutes. Data collection included overall reactions to NFI 2, implementation timetable, provider training and support, ECCP staffing changes, data collection, and detailed descriptions of the ways in which the NFI 1 clinical interventions evolved for NFI 2. We interviewed ECCP leadership regarding any supports or barriers that emerged over time; changes in leadership structure or program structure; communication pathways that developed between ECCP staff and/or facility staff; internal and external data exchanges; and infrastructure modifications for data collection and project implementation. We also learned about efforts to improve communication with providers through NFI 2, particularly in the context of the six qualifying conditions.

During the ECCP interviews we gathered information regarding perceived barriers to implementation, such as billing challenges or external concerns (e.g., growth in Medicare managed care). We also asked ECCPs about changes to policies or regulations by state, local, commercial, corporate leadership, and other entities, including hospitals, and any new challenges to accepting new practices (e.g., liability or family concerns). Other topics included data collection processes, billing and claims-related concerns (e.g., recoupment), unintended consequences of the project and related spillover effects (positive and negative), lessons learned, sustainability, and, if applicable, reasons for facilities withdrawing from the Initiative. When possible, we also interviewed ECCP partners and subcontractors.

A.3.2   Nursing Facility Component

For each ECCP, we visited three to five C+P facilities annually and three to five P-O facilities biennially. Across all years, we completed telephone interviews with a selection of facilities until saturation was reached (for more information about saturation, see **Section A.3.3**).

At each C+P facility, the site visit team conducted multiple interviews, ranging in length from 5 to 60 minutes, depending on interviewee type. Interview topics included information on identification and treatment of the six qualifying conditions, billing processes and related documentation, adjustments to intervention design, any changes to the clinical interventions, data on care transition activities, changes in policies/procedures at the facility level, training, and relationship with ECCP staff, as well as overall project successes, challenges, and lessons learned.

For P-O facilities, the team conducted multiple interviews of similar length, but focused only on the payment component: identification and treatment of the six qualifying conditions and the new billing processes. We also asked about processes and capabilities that P-O facilities had implemented to participate in NFI 2 and how well those were working, as well as overall project successes, challenges, and lessons learned.

Facility interviewees included NFAs, directors of nursing (DONs), medical directors, primary care providers (PCPs) of record, and APRNs as well as business office staff, Minimum Data Set (MDS) coordinators, and other relevant staff members involved with billing processes and NFI 2 implementation. The teams made extra effort in scheduling arrival and departure times at nursing facilities to align with practitioner schedules. Practitioners provided integral feedback regarding payment processes and treatment of residents who had the six qualifying conditions.

A.3.3   Site Visit and Telephone Interview Facility Selection

For NFI 2, we tried to visit some C+P facilities that exhibited best practices or experienced particular challenges in NFI 1, as well as facilities that were not visited during NFI 1, not interviewed by phone in recent years, or that had particular characteristics (e.g., ownership type, location, bed size, five-star rating).

For telephone interviews, we developed an approach to determine saturation. First, teams called approximately 40 to 50 percent of participating facilities in each ECCP, and following completion, the team discussed common themes heard across calls. Then teams used ECCP-specific interview saturation matrix tools to ensure that we reached a diverse sample of facilities within several domains (e.g., rural, corporate owned, small bed size, C+P vs. P-O). This matrix also included some variables from previous project years to ensure that we tracked facilities that seemed to have lower engagement or who were not reached in previous years. Our teams sought to reach at least 50 percent interview completion for facilities within each of these domains. As each matrix was customized based on specific features within that ECCP, the total number of facilities varied. For example, in an ECCP with 30 rural facilities, reaching 50 percent saturation for the rural domain

would mean speaking with at least 15 rural facilities. Another ECCP might have only two rural facilities, meaning the team would need to interview at least one of those two. Using the saturation matrix, we reached not only saturation in terms of the types of information we heard from interviewees, but also saturation across facilities to confirm that we reached enough different kinds of facilities to reduce the likelihood that there may be substantial information missed.

A.3.4   Sharing Collaborative

CMS and SSS-T (the operations support contractor) hosted Sharing Collaborative meetings and ECCP workgroup calls with all the ECCPs. During these telephone meetings, ECCP staff discussed issues of common concern, including their successes, lessons learned, barriers encountered, and other findings that may have been important for us to explore through our site visits and telephone interviews. We participated in these calls silently and tracked the key topics that were discussed. These calls occurred regularly through the early years of the Initiative and initial implementation, but by 2018, most ECCP interviewees said these were less critical; the calls largely ceased by 2019. During the COVID-19 pandemic, the ECCPs convened a series of special workgroup calls. We joined silently to learn about ECCPs' and facilities' experiences and pandemic-related challenges, as well as the extent to which COVID-19 affected NFI 2 activities.

A.3.5   Protocol Development

RTI built on our existing NFI 1 interview protocol to develop three separate protocols (ECCP leadership, P-O, and C+P) for the NFI 2 activities, adding new process- and payment-related questions. We worked closely with CMS to finalize protocols and related materials prior to conducting annual site visits and telephone interviews (e.g., recruitment materials or consent letters), as protocols were tweaked slightly for each new Initiative year to reflect new developments or changes. Per CMS guidance to pilot test our interview protocols, we conducted nursing facility telephone interviews in every ECCP prior to conducting site visits.

Our interview protocols in NFI 2 focused on exploring the role of the new payment component. Previous questions were concerned with implementation of the Initiative, relationship with the ECCP, processes for reducing avoidable hospitalizations, staff response to the Initiative, successes and challenges faced, and sustainability. Many of these issues remained, and we documented these during our interviews. Combining protocols from all Initiative years, NFI 2 interviews focused on the following topics:

- P-O facility screening and recruitment
- Readiness assessments for NFI 2
- Types of support provided by ECCPs to assist in NFI 2 implementation
- Prior and concurrent efforts to reduce avoidable hospitalizations

- Variation in work plans

- Screening and selection of practitioners

- Training of facility staff and practitioners

- Changes in facility practices related to the six qualifying conditions

- Billing and documentation processes

- Recoupment and related billing concerns

- Sustainability of Initiative components over time and plans for the future

- Technical assistance on payment processes throughout the project

- Overall experiences for C+P facilities participating in NFI 1 and NFI 2

Other questions covered ongoing participation in Sharing Collaborative and workgroup events, as well as processes for reporting key data to CMS and its contractors. Per CMS's request, we also asked about Medicare Advantage penetration, resident disenrollment from Medicare Advantage plans to participate in NFI 2, and any shifting of fee-for-service (FFS) residents to I-SNPs or other managed care. We asked about managed care attrition rates and for interviewees' opinions about the motives toward switching between NFI 2 and managed care.

A.3.6 Analyzing Site Visit and Telephone Interview Data

We used several strategies to organize and synthesize the large volume of primary data we collected. We implemented rigorous procedures for standardized notetaking and analyses during NFI 1, and we built upon those existing processes for NFI 2. All notes were formatted identically and coded by theme using NVivo software. For NFI 2, we built upon the NVivo codebook used for NFI 1 so that we could look back at how the Initiative developed across years and across ECCPs. Specific to NFI 2, we added new codes to target billing and documentation, implementation costs, effects of the six qualifying conditions on facility practice, and practitioner participation. It is important to note that we used only high-level NVivo codes to maximize efficiency. A content analysis approach was used to analyze the interview data, with codes or labels attached to portions of the interview notes. Although some labels emerged directly from the content of the interviews, others represented a priori categories reflecting the project aims. In this way, both unanticipated findings and anticipated areas of interest were captured during the coding process.

All coders underwent intensive trainings related to project structure, interview techniques, note taking, and NVivo coding. Following all initial trainings, coders were paired and asked to code identical interviews in identical NVivo databases. Coders were expected to reach a Kappa score of .75 or greater, meaning that the codes matched 75 percent of the time. Experienced NFI 2 coders also reviewed the coded output from both coders to determine how the coding differed (i.e., the content that accounted for the other 25 percent of the time). The team discussed differences and discrepancies to ensure consistency. Once coders reached a Kappa score of .75 or more, they were

then paired with a different partner coder and tested again. These cross-coding activities were repeated annually to ensure that all coders had the same intensive training to facilitate expertise with the codebook and mission of the project. Following the coding process, senior team members reviewed all coded interview text and ran queries by specific coded topics. The output was reviewed and organized across ECCPs using both NVivo and Excel to document and track key details. For detailed reports by ECCP, please see *Appendices B–G*.

A.3.7 Exit Interviews

We attempted to conduct exit interviews with facility leadership for all facilities that opted out of NFI 2 prior to the end of the Initiative. Exit interviews typically lasted about 10 minutes, and our protocol included NFI 2 successes and challenges, reasons for leaving the Initiative, and any NFI 2 components that would be sustained beyond the end of the facility's participation in the Initiative. We attempted to conduct exit interviews as close to the time of facility withdrawal as possible, and we reached out to facilities up to three times before describing them as exit interview nonrespondents.

A.3.8 Key Stakeholder Telephone Interviews

Key stakeholder interviews explored similar issues across states and built upon our NFI 1 and NFI 2 site visit findings to understand the environment in which NFI 2 was implemented. Stakeholder interviews provided data on Medicare rulemaking updates, changes in the Medicare Advantage program, association-sponsored initiatives, health provider or insurance plan efforts that are widespread, other initiatives sponsored by CMS and/or changes in individual Medicaid state plans and programs.

We conducted between 5 and 10 key stakeholder telephone interviews per ECCP state. Stakeholders included officials from state departments of health, officials from state Medicaid offices, and state leads from nursing facility associations (e.g., the American Health Care Association [AHCA], Leading Age). We drew stakeholders from a variety of other settings, and asked large health care chains, advocacy groups, state aging committees, and ACOs about their own organization's efforts to reduce hospitalizations among nursing facility residents. We also asked if they are aware of any similar efforts by other organizations. Because stakeholders came from a wide variety of organizations, questions were broad and sought to understand the state context from the perspective of the stakeholder. Seeking input from a range of stakeholders and allowing their perspectives to be the focus of the interviews allowed us to paint a complete picture of the context within each state under which the Initiative is being implemented.

We relied on existing ECCP contacts and stakeholder networks for preliminary recruitment, and we used a snowball approach to recruit additional responses (i.e., asking interviewees to recommend other potential interviewees). We developed one general interview guide with input from our

consultants, which was adapted to the needs of each state. We worked closely with CMS to finalize protocols and any related materials prior to conducting the stakeholder interviews.

A.4 Primary Data Collection Methods Changes in Response to the 2020 Public Health Emergency

In 2020, the global COVID-19 pandemic resulted in a public health emergency that threatened vulnerable older adults, particularly nursing facility residents. This situation made in-person primary data collection impossible. In January–March, prior to the formal declaration of public health emergency, our team conducted telephone interviews with over 50 percent of participating facilities across ECCPs. However, CMS and our team worked together to cancel site visits planned for April–July 2020. We pivoted from this original site visit plan, developing four alternative data collection components: policy/regulatory review, media review, ECCP Workgroup questionnaire, and final ECCP phone interviews.

A.4.1 Policy/Regulatory Review

In March 2020, we developed a policy tracker to monitor changes in federal and state policies in response to the COVID-19 pandemic that affected nursing facilities. Understanding of these changes was essential for assessing their effect on NFI 2 implementation in facilities. For federal policies, we reviewed daily CMS bulletins that provided news, guidance, and policy changes for facilities, as well as relevant guidance from other federal agencies (e.g., Centers for Disease Control). For state policies, a team member reviewed each ECCP state's Department of Health website for news, guidelines, and policy changes related to the pandemic. Our team reviewed relevant web announcements on the ECCP states' pandemic responses as well. This review process identified four categories of policy changes in response to COVID-19: distancing, workforce, burden, and patient flow. Our team shared policy findings with CMS (Ferrell & Tyler, 2020).

A.4.2 Media Review

Our team conducted a news media review for every ECCP state from March through August 2020. We developed identically structured Google Alerts for each ECCP with Boolean search strings to identify relevant news media articles. Search domains included ECCP names or acronyms, names of every participating facility, names of ECCPs/ECCP organizations, names of corporations that owned participating facilities, and names of key ECCP leaders (e.g., NFI 2 director or equivalent). From these search results, the team noted a host of key themes, including pandemic support funding, COVID-19 cases and deaths, local and corporate policies, and personal protective equipment (PPE) availability.

Additionally, teams tracked COVID-19 testing, incidence, and death counts for each participating facility, though some ECCP states provided more information publicly than others, particularly in the early months of the pandemic. These findings, documented by ECCP and date, recorded testing, diagnosis, and death rates at the facility, county, and state-levels; PPE availability; and

state reopenings. The primary data collection team utilized these findings to gain a better understanding of how participating facilities were impacted by the pandemic and at what times (i.e., differences in pandemic experience by ECCP state). This information could provide potential explanations for expected variations in 2020 data (e.g., NFI 2 facilities identified as having become exclusive COVID-19 treatment centers might be expected to have fewer NFI 2 claims during the pandemic).

A.4.3   ECCP Workgroup Questionnaire

During the pandemic, CMS facilitated Sharing Collaborative workgroup meetings with ECCP leaders, occurring every two weeks during March–June 2020. This workgroup addressed COVID-19 challenges for each ECCP. Because RTI participated in listen-only mode, our team was unable to ask direct questions. Instead, we provided CMS with a set of questions to be emailed to the ECCP program directors. These questions were as follows:

1) Which ECCPs have NFI facilities that became COVID-19-only facilities? How many?
2) Which ECCPs have NFI facilities that now have COVID-19-only wings/floors/units? How many?
3) How are facilities tracking COVID-19 cases? How are they tracking COVID-19 deaths?
4) How are the ECCPs and/or states tracking COVID-19 data for staff cases, patient cases, and patient deaths?
5) By ECCP, to what extent are facilities submitting claims for NFI 2 at this time?
6) By ECCP, how many facilities are moving into telemedicine? In what ways?
7) How are ECCP staff (e.g., ECCP nurses) supporting facilities during the emergency? What measures are they taking?

Following receipt of ECCP responses, we coded all response data to obtain a better picture of how NFI 2 activities coexisted with efforts to control the pandemic in participating nursing facilities.

A.4.4   Capstone ECCP Interviews

We conducted six, one-hour capstone telephone interviews with each ECCP individually. The interviews used largely the same protocol as in-person site visits with ECCP leaders, though we added a new question related to the pandemic. The overall goal of these interviews was to determine how the Initiative changed throughout the life of NFI 2. Key topics included ECCP perceptions of success, key challenges, and plans for long-term sustainability of Initiative components. As with our other interviews, all notes were coded in NVivo, just as they would have been if they were conducted in-person.

A.5 Survey Task Overview

RTI was responsible for the full survey life cycle, including working with CMS to develop the instruments, programming the instruments into web applications, running the data collection effort, and performing all data processing and editing of survey data.

In Initiative Years 2 and 3, we conducted two web-based surveys: the NFA Survey and the Practitioner Survey. Surveys provided standardized information from respondents in both C+P and P-O facilities. The core items in both surveys focused on the financial aspect of NFI 2, including how facilities and practitioners were paid, challenges related to billing, and attitudes toward the billing codes. The NFA Survey included more specific items concerning facility-related barriers to implementation and facility policies/procedures. The Practitioner Survey also included items on practitioner-specific barriers to billing, as well as more clinically focused items, such as confidence in facility clinical staff.

The survey instruments were designed to complement information captured from other primary data collection activities. We employed web-based data collection to ensure easy access and high response rates. We worked closely with CMS to finalize the survey instruments and were responsible for all data collection and analysis. We also identified and communicated any issues affecting sample frame design or data collection with CMS.

A.5.1 Instrument Development

Survey instrument design began in Initiative Year 2 with a review of relevant surveys, including prior NFI 1 NFA Surveys and existing surveys of providers. We narrowed the focus to domains most relevant for NFI 2 with input from team members leading site visits and telephone interviews. We obtained internal review of the survey instruments from RTI researchers with expertise in long-term care settings, health policy, and survey methods.

For the Practitioner Survey, we solicited additional feedback from consultants who had a similar background to potential respondents (i.e., practitioners). We also consulted with CMS to obtain feedback on the survey domains. Furthermore, in Initiative Year 2, we conducted cognitive testing of the Practitioner Survey by interviewing medical directors and participating practitioners from the majority of ECCPs. These practitioners provided information on the survey design, user experience , and guidance regarding item content and framing. This feedback helped reduce measurement error by ensuring the specific wording used in survey items matched the question intent.

We prioritized survey development that would minimize respondent burden. For instance, both surveys consisted primarily of closed-ended questions, with a very limited number of open-ended responses. The minimal use of open-ended items reduced response time and facilitated analysis across practitioners and facilities. Both surveys had an estimated completion time of less than 10

minutes. Furthermore, we tested the surveys on both mobile devices and tablets to ensure they were accessible and well-designed for use with any device, an especially important consideration for practitioners. Finally, to facilitate the recall of respondents who were invited to complete the survey, the timeframe used for the survey referred to the prior calendar year. For example, Wave 1, deployed in January 2018, asked NFAs and practitioners about their experiences in 2017. Farther look-back periods would have created more potential burden on respondents.

In Initiative Year 3, when updating the instruments for Wave 2, we made minimal changes to both surveys. The primary focus was on adding open-ended questions related to a new domain, the scalability of the Initiative nationwide, and any recommended changes by NFAs and practitioners.

A.5.2   Survey Frame Development

We received a complete sampling frame of NFAs from the ECCPs for all facilities, consisting of, at a minimum, the names, email addresses, and facility affiliations of potential respondents.

In Initiative Year 2, we undertook a complex sampling frame development process for the Practitioner Survey. Because participating practitioners could be affiliated with multiple facilities, our sample design allowed practitioners to complete separate surveys related to different facilities. We used two files from CMS to design the initial practitioner sample frame: (1) a list of participating practitioners from a CMS monthly roster file, and (2) a file of NFI 2-approved practitioners, including their contact information at the time of initial approval, which also had facility affiliation information. We linked contact emails/phone numbers with the current list of practitioners at the practitioner-facility level and excluded practitioners whose approval period did not overlap with the survey period as well as those affiliated with non-NFI 2 facilities.

After survey deployment, we provided multiple reminders to encourage responses. Although we automated most reminder emails, reaching out to practitioners affiliated with three or more facilities necessitated manual follow-up. To minimize the number of affiliated facilities for a given practitioner, we reviewed the case loads of practitioners working in at least three facilities and removed the affiliations that represented less than 10 percent of a practitioner's total case load. Finally, we obtained contact information for practitioners directly from the ECCPs as a final update to our data files.

During data collection, we followed up by phone and email to obtain updated contact information for any NFA or practitioner with email addresses that were undeliverable. This information was used to correct the sampling frame. In addition, we received communication via phone and email during survey follow-up from practitioners and their affiliated facilities and medical groups regarding updates to the practitioners' participation status. As a result, our sample frame decreased after removing ineligible practitioners.

In Initiative Year 3, we streamlined the development of the sampling frame by using and updating the Wave 1 frame. We updated contact information with data solicited from ECCPs, as well as information from the monthly roster of practitioners who joined during the period of the survey, 2018. In addition, we simplified the design by restricting all practitioners to one facility association.

A.5.3 Survey Administration

To increase awareness among potential respondents, we communicated with ECCPs regarding the timing of the NFA and Practitioner Surveys prior to the start of data collection. Potential respondents received hyperlinked email invitations unique to each user, removing the need for individual logins and passwords, while still ensuring survey security.

Surveys were administered by our partners in RTI's Survey Research Division and Research Computing Division using Voxco software, which provided the necessary flexibility for data collection, as well as data encryption to ensure data security. Respondents were provided with a toll-free telephone number and email contact information for any technical or content-related questions. For our case management, we used RTI's Nirvana/Symphony system to keep track of the response status of NFAs and practitioners and to send initial and follow-up email reminders.

We closely tracked response status during data collection for Initiative Year 2. We conducted targeted follow-up with respondents who had started to complete the survey but did not finish it, as well as among respondent groups with lower interim response rates (e.g., specific ECCPs or facility groups). We used a combination of reminder emails and telephone calls to follow up with NFAs and practitioners. Reminder emails were initially sent on a biweekly basis, with increased frequency closer to survey due dates.

In Initiative Year 3, we collaborated with the Research Operations Center (ROC), a within-RTI organization that included call center staff with experience contacting medical practitioners, to follow up and increase response rates. ROC staff used a CATI (computer-assisted telephone interviewing) protocol to conduct all reminder phone calls with practitioners, expanding the scope of follow-up to an average of five attempts for all cases. Our staff continued to send reminder emails for NFAs.

A.5.4 Survey Data Analysis

We conducted bivariate analysis using Wave 1 NFA and Practitioner data. Specifically, we analyzed how key practitioner and NFA characteristics (e.g., background information, attitudes toward NFI 2, level of training received) were associated with survey outcomes of interest (e.g., beliefs about whether NFI 2 made financial sense, if it reduced hospitalizations, if NFI 2 codes were easy to integrate). We also examined whether these associations differ between practitioners and NFAs. For Wave 2, we repeated these analyses and also analyzed results longitudinally to examine changes and trends over time such as shifts in attitudes toward NFI 2. For detailed reports of survey findings, please see *Appendix H*.

APPENDIX B
AQAF TELEPHONE INTERVIEW FINDINGS, INITIATIVE YEAR 4

B.1   Key Findings

Based on interviews[1] with ECCP leadership and facility staff, RTI identified the following key findings:

- *At the start of NFI 2, Clinical + Payment (C+P) facilities sustained similar levels of staff engagement as they had during NFI 1, and Payment-Only (P-O) facilities, new to NFI, reported high engagement and eagerness to participate in NFI 2. Over time, engagement has waned for both facility groups due to a host of factors, most notably the substantial growth in Medicare managed care (i.e., Alabama-based Simpra) and what C+P facility interviewees described as Initiative "fatigue," resulting from participation in both NFI 1 and NFI 2.*

- *A few C+P and P-O facility interviewees reported that their facilities experienced improved care practices, increasing communication and awareness of the six conditions within their facilities. Many interviewees said they were successful in reducing hospitalizations over the course of the Initiative. However, most felt these practices were already in place prior to NFI 2.*

- *AQAF leadership reported that although there were successes associated with the Initiative, they saw fewer changes in facility care practices and culture in NFI 2 compared to NFI 1. They attributed this lack of substantial NFI 2 effects to the intervention being optional and offering incentives, rather than penalties. AQAF leadership suggested that an initiative with two-sided risk, such as some of the CMS alternative payment models, would be more effective in encouraging facility practice change.*

- *Billing in 2020 continued to be variable across C+P and P-O facilities, with most facilities reporting fewer claims submissions in Initiative Year 4 compared to prior years. As a result of the COVID-19 pandemic, only a few facilities continued to submit NFI 2 claims; most facilities were unable to sustain NFI 2 billing while also managing pandemic priorities.*

- *Interviewees reported that practitioners submitted fewer claims in Initiative Year 4, likely also attributable to the COVID-19 pandemic. Practitioners expressed support for the overarching goal of keeping residents out of hospitals, and many were willing to certify resident conditions for facility billing, but most practitioners did not submit their own NFI 2 claims.*

- *Some facilities noted higher rates of staff turnover in Initiative Year 4 at both the staff and leadership levels. The COVID-19 pandemic created statewide staffing*

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[1] COVID-19 Note: RTI conducted Year 4 facility telephone interviews in early 2020, prior to the onset of the COVID-19 pandemic. The pandemic prevented RTI site visits to facilities or ECCPs. Instead RTI conducted ECCP telephone interviews in July, 2020. All ECCP interviewees noted that the pandemic interrupted NFI 2 activities, facility engagement, and Initiative billing through 2020. From March through the end of NFI 2 in September, ECCP staff were unable to continue their work in C+P facilities, and ECCP leaders were unable to provide in-person support to C+P or P-O facilities.

challenges for all nursing facilities, potentially eroding NFI 2 engagement even further in many facilities.

- *Similar to previous years, Medicare managed care, specifically the Alabama-based Simpra plan, continued to expand across the state, resulting in a much smaller NFI 2 eligible populations for participating facilities in both groups.*

- *Thinking about sustainability, participating facility interviewees noted that communication, both internally and with practitioners, would continue through use of INTERACT tools. Many interviewees also mentioned a continued focus on the six conditions that were prioritized in NFI 2. AQAF interviewees indicated that as a Quality Improvement Organization (QIO)[2], they would continue to encourage aspects of NFI 2, such as use of key staff in each facility spearheading efforts to maintain Initiative components, such as INTERACT tools to support communication, beyond the end of the Initiative in facilities throughout the state.*

In January and February 2020, the RTI team completed telephone interviews with facility leadership and staff in both C+P and P-O facilities. We interviewed a variety of staff at these facilities including nursing facility administrators (NFAs), directors of nursing (DONs), assistant directors of nursing (ADONs), practitioners, billing/finance coordinators, and other nursing staff. In July 2020, we interviewed ECCP leadership by telephone. **Table B-1** summarizes data collection in 2020, and **Table B-2** summarizes the telephone interview findings for facility staff buy-in and implementation.

Table B-1. AQAF 2020 data collection summary

Number of facilities participating as of January 1, 2020	39
Ownership changes since 2019 site visit	0
Facilities withdrawn or removed from Initiative since 2019 site visit	1

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[2] As of the end of NFI 2, AQAF was no longer serving as a QIO.

Table B-2.   AQAF Telephone interview summary findings: Facility staff buy-in and implementation, 2020

Topic	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone)	22	10	12
Interviewer perceptions of buy-in to NFI 2			
High	9	3	6
Medium	8	5	3
Low	5	2	3
Number of facilities that hired/contracted new staff/ increased staff hours in 2020 because of NFI 2	4	0	4
Number of facilities with resident opt-outs in 2020	2	2	0
Number of facilities reporting that NFI 2 has been effective in reducing PAHs	19	8	11

NOTE: Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing or have not trained staff on the six conditions; generally limited engagement and limited participation in NFI 2.

B.2   ECCP Activities

Based on facility and ECCP telephone interviews, there were no significant changes in ECCP activities in 2020, apart from some pandemic-associated delays to sustainability efforts. Given that we were able to complete only one ECCP leadership interview with each ECCP after the start of the COVID-19 pandemic, other pandemic activities, such as supporting COVID-19 testing in facilities, may also have occurred but were not shared during the interviews.

B.2.1   Structure and Intervention Design

C+P facilities continued to follow the 2018 CMS Programmatic Assistance Letter requirements, utilizing their part-time ECCP RNs, called Delta Nurses, to varying degrees. Many facility interviewees reported benefiting from having a Delta Nurse to assist with clinical care assessments, facility staff education, and documenting changes in condition for NFI 2 billing. A few interviewees said their Delta Nurses were assisting only with documentation and education, not clinical assessments. Some also noted turnover among Delta Nurses, which they said reduced their overall facility engagement with NFI 2.

In March 2020, at the onset of the COVID-19 pandemic, facilities closed access to nonessential staff. The C+P Delta Nurses were asked to stay away from facilities, instead finding ways to work remotely to assist with chart reviews and similar efforts. An AQAF leadership interviewee noted that, "some nurses had access to the facility [electronic health record], and others had contacts in the facility that called twice a week with a report. They were very creative in their ways to obtain

the information they needed. They [Delta Nurses] put their numbers [for NFI 2 documentation] out to facilities if any questions arose and were available to facility staff." AQAF interviewees noted that this change in process related to the pandemic also resulted in fewer NFI 2 claim submissions for most facilities.

Although P-O facilities experienced no intervention changes in Initiative Year 4, AQAF noted that most of these facilities also submitted fewer NFI 2 claims as a result of the shift in focus necessitated by the global pandemic.

B.2.2 Learning Community Activities

Similar to findings in previous years, participants in both the C+P and P-O groups reported that early in NFI 2 they participated in Learning Community activities more often, but overall engagement has been low since the second year of NFI 2. Interviewees reported not attending meetings consistently, and with the COVID-19 pandemic, most of the Initiative Year 4 Learning Community activities were canceled.

B.2.3 Intervention Tools and Other Components

All C+P and P-O facilities interviewees reported consistent use of INTERACT, with many specifically citing Stop and Watch and SBAR as the most frequently utilized tools. Many of these facilities have integrated the INTERACT tool suite into their onboarding and training processes for newly hired staff members. As in prior years, interviewees noted use of INTERACT tools facility-wide, not specific to NFI 2-eligible residents.

B.3 NFI 2 Engagement

As in previous Initiative years, C+P and P-O facility staff engagement varied, though engagement was notably lower in Initiative Year 4 compared to prior years.

B.3.1 Residents and Families

The majority of facilities in both the C+P and P-O groups reported that no residents had opted out of the Initiative. Many of the interviewees shared that residents and families were aware of the Initiative or knew the facility endeavored to treat residents in-house. Of the little feedback that facilities have received from residents and families, most noted that families liked that their loved one could be treated in-house instead of having to go to the hospital. However, a few interviewees noted that there are still families that insist on their residents being sent to the hospital for all condition changes, regardless of whether the facility has the capability to treat the condition in-house.

B.3.2 Facility Staff

Most interviewees in both the C+P and P-O groups stated that facility staff were used to the Initiative, particularly INTERACT and the focus on the six conditions. However, a few interviewees

noted that some staff remained unengaged, saying NFI 2 is "just more paperwork." Some interviewees also noted that their engagement has declined in recent months, as they have grown fatigued with the NFI 2 documentation.

Most interviewees also noted that they neither changed their hiring practices nor hired any new staff specifically for the Initiative. A few facilities added advanced practice registered nurses (APRNs), but these staff typically supported both NFI 2 and other facility care. Many facilities also indicated that INTERACT tools training and communication about the six conditions were added to their new staff orientation trainings.

As in previous years, facility staff and leadership turnover continued to be a challenge for facilities across both the C+P and P-O groups, and, consequently, facilities were constantly educating and reeducating staff on the Initiative. Particularly with the COVID-19 pandemic, AQAF leadership described unprecedented high rates of turnover and facility staffing challenges that created substantial disruptions for all participating NFI 2 facilities.

B.3.3   Practitioners

Practitioner engagement also remained variable across facilities. No physicians withdrew from participating in the Initiative, and most interviewees said their practitioners understood and supported the Initiative's goal of treating residents in the facility and reducing hospitalization rates. A few interviewees noted improvement in practitioner engagement over time, with one C+P DON saying, "One [physician] was on the edge but has gotten a lot better about it. They know how it goes. It was an issue in the beginning to get them involved." Most interviewees also said the Initiative improved communication between practitioners and the nursing facility staff.

In addition to physicians, nearly all interviewees reported having at least one non-AQAF nurse practitioner taking care of residents. Most nurse practitioners were provided to facilities through a corporate office, Medicare managed care plan (e.g., Simpra), or in partnership with the facility's attending physicians. Facilities also noted that the nurse practitioners generally were in the facility more often compared to the physicians and tended to certify conditions for the Initiative most often. This nurse practitioner presence has increased substantially during the Initiative, where in NFI 1 and early NFI 2 very few facilities had nurse practitioners, now nearly all facilities have at least one who visits the facility regularly, often several times each week or full-time on weekdays. AQAF also provided access to nurse practitioners during evenings and weekends, though most facilities reported that they call their daytime practitioners with concerns, even outside regular workday hours, rather than calling the AQAF nurse practitioners. Some facility interviewees were unaware that AQAF might provide access to nurse practitioners during off-hours.

B.3.4   Other Facility Factors

Medicare managed care continued to expand its presence statewide, particularly Simpra being present in the majority of participating NFI 2 facilities (described in Section 6.2 of this report).

Simpra penetration in facilities led to fewer eligible NFI 2 residents, and to a much lesser degree, interviewees also said HealthCare's Optum also reduced the number of eligible NFI 2 residents.

Hospice use remained low in many participating NFI 2 facilities and did not have an effect on their Initiative-eligible resident populations.

B.4 Facility and Practitioner Billing

Most C+P and P-O interviewees reported low facility and practitioner billing. Most facility interviewees were uncertain about the extent of practitioner billing. The already-low billing frequency that interviewees described for both C+P and P-O facilities in Initiative Year 4 was reduced substantially as a result of COVID-19. AQAF leadership interviewees stated that few facilities continued to bill for NFI 2, adding that NFI 2 was not a priority for the majority of facilities during the pandemic.

B.4.1 ECCP Tools & Support

AQAF continued to provide scorecard quality reports to facilities for NFI 2, though it is uncertain whether this activity continued during the pandemic. According to facility interviewees, these reports essentially provided a "dashboard" of information, including rehospitalization rates, number of eligible residents, any missed billing opportunities, and other data to demonstrate how the facility is doing overall with the Initiative. Most interviewees said they appreciated these reports from AQAF and noted that they often review these reports in staff meetings to discuss opportunities for facility improvement.

B.4.2 Facility Billing & Recoupment

As noted, across both C+P and P-O facilities, many facilities reported relatively few NFI 2 claims submissions, even apart from the COVID-19 pandemic. Facility interviewees who were not billing or only rarely billing said they had too few eligible residents and often lacked the required NFI 2 documentation to submit claims. Some facilities also felt that Initiative billing was unattainable because of high staff turnover and a constant need to retrain nurses to document for NFI 2.

The few interviewees who noted successful claim submissions and payment during NFI 2 lauded the additional financial resources available to purchase facility equipment and meet related needs. Key purchases included electronic vital sign machines; EKG machines; mannequins for staff training; new electric beds; vein finders; bladder scanners; dopplers; lab equipment; and new building amenities, such as a new outdoor patio furniture for resident use or new community room amenities. In Initiative Year 4, several facilities that had submitted NFI 2 claims remained unaware of NFI 2 payment receipt because their corporate offices handled all billing processes and did not disburse payments back to the facilities.

Unlike in prior Initiative years, recoupment was not a major concern among facilities. Most interviewees reported they had not experienced any issues with audits or recoupment. Among the few interviewees that mentioned recoupment, they noted only very small sums recouped. These amounts were not described as burdensome.

B.4.3 Practitioner Billing & Recoupment

Most interviewees felt like their practitioners had been able to bill for the Initiative, but they did so very infrequently. A few interviewees noted that practitioners had shared they were happy to certify conditions for facility billing but said that their own claims payout amount was not worth the documentation effort.

B.5 Success and Challenges

As in prior years, C+P and P-O facilities appreciated INTERACT tools to improve facility communication, support early identification of resident changes in condition, and document those resident changes.

B.5.1 Most Successful Intervention Components or Tools

Interviewees from both C+P and P-O facilities said that the INTERACT tools were the most valuable aspect of the Initiative, especially SBAR, Stop and Watch, and Care Pathways. These tools helped improve facility communication and served as a formal resource to support early identification and documentation of resident changes in condition. Similarly, interviewees appreciated the NFI 2 focus on reducing hospital transfers and keeping residents in the facility for care by prioritizing the six conditions.

B.5.2 Most Challenging Intervention Components or Tools

Most facility interviewees shared few Initiative concerns, apart from the intervention change in 2018. C+P facility interviewees disliked the intervention change from full-time to part-time AQAF Delta Nurses. Similarly, some P-O interviewees felt that AQAF prioritized C+P facilities during the intervention transition, leaving less support for P-O facilities. P-O facilities also voiced frustration that C+P facilities received AQAF Delta Nurse support, whereas P-O facilities relied only on their facility staff to implement and maintain NFI 2 efforts. Some of these facility interviewees described NFI 2 billing challenges as a result of relying on already-busy facility staff.

Some C+P and P-O facility interviewees also mentioned the CMS change in NFI 2 clinical criteria as an ongoing barrier to billing. These changes, which took effect in 2019, made some condition criteria more stringent (e.g., removing the "altered mental state" criterion from urinary tract infection [UTI]) and harder for residents to qualify for NFI 2 billing. Interviewees noted that these changes resulted in fewer NFI 2 billing opportunities.

B.6   Avoidable Hospitalizations

Most C+P and P-O facility interviewees reported that they felt NFI 2 has been effective in reducing avoidable hospitalizations for facility residents.

B.6.1   Perceived Effectiveness of the Initiative

As in the prior Initiative year, most facility interviewees stated that the Initiative was effective in reducing potentially avoidable hospitalizations, and they attributed this reduction to increased staff awareness of resident condition changes and improved facility capabilities to treat residents in-house. However, some interviewees, particularly from P-O facilities, noted that this focus on keeping residents in their facilities for care had been established prior to NFI 2.

The few facility interviewees who reported little to no impact of NFI 2 on avoidable hospitalization rates explained that they had high acuity patient populations with many comorbidities. They felt these patients warranted hospital care for many exacerbations, reducing the potential facility benefit of an Initiative that rewards low hospitalization rates.

AQAF leadership interviewees reported that despite some successes with the Initiative, overall culture and practice in the majority of facilities remained unchanged in NFI 2. One interviewee shared, "I think with some additional tweaks that bring greater credibility and investment from the homes themselves, ownership groups, and corporations, that's when you'll see changes." AQAF leaders hoped for an additional demonstration opportunity or new Initiative that might expand engagement to these other stakeholders.

B.6.2   New Reports of Spillover and Contamination Effects

There were no changes to spillover or contamination in Initiative Year 4. The majority of C+P and P-O facilities still reported that all facility residents were treated the same (i.e., use of INTERACT tools, facility communication practices, focus on the six conditions), regardless of resident eligibility for NFI 2.

B.7   Updates to Policies & External Stakeholders

Continuing from 2019, hospitals remained largely unengaged in the Initiative, and Medicare managed care, especially Simpra, grew substantially.

B.7.1   Hospital Engagement

Facility interviewees reported low hospital engagement with NFI 2. A few facilities shared staff (e.g., Medical Director) with their local hospitals, which interviewees said was helpful in improving hospital awareness of NFI 2 efforts. However, many facility interviewees, particularly P-O, indicated that hospitals remained largely unaware of NFI 2. Despite low hospital awareness of NFI 2, interviewees noted the hospital priority of reducing rehospitalization rates. One C+P

administrator shared, "There is not a single hospital around here that is not aware of [rehospitalizations] and trying to do the same thing [as NFI 2] on some level." As far as the specifics of NFI 2, most interviewees indicated that local hospitals do not play a role in NFI 2.

B.7.2   Competing or Similar Initiatives

The prevalence of Medicare managed care, specifically Simpra, grew through this Initiative year, with almost every telephone interviewee mentioning this managed care plan. Simpra, an Alabama-based Medicare managed care plan owned by a consortium of nursing facility corporations in the state, launched in 2019 and continued enrolling residents through 2020. Facility interviewees shared that Simpra's structure and requirements were very similar to AQAF NFI 2, even including the focus on the six conditions. Although in 2019 facility interviewees mentioned that Simpra's reimbursement rates were lower than the NFI 2 amount, 2020 interviewees said the Simpra billing rates matched what facilities could bill under NFI 2.

Simpra recruited numerous residents from AQAF C+P and P-O facilities, resulting in substantial decreases in the number of eligible NFI 2 residents remaining in those facilities. One P-O administrator shared, "Almost all of our residents have signed up with [Simpra]." A C+P administrator shared a similar message, "Our [NFI 2 eligible resident] rate has not been good this year, but I feel that's mainly due to Simpra. We've not had as many [residents] for the Initiative in the last year compared to the year before." Several facility interviewees indicated that their NFI 2 eligible populations had dropped by more than 50 percent since Simpra began enrolling their residents. A few interviewees said that Medicare managed care residents occasionally returned to fee-for-service Medicare; one P-O administrator shared, "I know two particular residents disenrolled from Simpra and went back to traditional Medicare because of payment issues." However, interviewees said it was rare for residents to switch away from Medicare managed care.

Reporting on other efforts similar to NFI 2, a P-O facility administrator added, "We did participate in a Florida Atlantic University (FAU) study to reduce hospitalizations. That was maybe 1-1.5 years ago. They gave us a pamphlet that you hand out before admission and go over during the conference with the resident and family. It's called 'Go to the Hospital or Stay Here?'" The RTI team explored this project via web search and attempted to reach FAU staff to learn more about the project and how facilities were selected to participate, but FAU did not respond for comment. No other facility interviewees mentioned this study, though given our inability to reach FAU staff to confirm facility participation, it may be possible that other AQAF facilities also engaged in this FAU effort.

B.8   Initiative Sustainability and Plans for the Future

C+P and P-O facilities indicated that the lasting effects of NFI 2 will be communication tools and staff education for early identification of changes in condition. AQAF planned to support these efforts with ongoing trainings and education.

B.8.1 ECCP's Plans

Concerning sustainability, AQAF had several plans focusing on facility education beyond NFI 2. They wanted each facility to designate a champion who could encourage continued engagement with key aspects of the Initiative, such as facility-wide communication using INTERACT tools. AQAF planned to provide intensive in-person sustainability champion training for key staff members from all C+P and P-O facilities. However, the COVID-19 pandemic delayed deployment of these trainings. AQAF pursued a 6-month, no-cost NFI 2 extension from CMS to provide sustainability training beyond the original end of the Initiative. AQAF leadership felt this extension would allow training to be provided in-person after the pandemic or would allow time to develop virtual training sessions.

Broadly, AQAF, as a QIO, continued to encourage the overarching goals of NFI 1 and 2 for facilities statewide. Throughout the Initiative, members of the AQAF team have presented at state events (e.g., nursing home association meetings) about the benefits of improving nursing facility and practitioner communication and prioritizing on-site nursing facility care. Those conversations will continue beyond the end of the Initiative, particularly if facilities face hospital admission penalties like those imposed on hospitals for readmissions.

AQAF leadership interviewees noted that these sorts of nursing facility hospitalization penalties might be more effective than the NFI 2 payment incentive. As one interviewee noted of NFI 2, "You have to make [nursing facility hospitalizations] punitive. That's what's working now with the [hospital] 30-day admissions rate. Once [hospital readmissions] became punitive, people started focusing on it more. Once it became part of the survey process, they jumped on it." Another AQAF interviewee added, "In Alabama lots of the nursing homes revolve around the state survey agency. The main purpose is to get through that survey. If [Initiative] had that kind of pull, we could have made bigger strides." From these statements, broader sustainability of NFI 2 goals could be achieved through CMS enforcing new financial penalties, rather than NFI-2 style incentives. Likewise, if reducing facility resident hospitalizations were tied to survey performance, facilities might be more likely to engage fully.

B.8.2 Facility Plans

Across both C+P and P-O facilities, interviewees shared that the communication tools (i.e., INTERACT), particularly SBAR and Stop and Watch, were the most lasting effect of the Initiative. Likewise, interviewees said their facilities would continue to educate staff on early identification of changes in condition, with particular attention to the six NFI 2 conditions. A C+P administrator shared, "Our plan is to continue on whether the Initiative is in place or not. We will continue to educate." Interviewees across both facility groups described similar efforts to maintain staff education, early identification, and strong facility communication.

Several facilities that added APRNs also noted that the presence of an on-site practitioner has been very effective toward treating changes of conditions quickly, though most of these APRNs treated residents facility-wide, not just NFI 2 eligible residents.

Several C+P and P-O facility interviewees explained that the NFI 2 goals align with what they perceived as new trends in nursing facility care, which will make sustaining NFI 2 components easier over time. As one P-O administrator shared, "It's just hard to keep track what is AQAF and what is related to industry changes." The overarching perception from many interviewees was that NFI 2 supported efforts that were already in place in facilities. Another administrator explained that NFI 2 is "common sense," sharing, "If we keep sending residents to the hospital, it makes it look like we can't take care of them and can't do our jobs." Interviewees said that the Initiative was well-timed to align with perceived changes in nursing facility policy, both within Alabama and nationally.

B.9   Conclusion

Across all years of NFI 2, interviewees said the most successful Initiative components in AQAF facilities were INTERACT tools and associated training to improve facility-wide communication, as well as training and care related to the six NFI 2 conditions. These components would be sustained, with ongoing support from AQAF when possible during the global pandemic. Although interviewees largely were not engaged in NFI 2 billing to the extent that CMS designed and expected, interviewees expressed appreciation for the underlying goal of reducing hospitalizations. Instead, some interviewees recommended more of a risk-based intervention for reducing facility–hospital transmissions, noting that a punitive structure would be more successful than the NFI 2 financial incentive design.

APPENDIX C
ATOP2 TELEPHONE INTERVIEW FINDINGS, INITIATIVE YEAR 4

C.1   Key Findings

Based on interviews[3] with ECCP leadership and facility staff, RTI identified the following key findings:

- *Although Payment-Only (P-O) facilities were still much less engaged with the Initiative than Clinical + Payment (C+P) facilities, leadership awareness of the Initiative among that group seems to have improved in the last year. Unlike past years, leaders in P-O facilities were able to speak about the goals of the Initiative and discussed steps they would need to take to achieve those goals.*

- *The ECCP continued to move facility-based ECCP nursing staff away from a direct care role, and most C+P facility leadership reported having assigned a facility staff member to serve as Initiative champion. These champions were carrying out many Initiative-related tasks, such as entering data into the ATOP2 portal, maintaining the roster of eligible residents, billing, and promoting sustainability. ECCP leadership also expected P-O facilities to identify a staff member to serve as champion and this had happened in some cases.*

- *Practitioner buy-in of the Initiative continued to be the most consistent challenge among both C+P and P-O facilities. Many facilities reported having missed opportunities to bill under the Initiative due to either an inability to get practitioners to see residents during the specified NFI 2 timeframe to certify resident conditions for NFI 2 or because of missing practitioner documentation.*

- *Facility billing varied widely across both types of facilities with some facilities submitting several claims each month and others going months without submitting any claims. More P-O facilities were not submitting claims than those that were C+P. Low billing often resulted from low practitioner and staff buy-in to the Initiative and high facility leadership turnover.*

- *Most C+P and P-O facility leaders believed that the Initiative helped to reduce hospitalizations and expressed hope that NFI 2 would continue. Several facility leaders from both groups reported plans to continue using the SBAR after the Initiative ended and a desire to maintain the improved communication achieved under the Initiative.*

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[3] COVID-19 Note: RTI conducted Year 4 facility telephone interviews in early 2020, prior to the onset of the COVID-19 pandemic. The pandemic prevented RTI site visits to facilities or ECCPs. Instead RTI conducted ECCP telephone interviews in July, 2020. All ECCP interviewees noted that the pandemic interrupted NFI 2 activities, facility engagement, and Initiative billing through 2020. From March through the end of NFI 2 in September, ECCP staff were unable to continue their work in C+P facilities, and ECCP leaders were unable to provide in-person support to C+P or P-O facilities.

In January and February 2020, the RTI team completed telephone interviews with facility leadership and staff in both C+P and P-O facilities. We interviewed a variety of staff at these facilities including nursing facility administrators (NFAs), directors of nursing (DONs), assistant directors of nursing (ADONs), practitioners, billing/finance coordinators, and other nursing staff. *Table C-1* summarizes data collection in 2020, and Table C-2 summarizes the telephone interview findings for facility staff buy-in and implementation. *Table C-2* summarizes the telephone interview findings for facility staff buy-in and implementation.

Table C-1.   ATOP2 2020 data collection summary

Number of facilities participating as of January 1, 2020	34
Ownership changes since 2019 site visit	0
Facilities withdrawn or removed from Initiative since 2019 site visit	0

Table C-2.   ATOP2 Telephone interview summary findings: Facility staff buy-in and implementation, 2020

Topic	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone)	22	7	15
Interviewer perceptions of buy-in to NFI 2			
High	7	2	5
Medium	11	5	6
Low	4	0	4
Number of facilities that hired/contracted new staff/increased staff hours in 2020 because of NFI 2	1	1	0
Number of facilities with resident opt-outs in 2020	6	3	3
Number of facilities reporting that NFI 2 has been effective in reducing PAHs	17	7	10

NOTE: Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing or have not trained staff on the six conditions; generally limited engagement and limited participation in NFI 2.

C.2   ECCP Activities

In Initiative Year 4, the ECCP continued to emphasize Initiative sustainability for participating facilities across both groups. Although there were no major ECCP intervention changes this year, facility interviewees, regardless of group, reported continued adoption of a facility-based staff member to serve as ATOP2 champion and drive Initiative activities and sustainability. ATOP2 champions were introduced by the ECCP in 2019 and were expected to promote Initiative sustainability in C+P and P-O facilities. However, these sustainability efforts were greatly hindered by the pandemic.

C.2.1 Structure and Intervention Design

The 2018 merger between HealthInsight and Qualis Health (forming Comagine Health) continued to have no major effects on ATOP2 implementation. Most P-O and C+P facilities reported that their assigned facility staff ATOP2 champions continued to take greater responsibility for the Initiative in Initiative Year 4. These champions were carrying out many Initiative-related tasks, such as entering data into the ATOP2 portal, maintaining the roster of eligible residents, and billing. In C+P facilities, where ECCP nursing staff were once the drivers of the Initiative, facility staff reported that the ECCP continued to move facility-based ECCP nursing staff away from a clinical care role. Speaking about this transition of responsibilities away from ECCP nursing staff to facility champions, one C+P administrator shared, "*I think early on [ECCP nurses] were very hands on. I don't think it's fair to say [they are] hands off now, but in the beginning, they were in there side by side with floor nurses documenting the changes in condition and teaching them how to document. When we hired the champion [to replace another staff member] about a year ago, she took on that role. A lot of the time [ECCP nurses] would be on the floor doing assessments, but now they are coaching [existing facility staff].*"

C.2.2 Learning Community Activities

In Initiative Year 4, ATOP2 leadership and staff in both C+P and P-O facilities reported modifications to Learning Community activities. Specifically, these changes included more targeted ATOP2-related webinars, focusing on infection control and behavioral health topics; implementation of "champion calls;" and a reduction to the number of in-person collaboratives. ATOP2 leadership reported that the changes to the Learning Community format and scheduled times/days were an attempt to get better participation from nursing facilities. However, when asked about their participation in Learning Community activities this year, few nursing facility (NF) interviewees across both groups reported that facility staff were attending. Those who had attended reported that Learning Community activities helped reinforce already existing processes, such as *"strengthening [the] use of the SBAR and Stop and Watch",* according to one C+P DON. Outside of strengthening existing ATOP2 processes, no interviewees reported instituting anything new as a result of Learning Community participation. As summed-up by one P-O administrator, *"I wouldn't say [we've] adopted [anything] new, but maybe we've modified processes based off of others' best practices shared in [Learning Community activities]."*

C.2.3 Intervention Tools and Other Components

When asked about ATOP2 tool usage in Year 4, NFs across both groups reported that they were still using intervention tools but no more and no less than they had been using them in prior Initiative years.

C.3   NFI 2 Engagement

There were no major developments in Initiative engagement among residents and families, facility staff, or practitioners. As in prior Initiative years, facility staff and practitioner engagement varied widely across both C+P and P-O facilities. During interviews with ATOP2 leadership in Initiative Year 3, the ECCP shared that they would begin readiness assessments with P-O facilities in fall 2019 to determine facilities' ability to sustain elements of the Initiative after its end. The ECCP developed a readiness checklist to ascertain such things as whether ATOP2 components are part of staff training and if the facility uses root cause analysis for hospitalizations, for example. Accordingly, ATOP2 leadership expected that engagement in P-O facilities should improve following that assessment process, as it did with the C+P facilities. During Year 4 interviews, P-O facility staff did not seem widely aware of those ongoing readiness assessments, but leadership awareness of the Initiative among that group seemed to have improved from prior years.

C.3.1   Residents and Families

Across both facility groups, participating facility interviewees reported that resident opt-outs were rare, and that residents and families remained relatively unaware of the Initiative. Similar to what was heard in the prior year, interviewed NF staff across both groups still agreed that family engagement and education were crucial to reducing avoidable hospitalizations, and that lack of either can be a challenge. As shared by a P-O administrator, *"it comes down to family preference a lot of times. It's tricky to argue [for residents] staying here . . . if it's an iffy situation and family is worried about a decline, we'll send them to the hospital because we don't want to be on the other side of that."* This sentiment, that facility staff do not feel positioned to dissuade family members from insisting on hospitalization, was frequently heard among interviewed facility staff in both groups.

C.3.2   Facility Staff

In Initiative Year 4, facilities in both groups reported that staff engagement remained relatively unchanged, with C+P facilities still demonstrating greater staff engagement than P-O facilities. In Year 3, there were a few facilities that reported adding hours for existing facility staff members to cover Initiative responsibilities. In comparison, only one additional C+P facility reported similarly increasing hours this year—sharing that they had restructured the role of their staff development coordinator so that it was more aligned with ATOP2 responsibilities. Speaking to the changing Initiative roles of facility staff over the years, one C+P administrator explained, *"when I started, it was more relying heavily on the Comagine team to do a lot of the legwork frankly with the support of the [ECCP clinicians]. Now, it has definitely flipped. I think that's how it was supposed to work. They showed us how to do it and then we do it."* These additional ATOP2-specific responsibilities were consistent with the ECCP's continued push for facility staff to take greater ownership of the Initiative in their facilities.

One challenge that ATOP2 leadership noted regarding facility staff engagement was turnover of NF leadership. The ECCP reported that they "*were always on top of those changes, though, and the minute it happened we were on it training new people [on ATOP2].*"

C.3.3 Practitioners

No facilities reported hiring new practitioners for ATOP2. ATOP2 leadership and many facilities, especially in the P-O group, reported that practitioner engagement remained an ongoing challenge. This was despite ECCP efforts in 2019 to promote practitioner engagement and billing among both groups of facilities through several initiatives such as surveys designed to understand key challenges and creating mobile-friendly pocket guides with Initiative information for easy reference. Speaking to the lack of practitioner engagement, one P-O administrator shared efforts to retain buy-in from their practitioner groups, commenting that even after "*visiting twice and presenting the Initiative, [practitioners] never really initiated anything.*" In the few facilities with engaged practitioners, facility staff spoke to the myriad benefits having come from making progress with practitioner engagement over the years. One P-O administrator shared that after having a physician group "*come aboard the Initiative*" last year, "*other practitioners also jumped on board*", and since then, practitioners have been "*instrumental in not sending [residents] out.*"

C.3.4 Other Facility Factors

No facilities reported major changes to their capabilities or clinical focus. Additionally, there was no mention of changes or upgrades to the health IT or clinical software facilities were using to support ATOP2 activities.

C.4 Facility and Practitioner Billing

In Year 4, there were no major developments in facility and practitioner billing. As in prior Initiative years, there was little practitioner billing and no reported practitioner recoupment. Although C+P and P-O facilities received recoupment notices in June 2019 following an audit by the implementation contractor, few facilities shared recent experiences with recoupment in 2020.

C.4.1 ECCP Tools & Support

Interviewees in C+P and P-O facilities did not share any notable changes regarding ECCP tools and supports. However, when probed about the digital tools that ATOP2 leadership created in 2019 to assist with identifying eligible residents and determining billing eligibility as part of the ATOP2 web portal registry, several interviewees across both facility groups spoke positively of the web portal's new features. As expressed by one P-O health information manager, "*[we] love the clinical new billing pop-up. I can set up each day exactly and have the triple check process making sure each claim is clean and good to go.*"

C.4.2 Facility Billing & Recoupment

Interviewed staff reported no major changes in billing this year. Regardless of group, there are still some facilities that submit a few claims each month, and others that submit just a few claims all year. Though a handful of facility staff in both groups mentioned recoupment experiences, few, if any, indicated that recoupment was collected in Year 4. Speaking to recoupment, however, one P-O administrator lamented a prior experience where the facility reportedly *"did all the work to submit the [one and only] claim and then the money was taken back."* Though this administrator was referring to a NFI 2 recoupment experience in the past, this one instance impacted their current billing proclivity, *"making [them] a little gun-shy to do all that work [to bill] again."*

In describing NF experiences with recoupment, ATOP2 leadership acknowledged that ECCP staff had been more worried about NF reaction to recoupment than was warranted. They added that NFs "*thought of it as an opportunity to learn from mistakes, but were upset, especially in the P-O group when recoupment notices came years after the fact and by that time the mistakes were already corrected, and it wasn't a beneficial learning experience for them.*"

C.4.3 Practitioner Billing & Recoupment

Consistent with previous Initiative years, most staff interviewed across both facility groups were unaware of whether practitioners were billing, though some reported practitioners were billing, and others reported they were not. Despite a lack of uptake in billing for their own purposes, some practitioners were still certifying for facility billing. As explained by a P-O administrator, *"physicians are certifying our people [and] doing what they need to do for us to meet ATOP documentation, they just aren't billing [for themselves]."* There were no reports of practitioners having ATOP2 payments recouped or audited by CMS.

C.5 Success and Challenges

Facility staff reported that a change in mindset was the most beneficial component of the Initiative. Rather than being reactive to residents' declining health, staff reportedly felt more capable of proactively identifying and addressing early changes in condition. A few P-O facilities also reported improved relationships with their providers, though most facilities highlighted low provider engagement as a key challenge.

C.5.1 Most Successful Intervention Components or Tools

C+P and P-O facility staff reported that the Initiative's greatest success was raising awareness of changes in condition and treating in place. Across facilities, staff were more alert to small changes and felt more empowered to keep residents in the building. As one C+P ADON described, "*Nurses are better at assessing and trying to see little changes in condition. They don't always equate it to an ATOP patient or ATOP billable event, but I think they try to assess better.*" In C+P facilities, staff partially credited increased awareness to the ATOP2 nurses, who provide an additional set of eyes

and encourage facility staff to identify changes in condition. Facility staff established as C+P champions were also able to encourage other facility staff directly, and some described these staff as being more valuable than the ECCP embedded staff. One C+P administrator shared that the facility staff champions have "*a definite advantage when the person taking point is in-house and wears the same badge as everyone.*" Some P-O facilities also reported that their ATOP2 champions helped support increased awareness. Better overall communication, however, was most frequently cited as the change agent in P-O facilities. As in previous years, INTERACT tools were widely used to document changes in condition.

ATOP2 leadership reported that the ECCP nurse was the most successful component of the intervention saying, "*having nurses on site and having a direct support role was much more beneficial and led to higher engagement overall.*" However, it was also acknowledged that on-site support could create problems when NF staff relied too much on ECCP staff for implementing the Initiative. ATOP2 leadership planned that the facility-based staff champion intervention would transition Initiative efforts in C+P facilities away from those ECCP on-site nurses to facility staff, thus facilitating sustainability of some intervention components.

C.5.2 Most Challenging Intervention Components or Tools

Facility staff and ATOP2 leadership identified low practitioner engagement as the most common and severe challenge. As in previous years, both C+P and P-O facilities struggled to coordinate practitioner assessments within the time constraint for facility NFI 2 billing. Several reported "*missed opportunities… just because we didn't have a practitioner that could see the patient in a timely manner.*" Facility staff largely could not explain the barriers to practitioner involvement. A few stated that practitioners simply maintained their previous patterns and schedules, which did not allow for additional facility visits to confirm resident changes of condition for NFI 2. Some rural facilities reported on-call practitioners were unwilling to travel to assess changes in condition. In addition, even when practitioners were able to assess residents in person, they did not always complete proper documentation.

P-O facilities reported additional challenges ensuring staff buy-in and billing sufficient cases to justify involvement in the Initiative. Leadership conveyed a consistent need to "*reeducate and remind*" staff of the Initiative. Facility staff reported challenges remembering and applying the Initiative-specific clinical criteria. Some billing departments also found the calculations for ATOP2-covered days difficult to complete accurately. In some facilities, these challenges were underscored by the small number of eligible residents, few qualifying changes in condition, and limited opportunity to apply knowledge of the Initiative. Importantly, many of these P-O facilities still reported increased monitoring of changes in condition, even if they were not submitting NFI 2 claims.

C.6   Avoidable Hospitalizations

As in previous years, facility staff believed that the Initiative, in conjunction with other efforts, was having an impact on hospitalizations.

C.6.1   Perceived Effectiveness of the Initiative

Almost all C+P and P-O facility interviewees said they felt that the Initiative had reduced hospitalizations in their facilities, though few could share exact data. Facility staff cited increased communication and vigilance in identifying changes in condition as powerful tools to reduce hospitalizations. In many cases, however, the Initiative was only one piece in facilities' larger efforts to address resident transfers. Facilities viewed ATOP2 as a supplement to their own attempts to reduce hospitalizations for their short- and long-stay populations. They also described ATOP2 as complimentary to other initiatives with similar goals, such as Medicare managed care products. In these facilities, ATOP2 helped bring early identification and treating residents in-house to the forefront of staff minds and allowed them to receive credit for their work to reduce hospitalizations.

In contrast to facility interviewees' perceptions of NFI 2 hospitalization reductions, ECCP leadership stated that NFI 2 had likely not resulted in lower rates of hospitalization among C+P facilities than had already been achieved during NFI 1. As one ECCP interviewee said, "*I don't think payment reform components drove down readmissions rates, but it helped Nevada facilities to stabilize.*" Similarly, most ATOP2 P-O facilities already had low hospitalization rates overall, even prior to NFI 2, making additional reductions difficult.

C.6.2   5.2 New Reports of Spillover and Contamination Effects

There were no new reports of spillover or contamination. As in prior years, most facilities apply aspects of NFI 2, such as use of INTERACT or similar tools to enhance communication or a focus on the six conditions, building wide. Residents who are not eligible for the Initiative still benefit from these facility efforts.

C.7   Updates to Policies & External Stakeholders

Hospitals remained largely unaware of the Initiative, and facility staff rarely discussed their involvement with hospital representatives. No new initiatives were reported, though Medicare managed care remains pervasive, particularly for P-O facilities.

C.7.1   Hospital Engagement

As in previous years, most facility staff reported that hospitals were unaware of the Initiative. Two facilities with strong hospital partnerships had discussed their involvement in ATOP2, reporting that hospitals were happy to see facilities going *"above and beyond"* to reduce hospitalizations. No

facility staff reported that the Initiative had changed their relationships with hospitals, and no hospitals were actively engaged in the Initiative for either facility group.

C.7.2 Competing or Similar Initiatives

Medicare managed care continued to have a growing presence in C+P and P-O facilities. However, this growth was more pronounced in P-O facilities, where several interviewees said that increased managed care had continued to erode their Initiative-eligible residents. To help quantify this reduction in ATOP2-eligible residents, one P-O administrator shared, *"one thing that's significantly changed [and] greatly affected the ATOP program is that we use Optum Medicare [plan] for residents. That's probably tripled since we began ATOP, so our eligible number [of NFI 2 residents] decreases every quarter."* We also learned that in at least a few facilities across both groups, a growing hospice population over the years contributed to a slight decrease in these facilities' ATOP2 eligible populations.

C.8 Initiative Sustainability and Plans for the Future

One focus of the ECCP during 2019 and 2020 was on increasing the capacity for facilities across both groups to sustain Initiative activities beyond the end of ATOP2.

C.8.1 ECCP's Plans

In spring 2019, the ECCP instituted a process to assess the sustainability of ATOP2 in each C+P facility. As part of this process, a champion and a team in each facility were expected to take complete responsibility for all Initiative activities, thereby decreasing facility reliance on the ECCP nurses. The ECCP planned to introduce this same champion structure in the P-O facilities in fall 2019.

When speaking to C+P NFs in early 2020, it was clear that this process was still in place. Most facility leadership interviewees reported having a champion in place and no longer relying on ECCP nurses. For example, one administrator said, "*[What] we've done really is that we had a staff development person. We had two of those. We changed how their position is structured so that they more align with ATOP2."* Other C+P leaders similarly reported assigning a champion and restructuring staff roles, if necessary, for this purpose. We also heard a few similar reports from the P-O NFs, though the champions in those facilities were spearheading NFI 2 efforts (e.g., tracking hospitalizations) in absence of any ECCP nurse support.

ATOP2 leadership reported that efforts toward sustainability had waned March through June of 2020 due to the COVID-19 pandemic. However, a sustainability checklist had been developed, and the ECCP planned to send this list to NFs in August. The checklist was described as including "*questions to gauge whether there's timely identification and communication of changes in condition, …whether there's an annual root cause analysis of potentially avoidable hospital transfers, whether there's training of clinical staff. There's a section on staff development. We ask*

if ATOP components are part of staff training." NFs were given three weeks to complete these checklists and provide plans for improvement where necessary. ECCP staff were then discussing with facilities how to implement their sustainability plans and measure success.

C.8.2 Facility Plans

When asked what elements of the Initiative would remain after the Initiative ended, many NFs in both groups reported that they planned to continue using the SBAR after the Initiative ended. For example, a leader in a P-O NF said, "*We will continue to want SBARs done, and it's given us a new standard for how we expect documentation and changes to be identified and handled.*" Similarly, a C+P administrator said, "*…SBAR will stay in place. And making sure that we're treating the right symptoms and documenting*." This idea of continuing with improved documentation was also a recurring theme in both facility groups.

Other leaders expressed hope that good communication among staff would continue. For example, one P-O champion said, "*The closeness of the NP [nurse practitioner], myself, and the nurses. I think those relationships and the reporting will last.*" Others thought some of the education pieces would remain in place in their NFs.

C.9 Conclusion

In Initiative Year 4, many of the challenges identified in previous years persisted, such as low practitioner buy-in of the Initiative and limited engagement by P-O NFs. However, there was improved awareness of Initiative goals among P-O leaders. Plans for sustaining the Initiative continued and were relatively strong in C+P NFs, including identification of facility champions.

APPENDIX D
MOQI TELEPHONE INTERVIEW FINDINGS, INITIATIVE YEAR 4

D.1   Key Findings

Based on interviews[4] with ECCP leadership and facility staff, RTI identified the following key findings:

- *Most Clinical + Payment (C+P) interviewees reported that both phases of the Initiative contributed to a reduction in hospitalizations, and a few reported their hospitalization rate had stabilized. Interviewees attributed this positive trend to consistent MOQI APRN presence, a stable core group of nurses, and increased clinical skills among nursing staff.*

- *Among the few facilities that did not see a change in hospitalization rates, facility leadership attributed the lack of change to families insisting their residents go to the hospital, despite facility capabilities to care for residents in the nursing home.*

- *As in Initiative Year 3, some C+P and Payment-Only (P-O) interviewees reported that one of the successes of the Initiative was early recognition and treatment of the six qualifying conditions, thus mitigating hospitalization. Although interviewees said this early identification improved patient care, it reduced opportunities to submit NFI 2 claims because resident conditions did not reach the degree of severity specified in the NFI 2 clinical criteria.*

- *Staff from both C+P and P-O facilities noted that the acuity of long-term care residents had increased significantly over the course of the Initiative. They felt that this change in acuity had a major effect on eligibility because many of their residents with high clinical acuity transferred to hospice care and became ineligible for NFI 2.*

- *ECCP leadership and C+P facility interviewees identified missed opportunities for billing if the MOQI APRNs were not on-site when staff identified a resident change in condition. Interviewees reported that nursing staff felt more comfortable in reporting a change in condition to the resident's physician if they could discuss and confirm the change in condition with the MOQI APRN. Inability to reach a physician to discuss the change in condition when the MOQI APRN was not on-site was also reported as a reason for missed opportunities.*

- *ECCP leadership commented that over time, the APRN influenced facility advanced care planning and end-of-life care by working with facility staff and by establishing relationships and building trust with residents and family members.*

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[4] COVID-19 Note: RTI conducted Year 4 facility telephone interviews in early 2020, prior to the onset of the COVID-19 pandemic. The pandemic prevented RTI site visits to facilities or ECCPs. Instead RTI conducted ECCP telephone interviews in July, 2020. All ECCP interviewees noted that the pandemic interrupted NFI 2 activities, facility engagement, and Initiative billing through 2020. From March through the end of NFI 2 in September, ECCP staff were unable to continue their work in C+P facilities, and ECCP leaders were unable to provide in-person support to C+P or P-O facilities.

- *Throughout the Initiative, ECCP and facility staff reported that varied practitioner engagement and buy-in continued to be a barrier to NFI 2 claims submission, despite frequent one-on-one communication by the ECCP leadership in both C+P and P-O facilities.*

- *As in prior site visit interviews, interviewees from both C+P and P-O facilities reported the challenge of sustaining Initiative components because of staff turnover. Some facilities resorted to hiring agency nurses and reported difficulty engaging these temporary staff in the Initiative (e.g., using INTERACT tools) when they were in the facility intermittently. Interviewees added that MOQI APRN turnover in C+P facilities also impacted the ability of the facility to sustain the components of the Initiative, particularly the staff's level of comfort treating residents in place when there was a change in condition.*

- *C+P and P-O interviewees indicated that they would continue to use the INTERACT tools after the Initiative ends. Some C+P facility DONs and NFAs also wanted to hire an APRN for their facilities at the end of NFI 2, in place of the MOQI APRNs, but they were not sure if their corporations would provide the resources to do so.*

In January and February 2020, the RTI evaluation team completed telephone interviews with facility leadership and staff in both C+P and P-O facilities. We interviewed a variety of staff at these facilities including nursing facility administrators (NFAs), directors of nursing (DONs), assistant directors of nursing, billing/finance coordinators, and other nursing staff. In July 2020, we interviewed key members of the ECCP leadership team via videoconference. **Table D-1** summarizes data collection in 2020, and **Table D-2** summarizes the telephone interview for facility staff buy-in and implementation.

Table D-1.   MOQI 2020 data collection summary

Number of facilities participating as of January, 2020:	40
Ownership changes since 2019 site visit:	0
Facilities withdrawn or removed from Initiative since 2019 site visit:	0

Table D-2.   MOQI telephone interview summary findings: Facility staff buy-in and implementation, 2020

Topic	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone)	23	9	14
Interviewer perceptions of buy-in to NFI 2			
High	17	9	8
Medium	3	0	3
Low	3	0	3

(continued)

Table D-2. MOQI telephone interview summary findings: Facility staff buy-in and implementation, 2020 (continued)

Topic	Total	Clinical + Payment	Payment-Only
Number of facilities that hired/contracted new staff/increased staff hours in 2020 because of NFI 2	0	0	0
Number of facilities with resident opt-outs in 2020	3	1	2
Number of facilities reporting that NFI 2 has been effective in reducing PAHs	18	9	9

NOTE: Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing or have not trained staff on the six conditions; generally limited engagement and limited participation in NFI 2.

D.2 ECCP Activities

As in all years of NFI 1 and NFI 2, the ECCP continued to support facility staff throughout Initiative Year 4.

D.2.1 Structure and Intervention Design

The MOQI intervention is well established across the participating facilities with no changes in 2020. There have been no changes in staffing and no formal changes to the intervention in either the C+P or P-O facilities.

As in previous years, all interviewed facility staff felt supported by the ECCP and viewed the implementation team favorably. A P-O facility interviewee shared that when they were experiencing trouble gaining buy-in from a physician, a MOQI staff member met with the physician to explain the program, which improved the physician's willingness to visit the facility to certify qualifying resident changes in condition for NFI 2 billing. This example reinforces the consensus that the MOQI team was *"always right there and have answered [facilities] right back,"* as one P-O staff interviewee shared.

All C+P interviewees continued to value the on-site MOQI advanced practice registered nurse (APRN). A C+P NFA shared "Everyone has a comfort zone with [the MOQI APRN], I would have her continue here in employment because I think she has a vital role in the community." Almost all interviewed C+P facilities noted the MOQI APRN as the one component of the Initiative they would like to sustain. However, for many facilities, interviewees shared that retaining an APRN post-Initiative would not be financially feasible.

D.2.2 Learning Community Activities

No changes were made to Learning Community activities for 2020. A few C+P and P-O facilities reported participating in Learning Community offerings. The few mentioned were about Crucial

Conversations and INTERACT tool use. Facility staff reported finding them to be "useful refreshers" on these topics.

D.2.3   Intervention Tools and Other Components

No changes were made to the INTERACT tools, and both C+P and P-O facilities continued to use them regularly. Participants in C+P and P-O facilities reported consistent use of SBAR and Stop and Watch, and the Clinical Pathways tool. As reported in 2019, staff continued to incorporate SBAR into their daily documentation (C+P and P-O). One C+P facility also reported incentivizing the staff to encourage the use of the Stop and Watch forms.

Staff from a C+P facility also described integration of Mediprocity, a software application for text communication between nursing staff and practitioners, and an advance directive fair to teach physicians how to approach end-of-life (EOL) conversations. Interviewees said these tools were particularly helpful in increasing physician buy-in. In addition, many C+P facilities reported that having a MOQI APRN in their facilities was a great asset when having difficult EOL conversations with residents and families.

D.3   NFI 2 Engagement

Although overall facility staff engagement remained consistent in Initiative Year 4 compared with previous years, interviewees reported a small decrease in resident and family engagement. Education on the Initiative for families continued to be important to their engagement and buy-in. Practitioner engagement varied across facilities, with some reporting high engagement and others little to none.

D.3.1   Residents and Families

C+P and P-O resident and family responses to the Initiative remained favorable and consistent with prior Initiative years. For example, C+P and P-O interviewees shared that residents and families were actively completing Stop and Watch forms for residents. Several staff in both C+P and P-O facilities reported a positive association between Initiative education and family buy-in, with many noting that family education was crucial to the Initiative's success. As a C+P DON stated, *"Not all [families] are still willing to let us treat in the building, but the number of people we've been able to shift that mindset has grown."* Although some families still insisted on sending residents to the hospital for care, Initiative education helped improve family buy-in to NFI 2.

Some facilities also noted that the number of eligible residents has declined somewhat through Initiative Year 4. A few P-O interviewees noted that their resident populations had high clinical acuity, resulting in more hospice care use and thus reducing the number of NFI 2-eligible residents in their facilities.

Both C+P and P-O facility staff reported that few residents had opted out of the Initiative. Reasons cited for opting out included switching to a managed care plan, a lack of understanding of the Initiative, and a general disinterest in the Initiative.

D.3.2   Facility Staff

Facility staff engagement remained varied among all participating facilities. Several C+P and P-O facility staff described a positive attitude change throughout NFI 2, with increased facility staff willingness to complete the required documentation for the six qualifying conditions. As one NFA shared, *"Even though it started off as a challenge that is ongoing, we went from having no SBARs to having 5-6 every week."* A few P-O facilities still reported little to no engagement with the Initiative this year, with one NFA stating the program is *"basically…dead in the water right now."* Among less engaged C+P and P-O facilities, interviewees named three primary reasons for low engagement: perceived burden of NFI 2 documentation for billing, high rates of staff turnover, and lack of leadership oversight.

None of the C+P or P-O interviewees said their facilities hired new staff specifically for the Initiative. However, some C+P and P-O interviewees reported discussing the purpose of the Initiative during their hiring processes, including introducing the INTERACT tools to new hires.

D.3.3   Practitioners

Similar to previous Initiative years, practitioner engagement varied across C+P and P-O facilities. Many facility staff said their facilities had highly engaged practitioners who reportedly felt confident in the nursing staff's capabilities when discussing a resident's change in condition. A P-O NFA shared that practitioners' *"overall confidence, especially in charge nurses, has increased due to [NFI 2]."* Additionally, C+P and P-O interviewees shared that although transfers decreased over the course of the Initiative, some physicians still send residents to the hospital to be on the "safe side." However, a DON from a C+P facility shared that MD-ordered transfers are *"nothing near where we were at in the first 4 years [of the Initiative]."*

In contrast, some C+P and P-O interviewees reported little to no buy-in from practitioners, suggesting that this low level of provider engagement stemmed from three sources: (1) conflicting affiliations (i.e., serving as Rural Healthcare Providers); (2) insufficient monetary incentives, particularly for practitioners who would have to travel long distances to certify conditions for facility billing; and (3) personal beliefs regarding the Initiative. A P-O NFA shared that one practitioner *"just kept identifying that the program was fraud"* because the practitioner did not agree with the required clinical criteria to qualify a resident for one of the six qualifying conditions (e.g., drawing a complete blood count for a suspected urinary tract infection [UTI]). The NFA further explained that *"[Practitioner] thinks that the [NFI 2] symptoms that qualify a person are pretty ambiguous."*

A member of the ECCP billing team reported that there were some physicians who continued resisting NFI 2, either because they did not agree with the qualifying criteria or because they were generally suspicious of the Initiative. One ECCP member speculated that practitioners might be afraid of having to undergo a Medicare audit and risk their practices if they submitted Initiative-generated claims.

A few facility interviewees (C+P and P-O) shared that newer practitioners were not familiar with the facility staff skills and therefore were not confident with nursing facility staff, adding *"not sure if the practitioner had completely bought in with the program."* Other C+P and P-O facility interviewees shared that their practitioners were resistant to working off-hours and there were struggles with communication between facility staff and practitioners as some practitioners would not return calls from facility staff. One C+P staff member noted that practitioners, *"don't want to call back, especially on a Friday afternoon into the weekend,"* and ask staff "*why are you calling me for this at 10pm*?" adding that, "*nurses don't want to make that phone call to the physician."* Interviewees noted that when providers were unfamiliar with the Initiative and the facility staff skills, there was low NFI 2 practitioner engagement.

D.3.4   Other Facility Factors

No C+P or P-O interviewees reported major changes to their facility's structural capabilities, such as creating new units or expanding health information technology, within the past 2 years.

As mentioned earlier, hospice use reduced the number of eligible residents from some facilities; several facility interviewees noted fewer eligible residents because of increased Medicare managed care penetration. A P-O NFA shared a belief that long-term care patients are drawn to managed care plans, like Optum, because of *"different benefits to long-term care patients – glasses, hearing aids."*

D.4   Facility and Practitioner Billing

The volume of facility and practitioner billing depended on facility staff and practitioner engagement and perceived staff support from facility administrators and the ECCP staff.

D.4.1   ECCP Tools & Support

MOQI leadership noted, as in previous years, that their ECCP billing support team assumed an active role in some facilities to promote NFI 2 billing. One MOQI billing team member commented that their role *"became even more involved than they ever thought it would be,"* particularly for P-O facilities. MOQI leadership noted that presence of a facility-based Initiative champion reduced dependence on the MOQI billing team. In C+P facilities, the MOQI APRN often served as the champion, identifying residents who met the criteria for the six qualifying conditions and encouraging facility staff to bill for those episodes. However, in P-O facilities without a committed

Initiative advocate, facilities either relied on the MOQI billing support team or neglected to bill NFI 2 at all.

D.4.2 Facility Billing & Recoupment

Facility billing practices were consistent with prior Initiative years. Interviewees noted wide variation, with some submitting NFI 2 claims regularly and others struggling to bill for the Initiative. Among the facilities that submitted frequent NFI 2 claims, most had developed a robust system for billing. These facilities had either maintained consistent billing staff or billed through their corporate offices. In C+P facilities, the presence of a MOQI APRN also was instrumental in ensuring that the six qualifying conditions were documented appropriately to submit NFI 2 claims. A few P-O interviewees mentioned that they often reached out to the MOQI billing team for assistance and found that team to be an effective resource, facilitating additional NFI 2 claims submissions.

A few interviewees from both C+P and P-O facilities reported using the NFI 2 claims reimbursements to improve care for their residents. For example, a P-O facility interviewee described new equipment purchases, such as a bladder scanner and a wheelchair scale. Another P-O facility discussed use of NFI 2 reimbursement dollars for staff education on topics like respiratory therapy. A few C+P facilities with centralized corporate billing reported requesting use of the reimbursement funds to purchase new equipment for their facilities. An NFA shared, *"We were aware that we had a certain amount of reimbursement, so we asked if we would be able to meet this request by using some of that extra reimbursement. So, we did use those funds."* Early in NFI 2 some facilities experiences challenges with receiving NFI 2 reimbursements from centralized corporate billers, but that seemed to improve over the years of the Initiative.

Among facilities that were not billing regularly, interviewees cited lack of a clear Initiative champion, coupled with the CMS changes in qualifying criteria as primary billing barriers. Additionally, some interviewees explained that issues with completing NFI 2 documentation, lack of education on proper billing practices for new staff, and physician resistance created further NFI 2 billing challenges.

C+P and P-O interviewees also noted fewer eligible residents because of both Medicare managed care penetration and many long-term care residents transferring to hospice or palliative care. C+P facility staff reported that MOQI APRNs were helpful in tracking resident eligibility. However, in the P-O facilities, staff reported that NFI 2 resident eligibility tracking had become too much of a burden. Most of the P-O facilities reported that they had billed NFI 2 only a handful of times or had not billed at all in recent months, in part due to the difficulty of tracking eligible residents.

In the final year of NFI 2, some facilities questioned the value of continuing with Initiative efforts. For example, a few P-O facility interviewees with new facility billing or administrative staff questioned the value of teaching them about the Initiative, given its imminent end date.

Staff in C+P and P-O facilities also described some missed billing opportunities and CMS recoupment. One P-O facility attributed those missed billing opportunities to facility leadership turnover. Another P-O facility noted an instance of returning money when they had billed for an event, only to learn later that the resident was not eligible for the Initiative. In general, recoupment occurred because of errors in documentation or resident ineligibility, although most facilities reported very few recouped claims.

D.4.3 Practitioner Billing & Recoupment

In Initiative Year 4 practitioner billing remained unchanged. Most facility staff across both C+P and P-O facilities were unaware of their practitioner's billing practices, and very few reported that their practitioners had been consistently billing through the Initiative. The most notable challenges to practitioner billing were the practitioner's affiliation as a Rural Health Provider or restrictions placed on the practitioner by their affiliated hospitals. Although practitioners did seem to understand and value the importance of avoiding hospitalizations in their resident population, they often did not bill NFI 2 for care.

D.5 Successes and Challenges

Most facility leaders in both C+P and P-O facilities declared the Initiative successful in reducing avoidable hospitalizations. Beyond NFI 2, these interviewees said they would sustain their low rehospitalization rate or further reduce hospitalizations by continuing to focus on early identification of the six qualifying conditions. In contrast, a few P-O facility staff believed they had not been successful in reducing hospitalizations in the last 2 years or did not think the Initiative had made a difference for their long-term care residents.

D.5.1 Most Successful Intervention Components or Tools

Most C+P and P-O facility staff reported that the Initiative's greatest success was lowering their rehospitalization rates by preventing unnecessary hospitalizations. As one C+P DON described, "*I think our participation for eligible residents has greatly decreased our hospitalizations for residents over the last couple years. Once we got staff engaged in the program… We have seen a great improvement.*" This reported success was attributed to staff's increased knowledge of the importance of caring for the resident in the facility and awareness of and attention to residents' changes in condition, which allowed them to "catch" and treat changes before they worsened. As one C+P DON stated, "*I would define [success] as are we able to keep our residents in house. Can we keep them here, can we treat what they have going on or are we not treating these things because my staff is doing a good job at what they do every day so they're not developing UTI infection or having these symptoms.*" Additionally, a P-O NFA reported "*Our UTI records are sky-rocketing because we're catching things so much earlier. Before the Initiative, we would never catch [these] and they would always go out to the hospital.*"

Most C+P and some P-O interviewees reported that INTERACT tools were one of the most successful and enduring components of the Initiative. As in previous years, facility staff reported using the INTERACT tools throughout the entire community and reported positive resident outcomes as a result. C+P facility staff reported that the stable presence of the MOQI APRN was instrumental in changing facility care practices and was viewed as a success in both phases of the Initiative. Additionally, increased discussions with residents and family members regarding EOL care, and residents having advanced directives were reported as successes in a few C+P facilities. Ongoing education, patients obtaining their optimal level of well-being, and for some C+P interviewees, reduction in the use of antipsychotic medications were also reported as successes of the Initiative.

D.5.2 Most Challenging Intervention Components or Tools

Consistent with prior interviews, both C+P and P-O interviewees reported facility leadership and staff turnover as a major barrier to consistent implementation of Initiative components. Daily staffing and staff turnover concerns were exacerbated by the COVID-19 pandemic. Some interviewees described difficulty attracting registered nurses interested in long-term care, ultimately resorting to use of staffing agency nurses. Both C+P and P-O interviewees repeatedly described the excessive amount of time, effort, and cost to educate, reeducate, and train new staff.

A few C+P and P-O facility staff reported fewer residents who met the revised CMS criteria for billing the six NFI 2 conditions. Interviewees noted that removing the change in mental status criteria for UTI resulted in a reduction in the number of NFI 2 claims submitted. Interviewees added that in some cases, the clinical criteria changes required much higher severity meaning that to submit NFI 2 claims, facility staff would have to allow conditions to exacerbate. As an NFA in a P-O facility stated, *"You have to let them get sicker than we let them get."* That sentiment was echoed among other P-O staff who felt that they were recognizing and treating changes in condition early, thus providing better care quality but missing the NFI 2 billing opportunities.

D.6 Avoidable Hospitalizations

Overall, nursing facilities perceived the Initiative as being effective in preventing avoidable hospitalizations. Spillover continued to occur in C+P and P-O facilities because all residents received the same type of care, regardless of their eligibility for the Initiative.

D.6.1 Perceived Effectiveness of the Initiative

Most interviewees believe the Initiative had a positive impact on reducing avoidable hospitalizations because staff are able to identify resident changes of condition more quickly. A P-O NFA shared that because of the Initiative, their staff is *"catching UTIs quicker. We never flagged UTIs. Since we started this Initiative we have flagged more."* Similarly, a C+P NFA shared that the rate of rehospitalizations is on *"a downward trend, which I attribute that to the Initiative."*

Among the few C+P and P-O facility interviewees who did not feel the Initiative reduced hospitalizations, most cited family resistance as the primary reason. As a C+P NFA shared, *"Some of the barriers, despite our best efforts, aren't going to go away, you still have a lot of families that…just insist someone has to go to the hospital."*

D.6.2 New Reports of Spillover and Contamination Effects

As in previous years, the effects of the Initiative continued to spillover to all residents, as staff provided the same care, regardless of Initiative eligibility. As one C+P NFA put it, *"Nurses on the floor have the same diligence with all patients…It is the same whether they are in the Initiative or not. The quality of care is the same."* Most interviewees in both C+P and P-O facilities confirmed that they provide the same staff education on the six qualifying conditions and use the INTERACT tools to care for all residents.

D.7 Updates to Policies & External Stakeholders

As in prior Initiative years, hospital engagement remained low to moderate. MOQI leadership continued to work on state legislation to expand the scope of practice for APRNs working in Missouri.

D.7.1 Hospital Engagement

As in previous years, most C+P and P-O facility staff reported that their local hospitals were aware of their facility's participation in MOQI and had ongoing conversations with their local hospitals regarding avoidable hospitalizations. Several P-O facility staff in rural areas reported having a *"great working relationship"* with local hospitals.

The extent of the collaboration with their local hospitals varied among the facilities. Some C+P facility staff reported meeting with the local hospital(s) monthly or quarterly to discuss rehospitalizations. Additionally, a C+P facility administrator reported that their APRN follows up with hospital staff when a resident is admitted, and a P-O facility staff interviewee reported that the local hospital follows up with the facility when a resident returns to the nursing facility. The overall impression from facility staff is that there is cooperation, appreciation, and recognition for being proactive in reducing avoidable hospitalizations between the facilities and hospitals.

A few P-O facility staff reported that their local hospitals were not aware of their participation in the Initiative.

D.7.2 Competing or Similar Initiatives

As reported in 2019, the St. Louis area accountable care organizations, acute care hospital, and nursing facility care consortium, continued to meet to disseminate acute care best practices to nursing facility residents with the long-term goal of standardizing care across all nursing facilities in the state. In 2020, legislation to enable APRNs to practice as independent practitioners in the state

of Missouri and federal legislation allowing nursing facilities to hire APRNs and have them bill Medicare for services continued to progress slowly. ECCP leadership staff commented that they hoped that some of the APRN practice restrictions the governor lifted during the pandemic would be incorporated into future APRN legislation. As noted, high Medicare managed care penetration in urban and rural areas also reduced the number of residents eligible for the Initiative.

D.8 Initiative Sustainability and Plans for the Future

Facility staff from both C+P and P-O groups agreed that they will continue efforts to educate all staff on identifying changes in condition before they worsen and on improving documentation using the INTERACT tools. They were enthusiastic about maintaining the facility care practice changes brought about through the Initiative and planned to continue preventing avoidable hospitalizations across long-term care and short-stay residents.

D.8.1 ECCP's Plans

According to MOQI leadership, the success of the Initiative lays in improving quality of care and reducing hospital transfers. However, the success could not have been achieved by implementing the payment piece on its own, and the ECCP emphasized that it was the combination of having an APRN in the C+P facilities, providing consistent feedback reports to the facilities to identify their own successes and challenges and the presence of a consistent support team that brought about the most favorable results. One of the major challenges that the ECCP felt that they had to navigate was translating information from CMS to the facilities. They noted internal frustrations with the changes in clinical criteria. The team acknowledged that one of their strengths was being able to create resources and tools that explained the changes for their facilities, which reinforced the need for a strong support team in this type of intervention. Furthermore, ECCP leadership continued to emphasize the role that the APRN played in the C+P facilities in keeping the focus on avoiding transfers to the hospital and affecting care practice changes in the facilities. One of the major successes in the C+P facilities was the change in conversation surrounding EOL and palliative care, which ECCP leadership felt was facilitated by the presence of the APRNs. As one member of the ECCP team described, *"If you move a resident into good end-of-life care, that is a positive outcome."* They also stressed the importance of having staff in nursing facilities with experience discussing EOL, which they felt could be helped by hiring APRNs or licensed social workers.

Beyond NFI 2, MOQI leadership began a pilot program through its new business, NewPath Health Solutions, LLC, to disseminate the Initiative across the United States. The focus of NewPath Health Solutions, LLC, is to assist long-term care facilities across the country to reduce avoidable hospitalizations and emergency department visits through improved care processes and to provide support for achieving residents' health care outcome goals by instilling an APRN in the participating facilities. Participating facilities also would receive the support of the company's team of long-term care experts.

D.8.2 Facility Plans

Overall, interviewed staff from both C+P and P-O facilities found the improvement in staff members' clinical skills to be the most valuable component of the Initiative. The Initiative encouraged staff to continue to build and strengthen their clinical skills, which led to better care for the residents. Facility staff were enthusiastic about continuing to provide all staff with the opportunity to attend training days and workshops to continuously improve residents' level of care. In the C+P facilities, staff found the presence of a MOQI APRN to be a vital resource for educating the nursing staff and for early identification of changes in resident condition. A few facilities noted the benefits of having an APRN in the facility full time and remarked that they would ask their leadership about being able to hire a permanent replacement for the MOQI APRN. Furthermore, C+P and P-O facility staff found the INTERACT tools to be especially helpful. Interviewees added that Stop and Watch forms were a useful way to engage many of the direct care and auxiliary staff in resident care, such as those in sanitation or food service. The Initiative helped to highlight the importance of these key staff members and include everyone in the process of caring for residents. Interviewees from both C+P and P-O facilities also mentioned that educating families on topics like avoiding hospitalization and transitioning to EOL care continued to be challenging. However, they felt it was crucial to gain the family's support to continue treating residents in-house whenever possible.

D.9 Conclusion

As mentioned in previous reports, the payment aspect of the Initiative was not viewed as an essential component. Rather, C+P and P-O staff celebrated the improvement in clinical care processes through better staff training and skills, use of INTERACT tools to facilitate communication and documentation, and prioritizing early identification of resident condition changes, particularly for the six qualifying conditions. C+P interviewees also highlighted the importance of having an on-site APRN to facilitate the early identification process. Additionally, interviewees noted the importance of having stable facility leadership and staff; high turnover rates were cited as barriers to Initiative sustainability. Practitioner buy-in was difficult to obtain even with the added financial incentive for physicians, and many C+P and P-O facility staff felt that without the Initiative, they would not be able to get a physician in to see the residents in a timely manner. Ultimately, most interviewees felt the Initiative had reduced avoidable hospitalizations and, because of staff skills and care processes learned during NFI 2, would continue to keep hospitalization rates lower than they were prior to the Initiative.

APPENDIX E
NY-RAH TELEPHONE INTERVIEW FINDINGS, INITIATIVE YEAR 4

E.1   Key Findings

Based on interviews[5] with ECCP leadership and facility staff, RTI identified the following key findings:

- *The NY-RAH intervention encountered no significant changes in the final Initiative year and remained the only education-only ECCP intervention that did not provide direct clinical care. In the prior Initiative year, the ECCP eliminated the Registered Nurse Care Coordinator (RNCC) positions and hired a mostly nonclinical, master's prepared staff, referred to as quality improvement specialists (QISs), to help facilities identify and carry out performance improvement projects (PIP).*

- *Many Clinical + Payment (C+P) facilities reported that their internal staff were too busy with other facility duties to fulfill NFI 2 requirements for billing, noting that the previous RNCCs were an integral part of their prior, self-described facility success with the different moving parts of NFI 2. The ECCP intended this 2019 staffing change to shift the responsibility for implementation of the NFI 2 to C+P facility staff. However, in the last Initiative year, C+P facilities often reported that QISs were not as valuable as the assigned RNCCs because the QIS role was never intended to assist directly with identifying eligible cases for billing, entering data into the NY-RAH Portal, or conduct staff training.*

- *Payment-Only (P-O) facilities created their own internal billing workflows with no dependence on ECCP staff (e.g., RNCCs or QISs). Because of this independent structure, P-O facility interviewees reported that they were regularly submitting NFI 2 claims, adding that NFI 2 enabled them to be paid for existing processes (i.e., prior to NFI 2) to treat residents in house.*

- *NY-RAH continued its focus on practitioner engagement to assist nursing facility claims submission while reducing emphasis on practitioner billing (i.e., use of G9685) because of very little use by practitioners across all Initiative years. Two Clinical Project Specialists (CPSs) with medical training, who previously facilitated physician engagement with NFI 2 billing (i.e., use of G9685) transitioned to assist with physician engagement to support facility billing.*

- *To support facility billing practices, NY-RAH continued encouraging NY-RAH-supported billing tools and Tableau Dashboards for both C+P and P-O facilities.*

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[5] COVID-19 Note: RTI conducted Year 4 facility telephone interviews in early 2020, prior to the onset of the COVID-19 pandemic. The pandemic prevented RTI site visits to facilities or ECCPs. Instead RTI conducted ECCP telephone interviews in July, 2020. All ECCP interviewees noted that the pandemic interrupted NFI 2 activities, facility engagement, and Initiative billing through 2020. From March through the end of NFI 2 in September, ECCP staff were unable to continue their work in C+P facilities, and ECCP leaders were unable to provide in-person support to C+P or P-O facilities.

QISs also attempted to engage C+P facilities in tool use to support PIPs. Despite encouragement, ECCP leadership reported very little use of the Tableau Dashboards and reports by assigned facility staff or leadership, even when a QIS was available to support tool use in C+P facilities. Although the ECCP attempted to make these reports simplified and user-friendly, most facilities continued to disregard them because of the reported data lag. The ECCP found using data from the 20 most recent transfers to be more effective at engaging facilities to establish and carry out their PIPs.

- *The outbreak of COVID-19 among New York nursing homes was detrimental to residents and staff. All 54 facilities reported cases of COVID-19 with many resident deaths. As expected, participating facilities were distracted and disengaged from the Initiative during this time. QISs could not enter any facilities from March through June 2020, although most gained access to facility electronic medical record systems during that time to help support billing. As of July 2020, most QISs still were not permitted to return to facilities in person.*

- *The NY-RAH ECCP leadership had QISs draft NFI 2 sustainability plans with their assigned facilities. These plans were meant to maintain the PIP process in facilities to continue reducing hospital transfers and improving resident quality of care beyond the end of NFI 2. The ECCP requested a no cost extension through December 2020 to support sustainability plans.*

In January and February 2020, the RTI team completed telephone interviews with ECCP leadership and facility leadership and staff in both C+P and P-O facilities. We interviewed a variety of staff in these facilities including nursing facility administrators (NFAs), directors of nursing, assistant directors of nursing, practitioners, billing/finance coordinators, and other nursing staff. **Table E-1** summarizes data collection in 2020, and Table E-2 summarizes the telephone interview findings for facility staff buy-in and implementation. **Table E-2** summarizes the telephone interview findings for facility staff buy-in and implementation.

Table E-1.   NY-RAH 2020 data collection summary

Number of facilities participating as of January 1, 2020:	54
Ownership changes since 2019 site visit:	0
Facilities withdrawn or removed from Initiative since 2019 site visit:	2

Table E-2. NY-RAH Telephone interview summary findings: Facility staff buy-in and implementation, 2020

Topic	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone)	29	13	16
Interviewer perceptions of buy-in to NFI 2			
High	18	8	10
Medium	8	4	4
Low	3	1	2
Number of facilities that hired/contracted new staff/increased staff hours in 2020 because of NFI 2	3	1	2
Number of facilities with resident opt-outs in 2020	2	1	1
Number of facilities reporting that NFI 2 has been effective in reducing PAHs	20	11	9

NOTE: Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing or have not trained staff on the six conditions; generally limited engagement and limited participation in NFI 2.

E.2   ECCP Activities

The NY-RAH intervention saw few changes during the last year of NFI 2. The QISs received mixed reviews from C+P facility interviewees, with only a few facilities regarding them as helpful. Most C+P interviewees described ongoing implementation challenges without their RNCCs, noting that because most QISs did not have clinical experience, they were not adequate substitutes for the prior RNCC role.

E.2.1   Structure and Intervention Design

C+P facility staff continued to report that the 2019 intervention change and resultant staffing switch from RNCCs to QISs reduced facility engagement with NFI 2. Some staff stated that they explicitly preferred the RNCC hands-on educational approach over the QIS performance improvement role. In contrast, a few facility staff reported the replacement of the RNCCs with the QISs as an improvement.

Across years of NFI 2, NY-RAH C+P practitioners did not submit many NFI 2 claims. Consequently, the ECCP decided to reduce CPS focus on practitioner use of the G6985 practitioner billing code and refocused CPSs to assist practitioners with providing accurate documentation to support nursing facility NFI 2 billing. This change is described in more detail in *Section 2.3.*

E.2.2   Learning Community Activities

ECCP Learning Community activities were minimal in the final year. The ECCP was previously known to provide regular webinars on relevant topics related to implementation, but several

facilities commented that there were no new webinars in the last year. Furthermore, as we have heard widely in the past, some facility leaders commented that the NY-RAH webinars had been redundant with the same information shared multiple times.

Of the few events that the ECCP hosted in the final year, most C+P and P-O facility interviewees reported participating. Of the C+P facilities that reported participating in these activities last year, about half considered these webinars valuable, and a quarter -- somewhat valuable. Of the P-O facilities that reported participating, half reported them as very valuable, and the other half reported them as somewhat valuable.

E.2.3 Intervention Tools and Other Components

There were no substantial ECCP changes to any tools or other components , other than an update to the Chart Audit Tool in the beginning of Initiative Year 4 to further assist facilities in identifying eligible cases for billing (more details provided in *Section E.5.1*). The ECCP also added a feedback report to help facility staff better understand why certain cases entered in the tool were not eligible for billing. Tableau Dashboards and reports, which were introduced toward the end of Initiative Year 3, saw very little use by facility staff.

E.3 NFI 2 Engagement

Engagement with NFI 2 remained variable across all facilities, with some facilities being highly engaged and others not at all.

E.3.1 Residents and Families

There were few changes reported with how residents or families engaged with the Initiative across facilities. Because NY-RAH was not a clinical care intervention there has always been limited family engagement; with the change to QIS intervention, family engagement was even more limited. The ECCP does support the annual Health Care Decisions Day, providing education to families about end-of-life care, but this national event was canceled because of COVID-19 and rescheduled for July 2021.

E.3.2 Facility Staff

In the last Initiative Year, no facilities reported hiring new nursing staff specifically, because of the Initiative. As reported previously in 2019, some C+P facilities had hired their ECCP nurse to assist them with billing after the staffing intervention change. However, since many facilities faced hardships during COVID, ECCP leadership stated that no C+P facilities had continued to employee RNCCs to assist with NFI 2. P-O facilities reported more facility staff engagement with the Initiative compared to C+P facilities.

E.3.3 Practitioners

Facility interviewees across both groups reported successes and challenges with practitioner engagement during the last year of the Initiative. As documented in prior Initiative Year reports, just before the start of 2019, the ECCP pivoted the focus of their CPSs from improving C+P practitioner use of the NFI 2 practitioner billing code G9685 to improving practitioner documentation to support nursing facility claims submission. This change occurred because there continued to be few reports of practitioners, across both types of facilities, submitting NFI 2 claims. Facility staff interviewees spoke very little about the role of the CPSs engaging their practitioners, so the extent of their role in encouraging practitioners is unknown. Additionally, ECCP leadership shared that one CPS had reduced their NFI 2 hours significantly to provide additional clinical expertise in hospital settings during the COVID-19 pandemic.

Although NY-RAH did not provide advanced practice registered nurses (APRNs), many facilities or facility practitioners employed their own APRNs who helped certify conditions for NFI 2. These non-ECCP APRNs, often referred to as NPs by facility staff, were regarded as essential to NFI 2 success. Notably, some P-O facilities commented that they were still working to expand their APRN presence, even in the last year of NFI 2. A P-O NFA said, "*We went from a consultant NP [nurse practitioner] early on to having a full-time NP. That started just over 2 years ago. That was a positive change,*" adding that the facility was able to make this improvement in APRN coverage because of the NFI 2 reimbursement funds. The NFA explained, *"Because of [the] project we are able to further justify the cost of having full-time NP. That is [the] biggest factor in preventing hospitalizations; having a medical provider in-house 40 hours a week."* A few other P-O facilities commented that they had more recently added APRNs or had increased existing APRN coverage to stabilize their resident care.

E.3.4 Other Facility Factors

Although some C+P and P-O facilities stated that the nursing facility incentive was not enough to purchase needed equipment that would assist them in preventing additional avoidable hospitalizations, multiple facilities commented on newer capabilities that may help them reduce hospital transfers. Although leadership at all facilities did not directly attribute these changes in capabilities to NFI 2 they still show an overall investment in reducing avoidable hospitalizations. Among P-O facilities, half stated that their clinical staff members had increased their capabilities, including tracheotomy care; on-site dialysis care, increasing on-site lab capabilities (e.g., iSTAT machine) to receive real-time results; and adding respiratory therapy. One facility reported that it could now accept left-ventricular assist device (LVAD) residents. Of the C+P facility interviewees, one staff member commented they were also newly accepting LVAD and right-ventricular assist device patients and treating more residents with transplants. This same facility installed a ventilator unit clinical monitoring system to automate the monitoring of acute changes in condition and introduced a new protocol to address residents with sepsis and seizures. One facility

purchased an AIRVO machine, which supplies humid, high-flow oxygen and can reduce the need for hospitalization.

E.4   Facility and Practitioner Billing

Facility billing proceeded with very little change in Initiative Year 4. Few C+P and P-O practitioners submitted their own claims.

E.4.1   ECCP Tools & Support

ECCP leadership made few changes to how they supported C+P and P-O facilities in the last year. ECCP leadership shared one change that increased facility response to the monthly data reports the ECCP provides. The ECCP began e-mailing facilities text-based information within the body of the email about their billing lags to eliminate the step of opening an additional report attachment. The ECCP found that facilities were more responsive to information presented this way. Another modification included, having CPSs focus their attention on improving practitioner documentation and improving the timeliness of practitioner certifications to support facility billing. However, as previously noted CPS efforts were interrupted by the COVID-19 pandemic.

E.4.2   Facility Billing & Recoupment

A few C+P and P-O facilities reported receipt of recoupment letters in Initiative Year 4. As previously reported, most facility interviewees said they had no challenges with the recoupment process.

E.4.3   Practitioner Billing & Recoupment

Two C+P facility administrators reported that their practitioners also received recoupment letters. Recoupment occurred through two tracks during NFI 2, with CMS reviewing and recouping claims for ineligible residents (known as Track 1) and the contractor, Telligen, conducting additional chart audits to identify ineligible claims (known as Track 2). ECCP leadership confirmed that practitioners had received recoupment letters from Track 1. The ECCP was unable to provide estimates on the number of practitioners who received these notices.

E.5   Successes and Challenges

Both ECCP leadership and facility perceptions of the most successful and challenging intervention components and tools are described in this section. These successes and challenges have remained consistent throughout NFI 2. Of note, the ECCP's Tableau Dashboard and accompanying reports, deployed in 2019, saw very little use by facility leadership or staff.

E.5.1   Most Successful Intervention Components or Tools

RNCC staff's clinical skills. Even though they were replaced with QISs in 2019 many C+P facility staff continued to regard the RNCCs as the most successful intervention component because of

their longstanding relationships with facilities since NFI 1. The RNCCs, all of whom were registered nurses, saw facility resident issues from a clinical perspective, and facility interviewees said this perspective was very valuable.

Chart Audit Tool. Implemented early in Initiative Year 2 (2018), this Excel tool has assisted almost all facilities in determining NFI 2 eligibility status of residents with changes in condition that may result in potential facility NFI 2 billing opportunities. It has also reduced documentation errors and reduced the amount of claims recoupment, according to the majority of facilities. ECCP leadership slightly disagreed, stating that all facilities had not used the tool as intended, but facilities remained steadfast in their appreciation of the chart audit tool.

SBAR. Facility interviewees mentioned INTERACT tools across Initiative years, but SBAR was commonly cited as the most important tool for documenting nurses' notes about resident changes in condition. Without this tool, many facilities would not have had standardized notes for practitioners to review and certify for nursing facility NFI 2 claims submission. Many facilities stated that the SBAR improved communication among their facility-based nurses and practitioners.

E.5.2 Most Challenging Intervention Components or Tools

Quality Improvement Specialists. C+P facilities have reported the QIS position as less useful compared to the prior RNCCs. Facility staff reported QIS frustrations, including their on-site presence being only part-time, lack of hands-on assistance with Initiative activities, and not having clinical skills.

NY-RAH Portal. Introduced in Initiative Year 1, this intervention component captured all eligible beneficiaries, their insurance status, and hospitalization, advance directive, and billing episode data. Across all years of NFI 2, C+P and P-O facility staff cited the portal as the most challenging tool all facilities were required to use. Facilities had to maintain and update resident census data on a routine basis. C+P facilities, which lost their RNCCs to the new QISs in 2019, appeared to have a new appreciation for the time needed to complete the NY-RAH portal. An NFA highlighted the challenges of managing the portal data entry after its RNCC was replaced with a QIS, *"We had two additional resources (RNCCs) for 6 years that were really on top of everything and helping spearhead and facilitate things. Not having them around, it took probably 3-6 months to really get it [portal data] going to not be an additional burden on others. We didn't realize how much these RNCCs had to do so we had no clue on that angle."* P-O facility interviewees also shared that dedicating in-house staff time to this task was difficult. Facility staff who are responsible for the portal data management used words like "repetitive," "tedious," and "daunting" to describe entering data into the portal.

Tableau Dashboard and Reporting. Facility interviewees reported that these dashboards and reporting, introduced in the latter half of Initiative Year 3, saw little use by facilities. ECCP

leadership confirmed that although they worked hard to simplify these reports and make the report data actionable, facility staff had little to no engagement with them. Interviewees noted the 9-month data lag as the primary barrier to use. This data lag caused many facility staff to question the value of the data and reports.

CMS Revisions of the Six Condition Qualifying Criteria. Changes to the NFI 2 clinical criteria in Initiative Year 3 meant many resident changes in condition no longer qualify for NFI 2 claims submission, thus reducing the number of claims submitted by C+P and P-O facilities.

E.6   Avoidable Hospitalizations

Many C+P and P-O facilities continued to report that the Initiative was successful in reducing avoidable hospitalizations. However, facilities often regarded the payment incentive as paying them for kinds of care they were already providing prior to the start of NFI 2.

E.6.1   Perceived Effectiveness of the Initiative

More than half of both the C+P and P-O facilities leadership stated that the Initiative had a positive effect on reducing avoidable hospitalizations. A registered nurse acting as the facility-based payment liaison in a P-O facility shared how much the Initiative has reduced their transfers of residents with the six qualifying conditions, stating, *"I've seen a reduction in all of them [the six qualifying conditions]. Since the start of program, claims were astronomical. I had at least 20 claims a month and now if I can get a couple, I think the tools really work and the nurses catch it sooner than later, it is before I can do anything [i.e., begin the process for documentation claims submission]."*

Staff who commented that NFI 2 was not having the desired effect on their eligible long-stay transfers said their facilities were already treating in place and had low transfer rates. Others noted that long-term care was already moving in this direction to reduce avoidable hospitalizations, so NFI 2 did not seem new or unique to those facilities. Interestingly, a Clinical Case Manager acting as the C+P facility-based payment liaison said NFI 2 was not having an effect because their attending physicians, managed and paid by a billing agency, were more likely to transfer residents, rather than treating them in-house. They added that their transfer rate had increased, moving from the lowest transfer rate in their region to the highest, compared to other nursing facilities. This concern was not widespread across facilities, but it highlights the continued importance of practitioner engagement to reduce avoidable hospitalizations.

E.6.2   New Reports of Spillover and Contamination Effects

There were no new reports of spillover or contamination in the last year of the Initiative. C+P and P-O facility interviewees indicated that they seek to identify resident changes in condition and avoid unnecessary hospital transfers for all residents, regardless of NFI 2 eligibility.

E.7 Updates to Policies & External Stakeholders

There are no updates regarding external stakeholders with the exception of New York's Delivery System Reform Incentive Payment (DSRIP) Program ending in March 2020.

E.7.1 Competing or Similar Initiatives

The most significant change during Initiative Year 4 was that the DSRIP program ended in March 2020. DSRIP, which started a year before NFI 2, had a similar goal of reducing avoidable hospitalizations among Medicaid beneficiaries in the community. Many NY-RAH nursing facilities across the state, participated in DSRIP. Most facility staff commented that the two efforts worked well together and did not interfere with one another. However, facility staff commented that DSRIP reporting included all facility residents (short- and long-stay), whereas for NY-RAH, facilities tracked only eligible long-stay residents. ECCP leadership made a similar comment this year stating that the focus of NFI 2 on the long-stay population alone did not easily fit into a facility's current assessment of changes in condition and billing workflows, resulting in the need for each facility to create a separate workflow to meet the Initiative requirements.

E.8 Initiative Sustainability and Plans for the Future

The ECCP focused on sustainability plans for their C+P facility's PIP process, which was guided by the QISs. Most C+P and P-O facilities believed they would continue using some of the tools or processes introduced by NFI 2 beyond the end of the Initiative.

E.8.1 ECCP's Plans

The ECCP had a few plans to help ensure that the facilities could sustain the processes they put in place during NFI 2, beyond billing. QISs drafted sustainability plans to inform the PIP process for their assigned C+P facilities. The ECCP also requested a no-cost extension from CMS from the end of the Initiative year through December 31, 2020. ECCP leadership stated that this extension would help recover lost Initiative time, including reduced staffing and hours, that occurred because of COVID-19.

E.8.2 Facility Plans

Several C+P and P-O facilities commented they would continue to support the concept of treating in place to reduce avoidable hospitalizations after the Initiative ends. Many C+P facilities said they would continue using the INTERACT tools, most notably the SBAR. Many facilities also mentioned continued use of Stop and Watch, but these mentions were less consistent. Multiple P-O facilities also commented that they would continue using the INTERACT tools. A few C+P and P-O facilities said they would continue education and documentation practices, but one P-O facility commented, *"The education piece might not go right away but over time, after the Initiative ends, it will lose its strength."* A few C+P and P-O facility interviewees said they would continue to monitor and document changes to the six qualifying conditions. Furthermore, one C+P facility

commented it would *"continue to focus on those [the six qualifying conditions] because those are the most hospitalized patients. [The Initiative] helped us focus on treat in place protocols for prevention."*

E.9   Conclusion

Although the NY-RAH intervention primarily remained the same in the last year of NFI 2, the continued effects of the 2019 staffing intervention changes, resulting in the elimination of the RNCC role and introduction of the QISs, remained a challenge for many C+P facilities. These facilities did not quickly adapt to a new workflow to identify and bill for the six qualifying conditions, absent the RNCCs. More pressingly, COVID-19 had a devastating effect on facility operations including layering onto existing challenges, such as short-staffing and low reimbursement. COVID-19 also directly affected all facilities, with at least one resident diagnosed with COVID-19 in every participating facility and many resident deaths. ECCP leadership described engagement with NFI 2 as nonexistent across all facilities during the initial onset of managing COVID-19 (March–June). This focus on the global pandemic also delayed the NY-RAH sustainability plans. ECCP leadership intended for QISs to complete sustainability plans for PIPs in C+P facilities, but with the COVID-19 pandemic delays, this did not occur as scheduled. NY-RAH applied for a no-cost extension to extend the project through December 2020. These additional months allowed extra time for QISs to train facility staff to complete PIPs independently including using Tableau reports to interpret data effectively. The ECCP's final goal was to sustain well-designed PIPs, informed by facility data, that may yield further reductions in avoidable hospitalizations.

APPENDIX F
OPTIMISTIC TELEPHONE INTERVIEW FINDINGS, INITIATIVE YEAR 4

F.1   Key Findings

Based on interviews[6] with ECCP leadership and facility staff, RTI identified the following key findings:

- *Clinical + Payment (C+P) and Payment-Only (P-O) interviewees frequently shared that they perceived an overall change in some facility care practices that they attributed to NFI 2. Interviewees noted that the change was especially true for clinical care nursing, communication, and attitude of some practitioners who were initially reluctant to engage with Initiative goals.*

- *The focus on early identification of resident changes in condition improved staff skills in identifying changes in resident condition, regardless of the specific condition, in both C+P and P-O facilities.*

- *Both C+P and P-O facilities noted increased Medicare managed care presence, specifically naming Optum. The amount of growth in the number of residents enrolled in Medicare managed care varied across facilities, but some interviewees noted that this growth had reduced the number of eligible NFI 2 residents in their facilities.*

- *The amount billed by facilities in both groups varied significantly. Some facility interviewees reported having few opportunities for billing because their residents were rarely ill, meaning the facilities had few opportunities to submit claims for any of the six billable conditions. In addition, some facilities reported having historically low hospitalization rates and, therefore, did not see much change in rates of hospitalization. Some P-O facilities, particularly those located in rural areas, did not have sufficient practitioner coverage to meet the NFI 2 certification timeframes.*

- *Practitioners reported that strict requirements for billing, small reimbursement amount, and fear of audits dissuaded them from billing. Most facilities reported that non-OPTIMISTIC nurse practitioners, not physicians, most often certified episodes for NFI 2. Practitioners who directly received NFI 2 reimbursement billed more often than those who worked in group practices where reimbursement was indirectly dispersed.*

- *Many facility leaders in both groups reported billing information was sent from their facility to a centralized billing office. These facility leaders often did not*

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[6] COVID-19 Note: RTI conducted Year 4 facility telephone interviews in early 2020, prior to the onset of the COVID-19 pandemic. The pandemic prevented RTI site visits to facilities or ECCPs. Instead RTI conducted ECCP telephone interviews in July, 2020. All ECCP interviewees noted that the pandemic interrupted NFI 2 activities, facility engagement, and Initiative billing through 2020. From March through the end of NFI 2 in September, ECCP staff were unable to continue their work in C+P facilities, and ECCP leaders were unable to provide in-person support to C+P or P-O facilities.

know whether billed episodes had been paid or whether any dollars had been recouped.

- *Most P-O facility leaders reported that tools, such as the diagnostic cards, the OPTIMISTIC website, and the monthly phone calls provided by OPTIMISTIC were significant factors in their perceived facility success with NFI 2. Both C+P and P-O facilities reported they will continue to use the educational tools, such as the six condition education sheets, six condition clinical pathways, and palliative care education sheets, after the Initiative ends.*

- *Most C+P facilities reported that the OPTIMISTIC nurses and the interventions they implemented, rather than the financial reimbursement, were the most significant factors in preventing avoidable hospitalizations in their facilities. Most C+P facilities reported that when the Initiative ended, the duties of the OPTIMISTIC registered nurse (RN) would fall to existing staff who already had "full plates." Although facilities expressed a strong desire to sustain those interventions, most were not confident they would be able to do so without hiring additional staff, which was not financially feasible.*

From January through March 2020, the RTI team completed telephone interviews with facility leadership and staff in both C+P and P-O facilities. We interviewed a variety of staff at these facilities including nursing facility administrators, directors of nursing, assistant directors of nursing, practitioners, billing/finance coordinators, and other nursing staff. In addition, a telephone interview was conducted with a member of the OPTIMISTIC leadership team in July 2020. **Table F-1** summarizes data collection in 2020, **Table F-2** summarizes the telephone interview findings for facility staff buy-in and implementation.

Table F-1.   OPTIMISTIC 2020 data collection summary

Number of facilities participating as of January 1, 2020:	40
Ownership changes since 2019 site visit:	N/A
Facilities withdrawn or removed from Initiative since 2019 site visit:	3

Table F-2.   OPTIMISTIC telephone interview summary findings: Facility staff buy-in and implementation, 2020

Topic	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone)	30	11	19
Interviewer perceptions of buy-in to NFI 2			
High	18	5	13
Medium	4	3	1
Low	6	2	4

Table F-2. OPTIMISTIC Telephone interview summary findings: Facility staff buy-in and implementation, 2020 (continued)

Topic	Total	Clinical + Payment	Payment-Only
No buy-in	2	1	1
Number of facilities that hired/contracted new staff/increased staff hours in 2020 because of NFI 2	0	0	0
Number of facilities with resident opt-outs in 2020	5	1	4
Number of facilities reporting that NFI 2 has been effective in reducing PAHs	24	9	15

NOTE: Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing or have not trained staff on the six conditions; generally limited engagement and limited participation in NFI 2.

F.2 ECCP Activities

OPTIMISTIC leadership and staff continued to engage in Initiative activities and offered support to both C+P and P-O facilities through Initiative Year 4.

F.2.1 Structure and Intervention Design

Prior to the COVID-19 pandemic, the OPTIMISTIC structure and intervention remained largely unchanged, with only mild fluctuations in staffing as a result of staff turnover. At the height of the COVID-19 pandemic in late spring/early summer of 2020, most OPTIMISTIC nurse practitioners did not work on-site at their respective facilities but engaged remotely, providing consultation and staff training. They also created a video on how to properly don personal protective equipment. In addition, OPTIMISTIC RNs communicated remotely with family members to answer questions and provide education on COVID-19.

Facility leaders in both groups reported staff adoption of a mindset to care for residents in place. OPTIMISTIC nurses in the C+P facilities facilitated this care practice shift by focusing on having end-of-life discussions with residents that identified whether the resident wanted to be hospitalized. The OPTIMISTIC nurses incorporated facility staff in those conversations, which has increased the comfort level of staff who, as a result, have a clearer understanding of the resident or responsible party's desires for end-of-life care. P-O facilities also reported an awareness among staff about the importance of caring for residents in place, but end-of-life discussions reportedly happened only "as needed." One P-O administrator lamented that staff resources were not available to have those conversations more regularly. Of the facilities that were interviewed, only one P-O administrator reported having a staff member certified in the provision of palliative care. Another stated that nurses in the facility were not well educated to have end-of-life discussions, instead relying on outside hospice providers to have those conversations.

Learning Community Activities. Most leaders in C+P and P-O facilities continued to appreciate OPTIMISTIC support and spoke highly of the various webinars, monthly calls, monthly data reports, emails, and in-person meetings. One P-O facility leader stated, *"I took a huge stack of OPTIMISTIC information [available at an in-person meeting] and each month at every (staff) Inservice [we] go over a new topic."* Through Initiative Year 4, OPTIMISTIC continued to add clinical tools, podcasts, and webinars to its website. These tools included information related to the six NFI 2 conditions and advance care planning and were formulated with specific tracts for staff, practitioners, and families.

F.2.2 Intervention Tools and Other Components

Many facility leaders in both groups reported that staff use INTERACT tools, especially SBAR or a similar tool, to document resident changes in condition. Leaders in both groups also reported that staff used the diagnostic cards that OPTIMISTIC developed for each of the six conditions. These cards provided quick reminders for facility staff about each of the conditions and the clinical criteria required to meet NFI 2 billing.

OPTIMISTIC RNs continued to be actively involved in ensuring that eligible residents had an opportunity to make decisions regarding end of life. Some C+P facilities reported that 100 percent of eligible residents had a POST form completed. Many leaders in P-O facilities stated that although they understood the importance of this process, they often did not have sufficient staff to fully engage in advance care planning with residents.

In addition, OPTIMISTIC nurses continued to assist C+P facility staff in recognizing changes in condition and assessing eligible residents who were transitioning from the acute care setting back to the facility.

F.3 NFI 2 Engagement

Resident and family response to the Initiative was unchanged from previous years; however, other facility factors such as changes in resident acuity impacted facility engagement with NFI 2. Changes in staff and practitioner engagement also influenced interviewees' perceived success of the Initiative.

F.3.1 Residents and Families

Staff in both C+P and P-O facilities doubted that families knew or understood the Initiative, even though most facilities in both groups included information about the Initiative in their admission packets.

Although residents and families may not have understood the Initiative, most C+P facility leaders expressed that families appreciated the OPTIMISTIC nurse and the time invested in end-of-life discussions. A second benefit was the reassurance families felt knowing that the physician would

come to the facility to see the resident when a change in condition happened. Despite these efforts to enhance caring for residents on site, some residents/families insisted their residents be sent to the hospital when experiencing a change in condition. One P-O facility administrator stated that more family education was necessary, adding that hospital participation in such education would be beneficial. Another P-O administrator stated that it was difficult for him to tell a family member that the hospital would treat residents in the same way as the facility. He stated, *"This [family mentality to send residents to the hospital] won't happen until the federal government says, 'You're not going to the hospital.' I don't know if that will ever happen."*

F.3.2 Facility Staff

In general, and not specifically related to OPTIMISTIC, facilities in both groups were trying to hire more registered nurses. Some facilities added positions such as respiratory therapists and wound care specialists. One P-O facility reported hiring an RN with a graduate degree for the facility education position. Both P-O facilities and C+P facility interviewees described a change in facility care practice away from hospitalization and toward treating residents in house. One P-O staff person stated, *"The Initiative forces us to take extra steps instead of sending [the resident] to the emergency room."* In contrast, C+P facilities stated that this care practice change had already occurred during NFI 1 and remained unchanged in NFI 2.

Most facilities in both groups reported that staff turnover and other facility priorities continued to interfere with staff engagement. One P-O facility leader stated that the facility had so many other broken systems (e.g., high rates of staff turnover) there was no time to implement the Initiative, even though they wanted to do so.

F.3.3 Practitioners

Practitioner engagement in the Initiative remained largely unchanged in Initiative Year 4. Most C+P facility administrators reported no issues with getting practitioners to certify resident episodes in a timely manner. These facilities reported having a non-OPTIMISTIC practitioner in the facility 5 days per week. Some stated that the Initiative prompted practitioners to make more timely visits in response to resident changes in condition. C+P leaders expressed reliance on the OPTIMISTIC nurse for taking the lead in coordinating the NFI 2 certification process.

In contrast, most participating P-O facilities in Indiana are rural and have less frequent practitioner presence. Some rural facility leaders reported difficulty getting a physician to certify an episode within the required timeframe for NFI 2 billing. One P-O facility leader reported that the facility practitioner said, *"I do not want to drive 20 minutes to do an initial visit."* Other P-O facility leaders reported significant use of on-call practitioners who did not know the residents or facility staff and, as a result, tended to send residents to the emergency department (ED) when changes in condition occurred. Finally, many P-O facilities reported that they did not have a consistent staff

person who was able to champion the Initiative and facilitate the process of certifying resident episodes, resulting in less frequent NFI 2 billing.

F.3.4 Other Facility Factors

A few facility administrators in both groups reported experiencing a change in the medical acuity of residents being admitted to their facilities. Of those reporting, half said they had been seeing an increase in acuity with more comorbidities. The other half reported admitting more residents who were younger and had mental health conditions that were not billable under NFI 2.

Leaders in two rural, P-O facilities said the local hospital had placed and were maintaining x-ray machines in their facilities to enable quicker diagnoses of changes in condition. Additionally, some facilities reported better access to laboratory services because of participation in the Initiative.

Several P-O facility administrators reported changes to their staff education programs. Examples included increasing focus on clinical assessment skills and using more in-person training instead of video-recorded training modules. One P-O facility leader stated that caring for residents in place was a focus of educational sessions for all facility staff.

F.4 Facility and Practitioner Billing

Many interviewees in both C+P and P-O facilities spoke highly of the support provided by OPTIMISTIC. This support included monthly phone calls to review a variety of NFI 2 data elements. Facilities in both groups reported that the facility billing rate reports provided by OPTIMISTIC were one of the most useful data elements.

F.4.1 ECCP Tools & Support

OPTIMISTIC continued to support facilities in both groups by providing monthly reports that included facility rehospitalization rates, facility billing rates, and other data components. A few facilities in both groups noted that they preferred to receive more data from OPTIMISTIC rather than less, even though they were not actively engaging with all of the data components. OPTIMISTIC also continued to provide a billing audit tool that most C+P and P-O interviewees said they used to make sure requirements were met to bill an episode of care for NFI 2. OPTIMISTIC offered monthly engagement calls, quarterly meetings, webinars, and email assistance to provide additional C+P and P-O facility support. Interviewees were appreciative of these opportunities, even though use of tools and attendance at meetings varied by facility.

F.4.2 Facility Billing & Recoupment

C+P and P-O interviewees reported wide variation in their NFI 2 billing. A few facilities in both groups reported minimal billing because the six qualifying conditions were not commonly experienced by their resident populations or their resident populations were very small (i.e., younger residents with mental health concerns, growth of short-term resident populations, higher

acuity residents). Several interviewees from both C+P and P-O facilities reported that the number of episodes billed decreased in Initiative Year 4 compared to the prior year because of the 2019 CMS changes in NFI 2 clinical criteria, particularly for urinary tract infections (UTIs) and skin infections. Instead, some facility interviewees reported more of a facility focus on other initiatives, such as antibiotic stewardship.

Some facilities in both groups reported they had received requests for additional documentation from CMS related to NFI 2 billable episodes. The most common issues identified when a billing episode was questioned were incorrect billing dates and not having adequate supporting documentation from either facility staff or practitioners. No facilities reported that money had been recouped.

Facility interviewees attributed missed opportunities for NFI 2 billing to staff turnover (i.e., lack of Initiative awareness among newer hires and agency staff), lack of facility nursing skills, inability of staff to capture changes of condition in a timely manner, lack of supporting documentation by facility staff, missing laboratory results, and inability to get practitioners to certify within the NFI 2 billing window. Several facilities in both groups also reported that missed opportunities resulted from the absence of a champion to ensure that all necessary steps for billing were completed. This absence happened infrequently for C+P facilities during those times when an OPTIMISTIC RN position was vacant. The champion was needed to coordinate among clinical staff, practitioners, and the billing department. One C+P administrator emphasized that it was important for a facility to have *"someone that can be a driver for the revenue that we generated and someone that makes sure we are taking all of the right steps."* A few P-O facilities reported that they had identified an OPTIMISTIC champion to assist with the billing process.

Some facilities in both groups had centralized corporate billing and, as a result, were not aware whether episodes had been billed or reimbursed, or how reimbursed funds were used. Of the facilities that had received NFI 2 claims payments directly, most in both groups stated that money generated from NFI 2 episodes was used for capital expenditures, typically defined as any expense that exceeds a defined amount (such as the purchase of sit-to-stand devices).

F.4.3   Practitioner Billing & Recoupment

Although most practitioners in both groups were willing to certify billable episodes for the facilities, some continued to be uninterested in billing because their payment structures provided no incentive for them to use the available NFI 2 billing codes. One administrator in a P-O facility reported that it is *"important for physicians to be motivated through financial measures because they ultimately make the decision [to hospitalize the resident]."* Practitioners in both groups who received NFI 2 reimbursement directly billed more often than those who worked in group practices where reimbursement was indirect. According to interviewees, additional reasons for not billing included time involved in the billing process, low practitioner confidence in facility staff ability to treat residents in-house, and fear of CMS audits.

F.5   Success and Challenges

Both C+P and P-O facilities saw a change in facility care practices with their staff prioritizing residents' in-house treatment, but interviewees described struggles maintaining accuracy and adequacy of necessary NFI 2 documentation.

F.5.1   Most Successful Intervention Components or Tools

Most frequently noted as a success was the overall care practice change seen in the facilities and the staff. Both C+P and P-O interviewees observed this change, especially in their clinical care nurses and in some practitioners, who had initially been reluctant to engage in the Initiative. One C+P administrator stated, *"A lot of nursing staff are habituated to notice early signs and symptoms that may preclude hospitalization. Naturally, they will follow those tendencies acquired through executing this program."*

In regard to the successes of the Initiative, C+P facilities reported satisfaction with the OPTIMISTIC nurses and the additional education and training opportunities provided for staff nurses. Additionally, some C+P facilities reported that the Initiative improved communication between facility nurses, administration, and doctors.

When noting successes, both C+P and P-O facilities saw growth in their nurses' clinical and analytic skills as a result of the education from OPTIMISTIC and the use of OPTIMISTIC tools. A P-O facility noted that this skills improvement would help their residents beyond the end of the Initiative. Both C+P and P-O facilities also saw the tools implemented (i.e., audit tool, diagnostic card, missed opportunity data) by the Initiative as NFI 2 successes, citing that their facilities have integrated these tools into daily activities.

F.5.2   Most Challenging Intervention Components or Tools

Some C+P interviewees and several P-O interviewees questioned the sustainability of the NFI 2 documentation requirements. These requirements will not be needed for NFI 2 billing beyond the end of the Initiative, but many interviewees explained that this level of documentation would be impossible to sustain, even if it were attempted for better resident charting or record-keeping.

Facility interviewees named a few other challenges with NFI 2 components. Some C+P facilities faced challenges with the Initiative because of delays in receiving lab results, which negatively impacted the ability to bill NFI 2 for an episode of care. Another facility noted that because of facility staffing challenges, their OPTIMISTIC RN was assisting with non-Initiative tasks, such as helping organize transportation to the ED. Additionally, some facilities noted that the CMS change in clinical criteria created challenges in billing NFI 2 for some resident changes in condition, although participating practitioners reportedly had no concerns about the revised NFI 2 criteria.

F.6   Avoidable Hospitalizations

Administrators in most facilities, both C+P and P-O, reported positive effects of the Initiative on avoidable hospitalizations. In the C+P group, most administrators continued to believe that the successful decrease in hospitalizations was attributable to the NFI 1 clinical interventions more than the NFI 2 reimbursement intervention.

F.6.1   Perceived Effectiveness of the Initiative

Most C+P and P-O facility administrators believed the Initiative had been effective in reducing avoidable hospitalizations, but many also reported other positive effects. For example, many reported an increase in the ability of staff to identify early changes in condition which often resulted in avoidance of hospitalizations. This increase in staff skills improved overall care quality, but because staff identified changes in condition prior to exacerbation, many of these were not billable for NFI 2. Related, several administrators mentioned other Initiative benefits including improved clinical assessment skills, more staff self-confidence in clinical abilities, better documentation, improved communication with practitioners, and increased number of end-of-life discussions and POST forms completion.

A small number of facility interviewees from both groups stated that they had historically low hospitalization rates and did not see additional benefits from participation in the Initiative. Other facility administrators stated that the Initiative did not change how they cared for residents; instead, it provided a financial incentive for care practices already in place in their facilities. As one P-O facility nurse stated, *"The payer source doesn't matter for us…we're going to treat the same and do change of condition the same and call the doctor the same."*

F.6.2   New Reports of Spillover and Contamination Effects

Administrators in both groups reported that staff were more aware and focused on capturing changes in resident condition. This applied to both NFI 2-eligible and non-eligible residents, and to changes in conditions other than the six specified in NFI 2.

F.7   Updates to Policies & External Stakeholders

An increase in Medicare managed care penetration and an increase in use of hospice care decreased the number of residents eligible for the Initiative.

F.7.1   Hospital Engagement

C+P and P-O administrators reported that they were not sure their local hospitals were aware of their facility participation in the Initiative. In general, when the hospitals were aware of NFI 2, facility interviewees described their NFI 2 participation as having a positive effect on the hospital-facility relationship.

F.7.2   Competing or Similar Initiatives

Several facilities reported an increase in number of residents selected a Medicare managed care plan, with some facilities reporting newly penned facility contracts with managed care organizations. Managed care penetration reduced the number of NFI 2-eligible residents in both C+P and P-O facilities.

In addition, some facilities in both groups reported an increase in hospice utilization. A few interviewees indicated that some hospitals and practitioners were "pushing" for more use of hospice services.

A few interviewees mentioned other efforts to reduce hospitalizations. Some rural P-O facilities reported that emergency medical services' personnel were performing resident assessments and starting intravenous fluid administration at the facility. By doing so, they were able to prevent some resident transfers to the hospital. In addition, at least one facility reported that its focus on antibiotic stewardship had already decreased occurrences of UTI and respiratory infections.

Finally, facility leadership focused on readmission rates of short-term residents and allocated resources to that effort, in turn decreasing resources available to preventing readmission of long-term residents.

F.8   Initiative Sustainability and Plans for the Future

Most facility administrators in both groups indicated that the Initiative helped staff adopt sustainable care practices to prevent avoidable hospitalizations. Although most facilities in both groups reported maintaining use of OPTIMISTIC tools (e.g., SBAR), C+P facilities had concerns about continued implementation of the various interventions provided by the OPTIMISTIC nurses.

F.8.1   ECCP's Plans

The OPTIMISTIC plan for facilities in Project Year 4 was to educate facility staff in taking over the role of the OPTIMISTIC RN. OPTIMISTIC planned to request a no-cost extension of the Initiative to work with interested facilities.

Additionally, OPTIMISTIC has continued to market its commercial product, Probari. This product offers consultation to facilities on strategies, methods, and tools OPTIMISTIC deemed to be successful in preventing avoidable hospitalizations. OPTIMISTIC planned to market Probari to facilities nationwide, not just within Indiana.

F.8.2   Facility Plans

Leaders in C+P facilities stated that nursing staff, social service workers, and practitioners would continue to implement interventions provided by the OPTIMISTIC nurses beyond the end of NFI 2. All facilities reported the OPTIMISTIC nurse position would be missed. One leader stated, *"The*

OPTIMISTIC [nurse] just looks at residents and doesn't have paperwork or dining room duty [unlike facility nurses], so losing her focus is going to be the hardest part. If the unit managers take on [ECCP nurse] work, it is just added things for them to do." Another facility leader remarked, *"We will be lost. We are worried about that. [ECCP nurse] is another set of eyes and wants to lend a hand."* OPTIMISTIC activities specifically mentioned that would be hardest to sustain were the end-of-life discussions and the bedside, real-time education provided by OPTIMISTIC staff. None of the interviewed C+P facility administrators reported that they would be able to replace the OPTIMISTIC nurse positions in their facilities.

P-O facility administrators said they were hopeful that staff would continue to use the tools OPTIMISTIC introduced during NFI 2. These tools reportedly helped staff to identify changes in resident condition more quickly, document appropriately, and indirectly encouraged use of the SBAR tool that had already been implemented prior to NFI 2. A few facility leaders remarked that Medicare managed care organizations, such as Optum, had a similar goal of preventing hospitalizations and would help sustain NFI 2 practices in their facilities.

Administrators in almost all facilities expressed disappointment that the Initiative was ending.

F.9   Conclusion

Through Initiative Year 4, C+P and P-O facility leadership frequently reported that they observed a change in care practices among clinical care nursing staff, practitioners, and administrators. Although facilities noted that staff awareness of changes in resident condition had improved, the staff still may not have the clinical and analytical skills necessary to achieve good outcomes for residents with more advanced illnesses. Particularly for C+P facilities, interviewees said that sustaining NFI 2 practices would be very challenging, absent the OPTIMISTIC nurse. Going forward, facilities will continue prioritizing OPTIMISTIC tools to help identify and treat resident changes in condition, and some felt that the growing Medicare managed care presence would help support a continued facility focusing on reducing avoidable hospitalizations.

APPENDIX G
RAVEN TELEPHONE INTERVIEW FINDINGS, INITIATIVE YEAR 4

G.1   Key Findings

Based on interviews[7] with ECCP leadership and facility staff, RTI identified the following key findings:

- *As of the final year, the Initiative had stabilized and matured, with most facility staff having internalized the goal of reducing avoidable hospitalizations. Across facility groups, interviewees understood the goals of the Initiative, and a majority viewed NFI 2 as having reduced hospitalization rates in their facilities.*

- *Many Clinical + Payment (C+P) and Payment-Only (P-O) facility interviewees reported that the number of Initiative-eligible residents was relatively stable throughout the Initiative. Some facilities reported increased acuity for long-stay residents in recent years.*

- *C+P facilities reported continued NFI I activities, including a focus on end-of-life (EOL) care and widespread adoption of INTERACT tools to support facility communication. P-O facility interviewees also adopted INTERACT tools and noted that their use encouraged greater facility staff Initiative support. Both facility groups intended to sustain INTERACT tool use after the end of NFI 2.*

- *In C+P facilities, nursing staff buy-in varied based on perceptions of the RAVEN nurses. Although all RAVEN nurses facilitated staff engagement and NFI 2 billing, facility staff reported more positive perceptions of RAVEN APRNs compared to RNs, because APRNs were able to write orders and confirm the NFI 2 diagnoses.*

- *Facility billing varied substantially by facility. Most C+P facility interviewees noted that NFI 2 billing was handled by the RAVEN nurses. In P-O facilities, interviewees attributed billing variation to degree of practitioner engagement, wherein facilities with more engaged practitioners submitted more NFI 2 claims.*

- *According to interviewees from both groups, facility and practitioner NFI 2 billing rates did not increase in Initiative Year 4 and practitioner engagement remained challenging.*

- *Integration of the Curavi telemedicine carts in C+P facilities remained mixed, with most facilities reporting only occasional use. With the nationwide increase in use of telemedicine during the ongoing COVID-19 pandemic, RAVEN has*

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[7] COVID-19 Note: RTI conducted Year 4 facility telephone interviews in early 2020, prior to the onset of the COVID-19 pandemic. The pandemic prevented RTI site visits to facilities or ECCPs. Instead RTI conducted ECCP telephone interviews in July, 2020. All ECCP interviewees noted that the pandemic interrupted NFI 2 activities, facility engagement, and Initiative billing through 2020. From March through the end of NFI 2 in September, ECCP staff were unable to continue their work in C+P facilities, and ECCP leaders were unable to provide in-person support to C+P or P-O facilities.

focused on providing additional consultation services via the Curavi carts in the C+P facilities.

- *Among the P-O facilities, some interviewees stated that NFI 2 was one of the reasons behind hiring new facility APRNs. They noted that practitioners missing the 48-hour window for certifying changes in condition had been a major impediment to NFI 2 billing, so having a full-time APRN facilitated quicker assessment and treatment of resident condition changes.*

In January and February 2020, the RTI team completed 20 telephone interviews with facility leaders and staff in both C+P and P-O facilities. We interviewed a variety of staff in these facilities, including nursing facility administrators (NFAs), directors of nursing (DONs), assistant directors of nursing, practitioners, billing/finance coordinators, and other nursing staff. Additionally, we interviewed ECCP leadership in July 2020. *Table G-1* summarizes data collection in 2020, and *Table G-2* summarizes the telephone interview findings for facility staff buy-in and implementation.

Table G-1.   RAVEN 2020 data collection summary

Number of facilities participating as of January 1, 2020:	35
Ownership changes since 2019 site visit:	None
Facilities withdrawn or removed from Initiative since 2019 site visit:	None

Table G-2.   RAVEN Telephone interview summary findings: Facility staff buy-in and implementation, 2020

Topic	Total	Clinical + Payment	Payment-Only
Interviewed facilities (by phone)	20	8	12
Interviewer perceptions of buy-in to NFI 2			
High	11	3	8
Medium	7	4	3
Low	2	1	1
Number of facilities that hired/contracted new staff/increased staff hours in 2020 because of NFI 2	3	0	3
Number of facilities with resident opt-outs in 2020	4	1	3
Number of facilities reporting that NFI 2 has been effective in reducing PAHs	15	5	10

NOTE: Buy-in is based on interviewer perceptions using the following definitions: *High buy-in*: Facilities that are billing regularly, with staff who are aware and engaged; overall, the facility interviewees speak highly of the Initiative and its impact on reducing avoidable hospitalizations. *Medium buy-in*: Facilities that have begun to bill but are not doing so regularly; staff may recognize the Initiative and key components but may not be fully engaged. *Low buy-in*: Facilities that have not started billing or have not trained staff on the six conditions; generally limited engagement and limited participation in NFI 2.

G.2   ECCP Activities

The ECCP made no changes to the intervention in Initiative Year 4. Interviewees understood the Initiative goals, and most viewed them as fully implemented in their facilities.

G.2.1   Structure and Intervention Design

C+P and P-O interviewees said the intervention remained the same in Initiative Year 4 as it had been in previous years. However, among the C+P facilities, some interviewees noted that their facilities had RAVEN registered nurses (RNs), rather than advanced practice registered nurses (APRNs). Although some of these RNs had been with their facilities since the start of NFI 2, others had been hired to replace RAVEN APRNs because of ongoing APRN hiring challenges. Interviewees, whose facilities had previously had RAVEN APRNs, missed having their assessment skills and ability to write orders and certify for NFI 2 billing.

Through Initiative Year 4, RAVEN maintained its nurse liaison to support NFI 2 billing efforts in P-O facilities as these facilities did not have on-site RAVEN nurses. P-O interviewees described monthly in-person meetings with the RAVEN nurse liaison, noting that these conversations were especially helpful for NFI 2 facility education on billing documentation. The nurse liaison began conducting mock audits in Initiative Year 3 ensuring that facilities met NFI 2 documentation requirements. Interviewees described these mock audits as beneficial. When the COVID-19 pandemic began, the nurse liaison was no longer able to visit the P-O facilities in person because of facilities' concerns, so she switched to supporting the facilities remotely.

G.2.2   Learning Community Activities

In Initiative Year 4, interviewees reported less participation in RAVEN learning community activities compared to previous years, although P-O facilities seemed to be more aware of these activities than C+P facilities. Interviewees who had participated generally viewed the calls and events as helpful but nonessential components of the Initiative.

G.2.3   Intervention Tools and Other Components

Nursing staff in both C+P and P-O facilities use SBARs and Stop and Watch INTERACT tools, which has become a standard practice in most facilities. One P-O NFA stated that, *"Nurse aides are empowered by Stop and Watch. They used to feel like reports to nurses fell on deaf ears. Nurse aides don't always feel that they're important, but actually they are the most important actors in the residents' lives."*

RAVEN has continued supporting the telemedicine component for C+P facilities. When asked how RAVEN telemedicine is working, C+P interviewees described the Curavi telemedicine carts as somewhat helpful but underutilized. Although many facilities thought telemedicine was a promising solution to a lack of practitioner coverage, the efficacy of the Curavi carts in C+P facilities was muted because of inconsistent adoption. ECCP leadership speculated that in C+P

facilities that adopted and consistently used Curavi, telemedicine use would likely continue after the end of the Initiative. Because RAVEN nurses had to be pulled out of all C+P facilities because of the COVID-19 pandemic, ECCP leadership described additional consultative support being provided through Curavi carts to help facilities during the pandemic.

Although all C+P interviewees said their facilities prioritized advance care planning for residents, most did not feel RAVEN was affecting their EOL care directly. Some C+P interviewees said that the Jewish Healthcare Foundation, a RAVEN partner, had been helpful in educating providers on having discussions with residents on advance care planning and POLST forms and EOL dementia care. A few P-O interviewees indicated that the RAVEN program had a positive impact on EOL, although these facilities had not received the same level of RAVEN support for EOL efforts as C+P facilities with RAVEN nurses. Among the P-O interviewees who mentioned EOL, most cited an improved emphasis on building robust palliative care and hospice programs, stressing non-RAVEN APRN conversations with residents and families regarding their care wishes, and more facility staff education about EOL care.

Medication management reviews in C+P facilities by Rx Partners were not widely discussed in Initiative Year 4.

G.3   NFI 2 Engagement

Through Initiative Year 4, facility staff engagement increased slightly in P-O facilities but remained largely unchanged in C+P facilities. The opposite seemed to be true for practitioner engagement, with slight increases in C+P facilities and no change to practitioner engagement in P-O facilities.

G.3.1   Residents and Families

Across C+P and P-O facilities, most interviewees indicated that residents and families who were aware of the Initiative viewed it as a positive attribute in the facilities. Interviewees noted that many residents and families agreed that treating residents in place is best when possible, although some families still insisted their family member go to the hospital even when the facility could safely treat in place. Some interviewees also noted that they were not sure that families fully understood the Initiative, especially in the C+P facilities. Interviewees believed that families just saw the ECCP nurse as being part of the facility's care structure.

Facilities reported no recent opt-outs. Some interviewees in both C+P and P-O facilities mentioned a small number of opt-outs in the very beginning of the Initiative, but those were mostly the result of a lack of understanding and concern that the Initiative would prevent them from getting necessary hospital treatment.

G.3.2 Facility Staff

Facility staff engagement in C+P facilities remained consistent with previous Initiative years. Interviewees explained that the RAVEN nurse continued to champion most Initiative-related activities and that staff and RAVEN nurse relationships remained strong. Interviewees highlighted that facility staff often preferred to go to the RAVEN nurses with resident questions or concerns, rather than other facility or corporate practitioners.

Most P-O interviewees said they felt it was easy to achieve NFI 2 staff buy-in because their facilities already had existing care practices focused on treating residents in place whenever possible. Accordingly, P-O facility interviewees reported that facility staff have remained engaged with the Initiative. Although the concept of treating in place was not new, several interviewees noted that their facility staff were able to identify changes in condition more quickly than they did prior to NFI 2. Some P-O facilities also identified facility staff RNs to serve as RAVEN champions, which interviewees said helped support ongoing staff engagement with Initiative goals in their facilities.

Among the small number of facilities with lower engagement, interviewees cited staff turnover as the primary barrier to NFI 2 facility staff buy-in. When facilities have inconsistent staff, NFI 2 practices (e.g., use of INTERACT tools) are hard to maintain and require constant retraining of new staff. Some C+P facility interviewees also noted that use of agency staff who were unfamiliar with the Initiative served as barriers to NFI 2 engagement in their facilities.

G.3.3 Practitioners

As in prior years, practitioners engaged more with the Initiative in P-O facilities than in C+P facilities. C+P interviewees attributed this lower engagement to the presence of RAVEN APRNs who could certify resident conditions for NFI 2, reducing the need for outside practitioner participation. However, some facility interviewees noted that across all years of NFI 1 and NFI 2, practitioner engagement improved, as non-ECCP practitioners became more comfortable with the RAVEN nurses and facility care efforts to treat residents in-house. RAVEN helped these practitioners increase their trust in and respect of the facility nursing staff, which enabled them to build stronger working relationships with these nurses.

In contrast, practitioner engagement in P-O facilities remained largely the same across all Initiative years. Some P-O facilities reported having non-ECCP APRNs on staff who appeared to be more engaged, compared to attending physicians. Three of these P-O facilities noted that they had hired new practitioners, at least partly because of RAVEN. These staff assisted with facility tasks including helping certify diagnoses for the six qualifying conditions. Interviewees in P-O facilities without APRNs on staff reported struggling to get physicians to properly document and certify resident conditions within the required NFI 2 time window. As one of those P-O NFAs stated, *"[The physicians] haven't bought in since day one. It wasn't good and hasn't gotten better. Our three doctors all have big practices, so they won't drop their office hours to come in. [The RAVEN nurse*

liaison] will do training with them, but they can't make it in within the time window." Some P-O facilities also mentioned turnover among practitioners, which they said also affected engagement.

G.3.4   Other Facility Factors

Few facilities noted changes in capabilities, and although many facilities discussed increased acuity of their long-stay resident populations in prior Initiative years, not many facilities reported a significant change in 2020.

G.4   Facility and Practitioner Billing

Billing for NFI 2 remained challenging for many facilities. In C+P facilities, interviewees cited insufficient documentation as the primary barrier to submitting Initiative claims, and some P-O facility interviewees noted that lack of practitioner engagement continued to hinder Initiative billing.

G.4.1   ECCP Tools & Support

Staff from both C+P and P-O facilities spoke highly of billing support from RAVEN. C+P facility interviewees reiterated their happiness with the ongoing NFI 2 billing support from RAVEN nurses. P-O staff described monthly visits, mock audits, and ongoing education provided by the RAVEN P-O nurse liaison as particularly useful.

G.4.2   Facility Billing & Recoupment

Although some facilities submitted Initiative claims regularly, others rarely billed for NFI 2, even if changes in residents' conditions were recognized and treated. Staff in C+P facilities tended to rely solely on the RAVEN nurse to oversee billing for the Initiative. In contrast, P-O facility interviewees relied on facility staff, which led to some missed opportunities. Interviewees cited a lack of sufficient documentation as the primary reason for missed opportunities. Secondary concerns among both facility groups included insufficient practitioner coverage or buy-in to get timely certifications, and missing certification windows when tests were required to confirm a change in condition, especially for UTIs.

Few interviewees could offer estimates of NFI 2 reimbursement, and many were uncertain whether recoupment had occurred. One P-O NFA stated that the NFA's facility had experienced recoupment *"[once] or [twice] each time we audited, often because the physician didn't confirm a diagnosis. RAVEN leadership improved this process over time."*

G.4.3   Practitioner Billing & Recoupment

In Initiative Year 4, interviewees reported inconsistent NFI 2 practitioner billing, particularly for practitioners in P-O facilities. In some cases, interviewees said the medical director was engaged with the Initiative, but some attending physicians or non-RAVEN APRNs felt there were too few residents eligible for RAVEN to bother with Initiative claims submission. Interviewees from both

facility groups stated that involvement of the medical director was often seen as key to encouraging other facility practitioners to buy in.

None of the interviewees from either facility group offered insights into practitioner billing recoupment or audits.

G.5   Successes and Challenges

Facility interviewees reported success in educating their staff on identifying the six conditions and using the associated NFI 2 clinical tools; staff turnover and practitioner engagement remain large challenges.

G.5.1   Most Successful Intervention Components or Tools

Although C+P facility interviewees described general successes in their facility staff learning to identify the six Initiative conditions, most agreed that the RAVEN nurses were the most beneficial component of NFI 2. As one C+P NFA stated, *"Anytime you have a practitioner that's embedded and is hands on and clinical that can see and touch residents and assess and give orders, that has [a positive] effect on hospital readmissions."*

Almost all interviewed staff from P-O facilities felt they had been successful in establishing and maintaining processes for identifying the six conditions using NFI 2 education materials and INTERACT communication tools, such as Stop and Watch. Many C+P and P-O facility interviewees described the RAVEN quarterly reports as being helpful to understanding what specific clinical situations led to hospitalizations and what areas of focus would result in more opportunities to treat residents in place.

G.5.2   Most Challenging Intervention Components or Tools

C+P facility interviewees described very few intervention challenges, likely because the RAVEN APRNs were responsible for documenting and certifying residents with the six qualifying conditions. Rather, C+P facility interviewees reported concerns with sustaining the intervention components because of ongoing staff turnover in many facilities. With high facility staff turnover and the use of agency staff, interviewees reported difficulty sustaining and consistently using Initiative components such as INTERACT tools.

Nearly all P-O facility interviewees said that the lack of consistent practitioner engagement was the most challenging component of NFI 2. Although many interviewees stated that their practitioners generally agreed with the goals of the Initiative, they often were unwilling or unable to certify residents within the required NFI 2 time window. Interviewees explained that these practitioners had too few eligible residents in their facility or too many other competing responsibilities for the Initiative to become their priority. Other P-O interviewees noted that even when practitioners

were able to certify residents within the required time window, their documentation often failed to meet NFI 2 criteria, thus preventing the facility from submitting Initiative claims.

Interviewees from both groups noted the criteria for some of the six qualifying conditions were challenging to meet, especially following CMS revisions to the clinical criteria in 2019. Interviewees felt that the revised criteria were too stringent; staff often recognized and treated residents before the conditions worsened to the point of qualifying for NFI 2 billing.

G.6   Avoidable Hospitalizations

Facility interviewees from both groups reported that NFI 2 had reduced avoidable hospitalizations. However, compared to prior Initiative years, fewer facility interviewees expressed this sentiment.

G.6.1   Perceived Effectiveness of the Initiative

Overall, facility staff remained positive regarding the Initiative's effect on reducing avoidable hospitalizations. Many interviewees from both facility groups cited the Initiative as improving clinical staff confidence and facilitating earlier recognition of resident changes in condition. However, some interviewees noted that the Initiative did not focus on a large enough eligible patient population to be effective (e.g., could have included short-stay residents as well), concluding that NFI 2 had not had as profound an effect on reducing avoidable hospitalizations as it could have.

A few interviewees from both facility groups also said the Initiative was redundant. These interviewees explained that NFI 2 provided a financial incentive for facility care practices that had been in place prior to the Initiative. As one P-O quality director said, *"I think [RAVEN] doesn't change anything because our philosophy is aligned with RAVEN. We are still going to go ahead and encourage the doctor to treat in place."*

G.7   Updates to Policies & External Stakeholders

Although a few C+P and P-O interviewees reported that the managed care population increased overall, most made few mentions of other policies or coordination with external stakeholders that might overlap or impede NFI 2 implementation.

G.7.1   Hospital Engagement

None of the C+P facility interviewees described any new interaction with local hospitals. Interviewees noted that some hospitals were aware of NFI 2, but that awareness had not had any effect on the facility-hospital relationship.

Some P-O facility interviewees described participating in new Affordable Care Organizations (ACOs). One P-O interviewee from a facility that was a member of an ACO described RAVEN as well aligned with the ACO-wide effort to treat residents in place consistently. In contrast, a P-O NFA

from another facility felt that their participation in ACO had resulted in a higher-acuity patient case-mix. Some of these higher-acuity residents had cognitive issues or other comorbidities that required additional care and increased their potential need for hospitalization.

G.7.2 Competing or Similar Initiatives

Both C+P and P-O interviewees reported an overall increase in Medicare managed care penetration, although most said the impact of Medicare managed care was minimal on their long-stay population. Some interviewees even noted that they had converted managed care patients to fee-for-service upon admission to the facility. One P-O NFA explained, *"[FFS] is easier, don't need pre-certifications. Families always agree."* Other facilities expressed more neutral views about Medicare managed care plans, but none of the interviewees felt this growth had any effect on NFI 2 participation in facilities.

G.8 Initiative Sustainability and Plans for the Future

Most interviewees from both C+P and P-O facilities said their staff intended to maintain the existing clinical practices from NFI 2 after the Initiative ended. P-O facility interviewees noted that efforts to keep residents in the facility for care had existed prior to NFI 2 and would be sustained beyond the end of the Initiative. RAVEN leadership also planned to continue the RAVEN intervention in University of Pittsburgh Medical Center (UPMC)-owned facilities.

G.8.1 ECCP's Plans

RAVEN leaders will continue encouraging facilities throughout Pennsylvania to treat residents in place, relying on key lessons learned during NFI 1 and NFI 2. They planned to maintain the RAVEN intervention in UPMC-owned facilities, encouraging a gero-palliative approach that initially underlined the NFI intervention. RAVEN leadership reported that Rx Partners would continue to provide pharmacy reviews to UPMC facilities. UPMC's telemedicine effort through Curavi Health also would continue in UPMC facilities and expand to other facilities within and beyond Pennsylvania.

G.8.2 Facility Plans

Regarding NFI 2 sustainability, all C+P and P-O facility interviewees stated that they would continue to focus on reducing avoidable hospitalizations and treating residents in the facility whenever possible. C+P facilities noted that they would continue to use the INTERACT tools, educate staff on early recognition and treatment of the six conditions, and use all educational materials from NFI 2. Some C+P facilities also expressed interest in hiring their existing ECCP APRNs to support ongoing facility care practices. Because many P-O facility interviewees felt that NFI 2 standards of care were in place in their facilities before the Initiative began, they felt these same standards would remain after the end of the Initiative. A few P-O DONs added that they might be pleased for the end of the Initiative because it would mean a return to the standard

documentation practices rather than the more extensive nursing documentation that was required for NFI 2 billing.

G.9　Conclusion

Across all years of NFI 2, participating C+P and P-O facilities endeavored to increase early identification of resident changes in condition and reduce avoidable hospitalizations. Nearly all C+P facility interviewees reported that a change in facility care practices occurred during NFI 1 and NFI 2, with on-site treatment becoming more of a priority for all facility staff. Although most P-O facilities already had prior efforts in place to reduce avoidable hospitalizations, many interviewees noted that NFI 2 had increased staff skills and awareness, particularly for recognizing the six conditions. That said, interviewees from both groups said the focus on reducing hospitalizations was a greater priority than submitting NFI 2 claims. Most interviewees noted a decrease in NFI 2 billing through Initiative Year 4.

Most facility interviewees highlighted plans to continue use of INTERACT tools and, particularly for facilities with non-RAVEN APRNs, ongoing practitioner support to identify and treat resident changes of condition quickly. However, interviewees also cited facility staff turnover concerns as potential barriers to INTERACT sustainability; the COVID-19 pandemic exacerbated these types of staffing challenges. RAVEN leadership hopes that telemedicine also would become a legacy of NFI 2 in Pennsylvania, but the efficacy of the Curavi carts in C+P facilities was muted because of inconsistent adoption.

APPENDIX H
SURVEY FINDINGS

H.1 Overview

For the NFI 2 evaluation, RTI conducted Nursing Facility Administrator (NFA) and Practitioner Surveys twice (Wave 1 and Wave 2). This appendix presents the full survey responses of all closed-ended questions from two waves of the NFA and Practitioner Surveys. The goal of this appendix is to examine whether NFA and practitioner responses changed between 2017 and 2018 as the Initiative matured, and to compare and contrast views and perceptions of NFAs and practitioners concerning similar issues related to the Initiative design, successes, and challenges.

While over 87 percent of respondents to the NFA survey were employed as NFAs, several directors of nursing (DONs) and billing staff responded as well. **Table H-1** presents the breakdown of roles among the NFA survey respondents. Among practitioners, we surveyed participating facility medical directors, attending physicians, as well as advanced practice registered nurses (APRNs). However, the survey specifically excluded ECCP nurses working on-site in Clinical + Payment (C+P) facilities. Physician respondents ranged from salaried employees of the facilities to independent practitioners; the breakdowns of physician roles and employment types are in **Tables H-20** through **H-23**.

We conducted Wave 1 surveys January–March 2018, asking respondents to think about their experiences with NFI 2 in their specific facilities during Initiative Year 1. For Wave 2 of the survey, conducted from March to April 2019, respondents were asked to focus on their experiences with NFI 2 during Initiative Year 2. All responses were stratified by facility intervention group, wave, and type of respondent (NFA or practitioner) and include the number of respondents for each group, along with a percentage distribution of answers to each survey question. **Tables H-2** through **H-19** focus on responses to both waves of the NFA Survey. **Tables H-20** through **H-41** focus on responses to both waves of the Practitioner Survey.

Table H-1 provides an overview of the NFA Survey and Practitioner Survey response rates and number of respondents. For our final samples presented below, we included only respondents who had completed (either "yes" or "no") a key question regarding use of the Initiative billing codes. For NFAs this question read, "Did your facility use any of the Initiative facility billing codes (G9679–G9684) for any of the six qualifying conditions?" The corresponding Practitioner Survey question read, "Have you used the Initiative practitioner billing codes (G9685 or G9686)?" The resultant samples totaled 215 NFAs in Wave 1 (95 in C+P and 120 in P-O facilities), and 217 NFAs in Wave 2 (92 in C+P and 125 in P-O facilities). Among the practitioners, we included 240 in Wave 1 (122 associated with C+P and 118 associated with P-O facilities), and 240 in Wave 2 (115 associated with C+P and 125 associated with P-O facilities).

Table H-1.   NFA and Practitioner Surveys: Data collection and response rates

Sample	Wave	Retrospective time period of survey	Data collection time period	Sample frame size	Number of respondents	Response rate (%)
NFA	Wave 1	2017	January to March 2018	249	216	86.7
NFA	Wave 2	2018	January to February 2019	246	217	88.2
Practitioner	Wave 1	2017	January to March 2018	680	241	35.4
Practitioner	Wave 2	2018	March to April 2019	547	240	43.9

SOURCE: RTI analysis of survey data.

H.2   NFA Survey Results

Table H-2.   What is your role at the facility?

Intervention group	N (NFA)	Percent			
		NFA/ED	DON	Billing staff	Other
Wave 1					
Overall	215	87.9	3.7	5.6	2.8
Clinical + Payment	95	91.6	4.2	4.2	0.0
Payment-Only	120	85.0	3.3	6.7	5.0
Wave 2					
Overall	217	88.0	6.0	2.3	3.7
Clinical + Payment	92	90.2	4.3	2.2	3.3
Payment-Only	125	86.4	7.2	2.4	4.0

DON = director of nursing; ED = emergency department; NFA = nursing facility administrator.

SOURCE: RTI analysis of survey data.

Table H-3.   When did you start working at the facility?

Question	N (NFA)	Percent		
		Before September 2012	Between September 2012 and <month> 2016	<month> 2016 or later
Wave 1				
Overall	215	44.2	33.0	22.8
Clinical + Payment	95	45.3	31.6	23.2
Payment-Only	120	43.3	34.2	22.5
Wave 2				
Overall	217	36.9	30.0	33.2
Clinical + Payment	92	34.8	34.8	30.4
Payment-Only	125	38.4	26.4	35.2

SOURCE: RTI analysis of survey data.

NOTE: <month> = go-live month; date varied by ECCP.

Table H-4.   Approximately how many practitioners (i.e., physicians, advanced practice registered nurses [APRNs], and physician assistants [PAs])…?

Question	N (NFA)	Mean	SD	Minimum	Maximum
Care for eligible long-stay residents at your facility*					
Wave 1					
Overall	215	5.9	4.6	1.0	37.0
Clinical + Payment	95	6.6	4.8	1.0	25.0
Payment-Only	120	5.4	4.3	1.0	37.0
Wave 2					
Overall	217	5.9	4.9	0.0	50.0
Clinical + Payment	92	6.8	6.6	0.0	50.0
Payment-Only	125	5.3	3.0	0.0	20.0
Are approved to participate in the Initiative at your facility?					
Wave 1					
Overall	215	4.2	3.4	0.0	20.0
Clinical + Payment	95	4.9	4.0	1.0	20.0
Payment-Only	120	3.7	2.8	0.0	20.0
Wave 2					
Overall	217	3.8	2.5	0.0	14.0
Clinical + Payment	92	4.5	3.0	0.0	14.0
Payment-Only	125	3.2	2.0	0.0	11.0
Are approved to participate in the Initiative and are salaried by your nursing facility/corporation?					
Wave 1					
Overall	215	0.7	1.6	0.0	12.0
Clinical + Payment	95	0.7	1.6	0.0	8.0
Payment-Only	120	0.8	1.6	0.0	12.0
Wave 2					
Overall	217	0.7	1.6	0.0	13.0
Clinical + Payment	92	0.7	1.8	0.0	13.0
Payment-Only	125	0.7	1.3	0.0	7.0

SOURCE: RTI analysis of survey data.

NOTE: * = Excluding the <ECCP Nurse> for Clinical + Payment (not AQAF/NY-RAH) facilities.

Table H-5. Do you have a full-time physician, APRN, or PA at your facility who cares for eligible long-stay residents?

Intervention group	N (NFA)	Percent		
		Yes	No	Other
Wave 1				
Overall	215	43.7	54.9	1.4
Clinical + Payment	95	44.2	54.7	1.1
Payment-Only	120	43.3	55.0	1.7
Wave 2				
Overall	217	48.8	51.2	0.0
Clinical + Payment	92	51.1	48.9	0.0
Payment-Only	125	47.2	52.8	0.0

SOURCE: RTI analysis of survey data.

NOTE: * = Excluding on-site ECCP staff who provided clinical care in many Clinical + Payment (not AQAF/NY-RAH) facilities.

Table H-6. Did your facility use any of the Initiative facility billing -codes (G9679–G9684) for any of the six qualifying conditions?

Intervention group	N (NFA)	Percent		
		Yes	No	Unsure
Wave 1				
Overall	215	88.8	3.7	7.4
Clinical + Payment	95	92.6	2.1	5.3
Payment-Only	120	85.8	5.0	9.2
Wave 2				
Overall	217	87.1	6.0	6.9
Clinical + Payment	92	89.1	5.4	5.4
Payment-Only	125	85.6	6.4	8.0

SOURCE: RTI analysis of survey data.

Table H-7. How frequently did the ECCP nurse confirm a qualifying diagnosis?

Intervention group	N (NFA)*	Percent				
		Never	Rarely	Sometimes	Often	Always
Wave 1						
Overall	52	3.8	1.9	19.2	36.5	38.5
Clinical + Payment	52	3.8	1.9	19.2	36.5	38.5
Payment-Only	—	—	—	—	—	—
Wave 2						
Overall	48	0.0	6.3	25.0	31.3	37.5
Clinical + Payment	48	0.0	6.3	25.0	31.3	37.5
Payment-Only	—	—	—	—	—	—

SOURCE: RTI analysis of survey data.

NOTES: * = skip pattern. Respondents were Clinical + Payment (not AQAF/NY-RAH). — = data not applicable.

Table H-8. How does your facility submit claims to Medicare for using the Initiative *facility* billing codes (G9679–G9684)?

Intervention group	N (NFA)*	Percent			
		Directly by facility	Via corporate/ chain centralized billing office	Via independent billing contractor	Other
Wave 1					
Overall	190	46.3	48.4	4.7	0.5
Clinical + Payment	87	46.0	48.3	5.7	0.0
Payment-Only	103	46.6	48.5	3.9	1.0
Wave 2					
Overall	187	49.2	46.5	4.3	0.0
Clinical + Payment	81	50.6	43.2	6.2	0.0
Payment-Only	106	48.1	49.1	2.8	0.0

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents were using billing codes.

Table H-9. How does your facility receive payments for using the Initiative *facility* billing codes (G9679–G9684)?

Question	N (NFA)*	Percent		
		Directly from Medicare	From corporate/ chain office	Other
Wave 1				
Overall	189	59.8	38.6	1.6
Clinical + Payment	87	57.5	41.4	1.1
Payment-Only	102	61.8	36.3	2.0
Wave 2				
Overall	187	54.0	46.0	0.0
Clinical + Payment	81	56.8	43.2	0.0
Payment-Only	106	51.9	48.1	0.0

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents were using billing codes.

Table H-10. My facility's corporate/chain administrative office transfers…

Question	N (NFA)*	Percent		
		All payment	Some payment	No payment
Wave 1				
Overall	73	76.7	5.5	17.8
Clinical + Payment	36	69.4	5.6	25.0
Payment-Only	37	83.8	5.4	10.8
Wave 2				
Overall	88	72.7	8.0	19.3
Clinical + Payment	35	77.1	5.7	17.1
Payment-Only	53	69.8	9.4	20.8

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents indicated their facility's corporate/chain administrative office received payment.

Table H-11. Have you or your staff received the following types of support related to Initiative?

Question	N (NFA)	Support (percent)		
		Sufficient	**Insufficient**	**Not received**
Educational materials and training (e.g., toolkits, webinars)				
Wave 1				
Overall	212	93.9	4.7	1.4
Clinical + Payment	94	94.7	3.2	2.1
Payment-Only	118	93.2	5.9	0.8
Wave 2				
Overall	216	93.5	4.6	1.9
Clinical + Payment	91	91.2	5.5	3.3
Payment-Only	125	95.2	4.0	0.8
Help with data collection and reporting				
Wave 1				
Overall	212	91.5	5.7	2.8
Clinical + Payment	94	94.7	5.3	0.0
Payment-Only	118	89.0	5.9	5.1
Wave 2				
Overall	216	82.4	9.3	8.3
Clinical + Payment	91	79.1	14.3	6.6
Payment-Only	125	84.8	5.6	9.6
Guidance on documentation requirements for nursing facility staff and/or practitioners				
Wave 1				
Overall	212	89.2	9.4	1.4
Clinical + Payment	94	91.5	8.5	0.0
Payment-Only	118	87.3	10.2	2.5
Wave 2				
Overall	216	88.4	7.4	4.2
Clinical + Payment	91	83.5	12.1	4.4
Payment-Only	125	92.0	4.0	4.0
On-call support (phone, email, or on-site) for questions about facility billing codes				
Wave 1				
Overall	212	91.5	3.8	4.7
Clinical + Payment	94	87.2	6.4	6.4
Payment-Only	118	94.9	1.7	3.4
Wave 2				
Overall	216	84.7	6.5	8.8
Clinical + Payment	91	80.2	11.0	8.8
Payment-Only	125	88.0	3.2	8.8

(continued)

Table H-11. Have you or your staff received the following types of support related to Initiative? (continued)

Question	N (NFA)	Support (percent)		
		Sufficient	**Insufficient**	**Not received**
Quality control and review prior to billing				
Wave 1				
Overall	212	72.2	8.0	19.8
Clinical + Payment	94	80.9	7.4	11.7
Payment-Only	118	65.3	8.5	26.3
Wave 2				
Overall	216	74.5	8.3	17.1
Clinical + Payment	91	74.7	14.3	11.0
Payment-Only	125	74.4	4.0	21.6

SOURCE: RTI analysis of survey data.

Table H-12. Overall, have you and your staff received sufficient support about using the Initiative *facility* billing codes (G9679–G9684)?

Intervention group	N (NFA)	Percent	
		Yes	**No**
Wave 1			
Overall	211	95.7	4.3
Clinical + Payment	93	96.8	3.2
Payment-Only	118	94.9	5.1
Wave 2			
Overall	216	91.2	8.8
Clinical + Payment	91	86.8	13.2
Payment-Only	125	94.4	5.6

SOURCE: RTI analysis of survey data.

Table H-13. How important is it that residents be treated on-site in the nursing facility whenever possible?

Intervention group	N (NFA)	Percent				
		Not at all important	**Somewhat important**	**Moderately important**	**Very important**	**Extremely important**
Wave 1						
Overall	211	0.0	0.5	0.0	10.0	89.6
Clinical + Payment	93	0.0	1.1	0.0	10.8	88.2
Payment-Only	118	0.0	0.0	0.0	9.3	90.7
Wave 2						
Overall	216	0.0	0.5	0.0	15.3	84.3
Clinical + Payment	91	0.0	1.1	0.0	14.3	84.6
Payment-Only	125	0.0	0.0	0.0	16.0	84.0

SOURCE: RTI analysis of survey data.

Table H-14. Please indicate the extent to which you agree or disagree with the following statements about the Initiative.

Statement	N (NFA)	Percent			
		Strongly agree	Agree	Disagree	Strongly disagree
Overall, it was easy to integrate the facility billing codes into my facility's existing processes.					
Wave 1					
Overall	211	35.5	57.8	5.2	1.4
Clinical + Payment	93	36.6	58.1	4.3	1.1
Payment-Only	118	34.7	57.6	5.9	1.7
Wave 2					
Overall	215	37.7	53.5	7.4	1.4
Clinical + Payment	91	35.2	57.1	6.6	1.1
Payment-Only	124	39.5	50.8	8.1	1.6
It makes financial sense for my facility to use the facility billing codes.					
Wave 1					
Overall	211	66.8	32.2	0.9	0.0
Clinical + Payment	93	71.0	29.0	0.0	0.0
Payment-Only	118	63.6	34.7	1.7	0.0
Wave 2					
Overall	215	57.7	38.1	2.8	1.4
Clinical + Payment	91	53.8	41.8	4.4	0.0
Payment-Only	124	60.5	35.5	1.6	2.4
The Initiative has improved the quality/outcomes of resident care at my facility.					
Wave 1					
Overall	211	58.3	38.9	2.8	0.0
Clinical + Payment	93	68.8	31.2	0.0	0.0
Payment-Only	118	50.0	44.9	5.1	0.0
Wave 2					
Overall	215	45.6	44.2	8.4	1.9
Clinical + Payment	91	48.4	42.9	7.7	1.1
Payment-Only	124	43.5	45.2	8.9	2.4
The Initiative has reduced the number of potentially avoidable hospitalizations among eligible long-stay residents in my facility.					
Wave 1					
Overall	211	45.0	47.9	6.6	0.5
Clinical + Payment	93	58.1	38.7	3.2	0.0
Payment-Only	118	34.7	55.1	9.3	0.8
Wave 2					
Overall	215	38.6	52.6	6.0	2.8
Clinical + Payment	91	47.3	47.3	5.5	0.0
Payment-Only	124	32.3	56.5	6.5	4.8

SOURCE: RTI analysis of survey data.

Table H-15.   Please indicate whether you agree or disagree with each of the following statements about the Initiative at your facility.

Question	N (NFA)	Percent	
		Agree	Disagree
My facility has added documentation aids to facilitate Initiative implementation.			
Wave 1			
Overall	211	85.8	14.2
Clinical + Payment	93	88.2	11.8
Payment-Only	118	83.9	16.1
Wave 2			
Overall	215	84.7	15.3
Clinical + Payment	91	84.6	15.4
Payment-Only	124	84.7	15.3
My facility already had other non-Initiative–related practices in place to reduce potentially avoidable hospitalizations for eligible long-stay residents.			
Wave 1			
Overall	211	81.5	18.5
Clinical + Payment	93	81.7	18.3
Payment-Only	118	81.4	18.6
Wave 2			
Overall	215	85.6	14.4
Clinical + Payment	91	89.0	11.0
Payment-Only	124	83.1	16.9
Payments from the Initiative facility billing codes are reimbursing my facility for care practices my staff were already performing.			
Wave 1			
Overall	211	72.5	27.5
Clinical + Payment	93	71.0	29.0
Payment-Only	118	73.7	26.3
Wave 2			
Overall	215	69.3	30.7
Clinical + Payment	91	68.1	31.9
Payment-Only	124	70.2	29.8
Initiative enrollment could decline in the coming months due to increasing resident enrollment in managed care			
Wave 1			
Overall	211	73.9	26.1
Clinical + Payment	93	79.6	20.4
Payment-Only	118	69.5	30.5
Wave 2			
Overall	215	74.0	26.0
Clinical + Payment	91	75.8	24.2
Payment-Only	124	72.6	27.4

SOURCE: RTI analysis of survey data.

Table H-16.   How frequently did your facility miss an opportunity to bill for any of the six qualifying conditions for the Initiative?

Intervention group	N (NFA)	Percent				
		Never	Rarely	Sometimes	Often	Always
Wave 1						
Overall	211	4.7	37.9	46.9	9.5	0.9
Clinical + Payment	93	5.4	38.7	52.7	3.2	0.0
Payment-Only	118	4.2	37.3	42.4	14.4	1.7
Wave 2						
Overall	215	6.0	29.3	51.6	12.6	0.5
Clinical + Payment	91	8.8	28.6	54.9	6.6	1.1
Payment-Only	124	4.0	29.8	49.2	16.9	0.0

SOURCE: RTI analysis of survey data.

Table H-17. Are any of the following statements a reason your facility missed an opportunity to bill?

Question	N (NFA)*	Percent		
		Major reason	Somewhat of a reason	Not a reason
Staff did not realize resident was eligible for the Initiative				
Wave 1				
Overall	201	6.5	38.3	55.2
Clinical + Payment	88	8.0	37.5	54.5
Payment-Only	113	5.3	38.9	55.8
Wave 2				
Overall	202	9.9	41.6	48.5
Clinical + Payment	83	12.0	42.2	45.8
Payment-Only	119	8.4	41.2	50.4
Staff did not recognize the resident's change in condition				
Wave 1				
Overall	201	4.0	37.3	58.7
Clinical + Payment	88	5.7	38.6	55.7
Payment-Only	113	2.7	36.3	61.1
Wave 2				
Overall	202	3.5	33.7	62.9
Clinical + Payment	83	6.0	37.3	56.6
Payment-Only	119	1.7	31.1	67.2
Practitioner did not confirm the qualifying diagnosis in the required time window				
Wave 1				
Overall	201	24.4	45.8	29.9
Clinical + Payment	88	22.7	44.3	33.0
Payment-Only	113	25.7	46.9	27.4
Wave 2				
Overall	202	21.8	49.5	28.7
Clinical + Payment	83	19.3	49.4	31.3
Payment-Only	119	23.5	49.6	26.9
Documentation of the change in condition was incomplete				
Wave 1				
Overall	201	14.4	56.7	28.9
Clinical + Payment	88	17.0	60.2	22.7
Payment-Only	113	12.4	54.0	33.6
Wave 2				
Overall	202	17.8	53.0	29.2
Clinical + Payment	83	16.9	61.4	21.7
Payment-Only	119	18.5	47.1	34.5

(continued)

Table H-17. Are any of the following statements a reason your facility missed an opportunity to bill? (continued)

Question	N (NFA)*	Percent		
		Major reason	Somewhat of a reason	Not a reason
Claims not submitted due to concern about auditing				
Wave 1				
Overall	201	1.5	14.4	84.1
Clinical + Payment	88	2.3	12.5	85.2
Payment-Only	113	0.9	15.9	83.2
Wave 2				
Overall	202	1.5	13.4	85.1
Clinical + Payment	83	2.4	13.3	84.3
Payment-Only	119	0.8	13.4	85.7

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents indicated their facility missed an opportunity to bill.

Table H-18. Did your facility experience any of the following as a challenge related to the Initiative?

Question	N (NFA)	Percent		
		Major challenge	Somewhat of a challenge	Not a challenge
Lack of corporate/chain buy-in				
Wave 1				
Overall	211	1.4	5.2	93.4
Clinical + Payment	93	1.1	6.5	92.5
Payment-Only	118	1.7	4.2	94.1
Wave 2				
Overall	215	2.3	3.7	94.0
Clinical + Payment	91	0.0	3.3	96.7
Payment-Only	124	4.0	4.0	91.9
Lack of buy-in from residents and family members				
Wave 1				
Overall	211	0.0	15.2	84.8
Clinical + Payment	93	0.0	18.3	81.7
Payment-Only	118	0.0	12.7	87.3
Wave 2				
Overall	215	2.3	15.8	81.9
Clinical + Payment	91	0.0	20.9	79.1
Payment-Only	124	4.0	12.1	83.9
Lack of buy-in from nursing facility staff				
Wave 1				
Overall	211	6.2	28.4	65.4
Clinical + Payment	93	2.2	31.2	66.7
Payment-Only	118	9.3	26.3	64.4
Wave 2				
Overall	215	4.7	34.4	60.9
Clinical + Payment	91	3.3	30.8	65.9
Payment-Only	124	5.6	37.1	57.3
Lack of buy-in from practitioners				
Wave 1				
Overall	211	6.2	37.9	55.9
Clinical + Payment	93	2.2	40.9	57.0
Payment-Only	118	9.3	35.6	55.1
Wave 2				
Overall	215	11.2	26.0	62.8
Clinical + Payment	91	8.8	24.2	67.0
Payment-Only	124	12.9	27.4	59.7

(continued)

Table H-18. Did your facility experience any of the following as a challenge related to the Initiative? (continued)

Question	N (NFA)	Percent		
		Major challenge	**Somewhat of a challenge**	**Not a challenge**
Lack of resources (e.g., equipment, lab capabilities, or diagnostic testing response time)				
Wave 1				
Overall	211	0.9	15.6	83.4
Clinical + Payment	93	1.1	14.0	84.9
Payment-Only	118	0.8	16.9	82.2
Wave 2				
Overall	215	3.7	12.6	83.7
Clinical + Payment	91	4.4	12.1	83.5
Payment-Only	124	3.2	12.9	83.9
Not enough eligible residents				
Wave 1				
Overall	211	4.7	18.0	77.3
Clinical + Payment	93	4.3	18.3	77.4
Payment-Only	118	5.1	17.8	77.1
Wave 2				
Overall	215	4.7	30.7	64.7
Clinical + Payment	91	2.2	28.6	69.2
Payment-Only	124	6.5	32.3	61.3
Inadequacy of payments from the Initiative facility billing codes				
Wave 1				
Overall	211	0.5	9.0	90.5
Clinical + Payment	93	1.1	11.8	87.1
Payment-Only	118	0.0	6.8	93.2
Wave 2				
Overall	215	0.9	9.3	89.8
Clinical + Payment	91	1.1	14.3	84.6
Payment-Only	124	0.8	5.6	93.5
Turnover of nursing facility staff				
Wave 1				
Overall	211	8.1	37.4	54.5
Clinical + Payment	93	7.5	37.6	54.8
Payment-Only	118	8.5	37.3	54.2
Wave 2				
Overall	215	10.7	44.2	45.1
Clinical + Payment	91	4.4	49.5	46.2
Payment-Only	124	15.3	40.3	44.4

(continued)

Table H-18. Did your facility experience any of the following as a challenge related to the Initiative? (continued)

Question	N (NFA)	Percent		
		Major challenge	**Somewhat of a challenge**	**Not a challenge**
Turnover of nursing facility leadership				
Wave 1				
Overall	211	8.1	18.5	73.5
Clinical + Payment	93	5.4	16.1	78.5
Payment-Only	118	10.2	20.3	69.5
Wave 2				
Overall	215	9.3	21.4	69.3
Clinical + Payment	91	4.4	20.9	74.7
Payment-Only	124	12.9	21.8	65.3
Too much time needed for practitioners to travel to facility to conduct Initiative activities				
Wave 1				
Overall	211	5.7	16.6	77.7
Clinical + Payment	93	3.2	9.7	87.1
Payment-Only	118	7.6	22.0	70.3
Wave 2				
Overall	215	4.2	22.8	73.0
Clinical + Payment	91	2.2	17.6	80.2
Payment-Only	124	5.6	26.6	67.7

SOURCE: RTI analysis of survey data.

Table H-19. Wave 2 Only: In your opinion, which of the following changes would be most likely to increase the use of the facility billing codes? *(Select up to three)*

Response	Percent		
	Overall	Clinical + Payment	Payment-Only
N (NFA)	215	91	124
Longer time window to confirm a qualifying diagnosis	43.7	35.2	50.0
Better communication among nursing staff about a qualifying change in condition	40.5	39.6	41.1
Reduced requirements for documentation of change in condition	31.2	35.2	28.2
More education and training about the Initiative	30.7	36.3	26.6
Additional practitioners to confirm a qualifying diagnosis	21.4	22.0	21.0
Better recognition of resident eligibility for the Initiative	18.6	19.8	17.7
Additional nursing staff to identify qualifying changes in condition	18.1	20.9	16.1
Changes to the clinical criteria	16.7	20.9	13.7
Higher payment amount for using the billing codes	13.5	13.2	13.7
None of these changes	7.0	5.5	8.1
Better technical support for submitting claims	3.3	5.5	1.6
Direct receipt of payments for using the billing codes	3.3	5.5	1.6

SOURCE: RTI analysis of survey data.

H.3   Practitioner Survey Results

Table H-20.   What is your role at the facility?

Intervention group	N (Practitioner)	Percent			
		Physician	APRN	PA	Other
Wave 1					
Overall	240	62.1	31.7	5.8	0.4
Clinical + Payment	122	59.8	33.6	6.6	0.0
Payment-Only	118	64.4	29.7	5.1	0.8
Wave 2					
Overall	240	63.8	31.7	4.6	0.0
Clinical + Payment	115	60.9	33.0	6.1	0.0
Payment-Only	125	66.4	30.4	3.2	0.0

APRN = advanced practice registered nurse; PA = physician's assistant.

SOURCE: RTI analysis of survey data.

Table H-21.   As a physician, are you a...?

Intervention group	N (Practitioner)*	Percent	
		Yes	No
Attending physician			
Wave 1			
Overall	149	90.6	9.4
Clinical + Payment	73	90.4	9.6
Payment-Only	76	90.8	9.2
Wave 2			
Overall	153	89.5	10.5
Clinical + Payment	70	90.0	10.0
Payment-Only	83	89.2	10.8
Medical director			
Wave 1			
Overall	149	49.0	51.0
Clinical + Payment	73	38.4	61.6
Payment-Only	76	59.2	40.8
Wave 2			
Overall	153	47.7	52.3
Clinical + Payment	70	40.0	60.0
Payment-Only	83	54.2	45.8

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents were physicians. Physicians can serve in multiple roles; categories are not mutually exclusive.

Table H-22.   Do you/your medical group employ APRNs or PAs who help you care for eligible long-stay residents at your facility?

Intervention group	N (Practitioner)*	Percent	
		Yes	No
Wave 1			
Overall	149	67.8	32.2
Clinical + Payment	73	65.8	34.2
Payment-Only	76	69.7	30.3
Wave 2			
Overall	148	64.9	35.1
Clinical + Payment	67	62.7	37.3
Payment-Only	81	66.7	33.3

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents were physicians.

Table H-23.   Which of the following best describes your primary employment status?

Intervention group	N (Practitioner)	Percent			
		Salaried by facility or corporate chain	Independent practitioner/ part of a small medical group	Part of a large medical group	Other
Wave 1					
Overall	240	15.4	53.3	29.6	1.7
Clinical + Payment	122	13.1	57.4	28.7	0.8
Payment-Only	118	17.8	49.2	30.5	2.5
Wave 2					
Overall	240	18.3	55.4	26.3	0.0
Clinical + Payment	115	18.3	56.5	25.2	0.0
Payment-Only	125	18.4	54.4	27.2	0.0

SOURCE: RTI analysis of survey data.

Table H-24.   Typically, about how often are you at this facility delivering direct patient care?

Intervention group	N (Practitioner)	Percent				
		Less than once per month	Once per month	2–3 times per month	1–2 times per week	3 or more times per week
Wave 1						
Overall	240	3.3	5.8	12.1	28.3	50.4
Clinical + Payment	122	2.5	6.6	10.7	27.0	53.3
Payment-Only	118	4.2	5.1	13.6	29.7	47.5
Wave 2						
Overall	240	3.8	3.8	10.4	33.3	48.8
Clinical + Payment	115	1.7	4.3	8.7	28.7	56.5
Payment-Only	125	5.6	3.2	12.0	37.6	41.6

SOURCE: RTI analysis of survey data.

Table H-25.   In a typical week, about how many hours are you delivering direct patient care at this facility?

Intervention group	N (Practitioner)*	Mean	SD	Minimum	Maximum
Wave 1					
Overall	189	17.0	13.6	1.0	70.0
Clinical + Payment	98	14.7	11.8	1.0	70.0
Payment-Only	91	19.5	14.9	3.0	50.0
Wave 2					
Overall	197	16.9	12.7	1.0	60.0
Clinical + Payment	98	17.2	13.0	1.0	60.0
Payment-Only	99	16.6	12.6	2.0	50.0

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents were in facility at least once a week.

Table H-26.   Have you used the Initiative *practitioner* billing codes (G9685 or G9686)?

Intervention group	N (Practitioner)	Percent				
		Yes, confirmation for any of the six qualifying conditions only	Yes, care coordination conferences only	Yes, both	No, neither	Unsure
Wave 1						
Overall	240	46.7	1.3	15.4	35.0	1.7
Clinical + Payment	122	50.8	0.0	10.7	38.5	0.0
Payment-Only	118	42.4	2.5	20.3	31.4	3.4
Wave 2						
Overall	240	46.3	1.3	22.1	28.8	1.7
Clinical + Payment	115	47.0	1.7	15.7	34.8	0.9
Payment-Only	125	45.6	0.8	28.0	23.2	2.4

SOURCE: RTI analysis of survey data.

Table H-27.   Have you confirmed a diagnosis for any of the six qualifying conditions for a *facility* billing code (G9679–G9684), without submitting the corresponding *practitioner* billing code (G9685)?

Question	N (Practitioner)	Percent		
		Yes	No	Unsure
Wave 1				
Overall	237	48.5	44.3	7.2
Clinical + Payment	119	55.5	38.7	5.9
Payment-Only	118	41.5	50.0	8.5
Wave 2				
Overall	237	53.6	38.8	7.6
Clinical + Payment	114	62.3	33.3	4.4
Payment-Only	123	45.5	43.9	10.6

SOURCE: RTI analysis of survey data.

Table H-28. How do you receive payments for using the Initiative *practitioner* billing codes (G9685 or G9686)?

Intervention group	N (Practitioner)*	Percent Directly by Medicare	Indirectly receive payments	Do not receive payments	Uncertain of how I get paid
		Wave 1			
Overall	151	30.5	13.2	19.2	37.1
Clinical + Payment	75	30.7	12.0	17.3	40.0
Payment-Only	76	30.3	14.5	21.1	34.2
		Wave 2			
Overall	163	28.2	15.3	23.9	32.5
Clinical + Payment	71	19.7	18.3	23.9	38.0
Payment-Only	92	34.8	13.0	23.9	28.3

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents were using billing codes.

Table H-29. How do you receive indirect payments for using the Initiative billing codes?

Question	N (Practitioner)*	Percent Tied to Initiative billing codes	Compensation is tied to total billing	Other
		Wave 1		
Overall	20	15.0	70.0	15.0
Clinical + Payment	9	22.2	66.7	11.1
Payment-Only	11	9.1	72.7	18.2
		Wave 2		
Overall	26	26.9	73.1	0.0
Clinical + Payment	13	7.7	92.3	0.0
Payment-Only	13	46.2	53.8	0.0

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents indicated receiving indirect payments.

Table H-30. Why are you not paid for using practitioner billing codes?

Question	N (Practitioner)*	Percent Because I am salaried	Because of billing challenges	Other
		Wave 1		
Overall	29	93.1	0.0	6.9
Clinical + Payment	13	92.3	0.0	7.7
Payment-Only	16	93.8	0.0	6.3
		Wave 2		
Overall	39	69.2	20.5	10.3
Clinical + Payment	17	82.4	11.8	5.9
Payment-Only	22	59.1	27.3	13.6

SOURCE: RTI analysis of survey data.

NOTE: * = skip pattern. Respondents indicated not receiving payments.

Table H-31. Did you receive education and training related to confirming a diagnosis for the six qualifying conditions for the Initiative?

Question	N (Practitioner)*	Yes, and this training was sufficient	Yes, and this training was insufficient	No, I did not receive training
		Support (percent)		
Wave 1				
Overall	236	63.1	14.4	22.5
Clinical + Payment	119	62.2	16.0	21.8
Payment-Only	117	64.1	12.8	23.1
Wave 2				
Overall	237	68.4	11.4	20.3
Clinical + Payment	114	66.7	14.0	19.3
Payment-Only	123	69.9	8.9	21.1

SOURCE: RTI analysis of survey data.

Table H-32. How important is it that residents be treated on-site in the nursing facility whenever possible?

Intervention group	N (Practitioner)	Not at all important	Somewhat important	Moderately important	Very important	Extremely important
		Percent				
Wave 1						
Overall	236	0.0	1.7	6.8	29.2	62.3
Clinical + Payment	119	0.0	1.7	9.2	35.3	53.8
Payment-Only	117	0.0	1.7	4.3	23.1	70.9
Wave 2						
Overall	237	0.4	2.1	4.6	30.0	62.9
Clinical + Payment	114	0.0	1.8	6.1	27.2	64.9
Payment-Only	123	0.8	2.4	3.3	32.5	61.0

SOURCE: RTI analysis of survey data.

Table H-33. Please indicate the extent to which you agree or disagree with the following statements about the Initiative.

Statement	N (Practitioner)	Percent			
		Strongly agree	Agree	Disagree	Strongly disagree
Overall, the clinical criteria for the six qualifying conditions for the Initiative are appropriate.					
Wave 1					
Overall	233	46.4	49.8	3.0	0.9
Clinical + Payment	119	39.5	58.8	0.8	0.8
Payment-Only	114	53.5	40.4	5.3	0.9
Wave 2					
Overall	233	48.1	48.5	1.3	2.1
Clinical + Payment	113	44.2	51.3	2.7	1.8
Payment-Only	120	51.7	45.8	0.0	2.5
I am notified in a timely manner of any qualifying resident's change in condition.					
Wave 1					
Overall	234	37.2	49.6	11.5	1.7
Clinical + Payment	119	31.1	53.8	12.6	2.5
Payment-Only	115	43.5	45.2	10.4	0.9
Wave 2					
Overall	233	33.9	53.2	8.6	4.3
Clinical + Payment	113	29.2	56.6	8.8	5.3
Payment-Only	120	38.3	50.0	8.3	3.3
NFI 2 has improved the quality/outcomes of resident care at my facility.					
Wave 1					
Overall	232	34.5	52.6	11.6	1.3
Clinical + Payment	119	29.4	58.0	10.9	1.7
Payment-Only	113	39.8	46.9	12.4	0.9
Wave 2					
Overall	232	36.2	50.9	9.5	3.4
Clinical + Payment	113	31.0	55.8	10.6	2.7
Payment-Only	119	41.2	46.2	8.4	4.2
NFI 2 has reduced the number of potentially avoidable hospitalizations among eligible long-stay residents at my facility.					
Wave 1					
Overall	225	31.6	54.7	12.9	0.9
Clinical + Payment	116	26.7	61.2	11.2	0.9
Payment-Only	109	36.7	47.7	14.7	0.9
Wave 2					
Overall	224	29.9	54.0	12.9	3.1
Clinical + Payment	110	23.6	60.0	12.7	3.6
Payment-Only	114	36.0	48.2	13.2	2.6

SOURCE: RTI analysis of survey data.

Table H-34. Please indicate the extent to which you agree or disagree with the following statements about the Initiative relating to billing.

Statement	N (Practitioner)	Percent			
		Strongly agree	Agree	Disagree	Strongly disagree
Makes financial sense to use the practitioner billing code for confirmation of the six qualifying conditions					
Wave 1					
Overall	232	38.4	47.4	11.2	3.0
Clinical + Payment	118	28.0	52.5	16.1	3.4
Payment-Only	114	49.1	42.1	6.1	2.6
Wave 2					
Overall	232	40.9	41.8	12.9	4.3
Clinical + Payment	112	33.0	44.6	17.9	4.5
Payment-Only	120	48.3	39.2	8.3	4.2
Makes financial sense to use the practitioner billing code for care coordination conferences					
Wave 1					
Overall	233	24.0	50.2	21.5	4.3
Clinical + Payment	119	15.1	54.6	23.5	6.7
Payment-Only	114	33.3	45.6	19.3	1.8
Wave 2					
Overall	231	21.2	50.2	21.6	6.9
Clinical + Payment	111	18.0	46.8	27.0	8.1
Payment-Only	120	24.2	53.3	16.7	5.8
Easy to integrate the Initiative practitioner billing codes into practice's existing processes					
Wave 1					
Overall	150	33.3	50.0	16.0	0.7
Clinical + Payment	75	21.3	56.0	21.3	1.3
Payment-Only	75	45.3	44.0	10.7	0.0
Wave 2					
Overall	162	37.0	45.7	14.2	3.1
Clinical + Payment	71	28.2	49.3	18.3	4.2
Payment-Only	91	44.0	42.9	11.0	2.2
Confident that billing staff/service are submitting claims using the practitioner billing codes					
Wave 1					
Overall	150	34.0	51.3	13.3	1.3
Clinical + Payment	75	28.0	50.7	20.0	1.3
Payment-Only	75	40.0	52.0	6.7	1.3
Wave 2					
Overall	162	32.7	50.0	13.6	3.7
Clinical + Payment	71	26.8	54.9	12.7	5.6
Payment-Only	91	37.4	46.2	14.3	2.2

(continued)

Table H-34. Please indicate the extent to which you agree or disagree with the following statements about the Initiative relating to billing. (continued)

Statement	N (Practitioner)	Percent			
		Strongly agree	Agree	Disagree	Strongly disagree
Payments from the Initiative practitioner billing codes reimburse for care practices already being performed					
Wave 1					
Overall	150	34.0	50.0	14.7	1.3
Clinical + Payment	75	28.0	52.0	17.3	2.7
Payment-Only	75	40.0	48.0	12.0	0.0
Wave 2					
Overall	162	28.4	48.8	18.5	4.3
Clinical + Payment	71	22.5	56.3	15.5	5.6
Payment-Only	91	33.0	42.9	20.9	3.3

SOURCE: RTI analysis of survey data.

Table H-35. I am confident that the facility's clinical staff are able to assess and treat residents on-site for the six qualifying conditions for the Initiative….

Statement	N (Practitioner)	Percent			
		Strongly agree	Agree	Disagree	Strongly disagree
During the day shift					
Wave 1					
Overall	233	49.4	45.9	4.3	0.4
Clinical + Payment	118	37.3	55.9	5.9	0.8
Payment-Only	115	61.7	35.7	2.6	0.0
Wave 2					
Overall	230	47.4	47.8	3.5	1.3
Clinical + Payment	111	40.5	54.1	4.5	0.9
Payment-Only	119	53.8	42.0	2.5	1.7
During the evening shift					
Wave 1					
Overall	233	30.5	54.5	13.7	1.3
Clinical + Payment	118	19.5	57.6	21.2	1.7
Payment-Only	115	41.7	51.3	6.1	0.9
Wave 2					
Overall	230	31.7	55.2	10.4	2.6
Clinical + Payment	111	21.6	64.9	12.6	0.9
Payment-Only	119	41.2	46.2	8.4	4.2
During nights/weekends					
Wave 1					
Overall	233	27.9	52.4	17.6	2.1
Clinical + Payment	118	17.8	55.9	23.7	2.5
Payment-Only	115	38.3	48.7	11.3	1.7
Wave 2					
Overall	230	27.4	54.3	14.3	3.9
Clinical + Payment	111	19.8	60.4	18.0	1.8
Payment-Only	119	34.5	48.7	10.9	5.9

SOURCE: RTI analysis of survey data.

Table H-36. When the facility's clinical staff contact me by phone or in-person, they are able to communicate the key information I need to make important clinical decisions.

Statement	N (Practitioner)	Percent			
		Strongly agree	Agree	Disagree	Strongly disagree
Wave 1					
Overall	233	33.5	58.8	6.4	1.3
Clinical + Payment	118	19.5	71.2	7.6	1.7
Payment-Only	115	47.8	46.1	5.2	0.9
Wave 2					
Overall	229	34.5	55.9	8.7	0.9
Clinical + Payment	111	26.1	64.0	9.9	0.0
Payment-Only	118	42.4	48.3	7.6	1.7

SOURCE: RTI analysis of survey data.

Table H-37. Did you experience any of the following as a challenge related to confirmation for any of the six qualifying conditions (billing code G9685)?

Question	N (Practitioner)	Percent		
		Major challenge	Somewhat of a	Not a challenge
Completing the amount of clinical documentation required				
Wave 1				
Overall	227	11.0	40.5	48.5
Clinical + Payment	116	15.5	40.5	44.0
Payment-Only	111	6.3	40.5	53.2
Wave 2				
Overall	228	9.2	42.1	48.7
Clinical + Payment	111	10.8	41.4	47.7
Payment-Only	117	7.7	42.7	49.6
Confirming the diagnosis within the required time window				
Wave 1				
Overall	227	6.2	46.3	47.6
Clinical + Payment	116	9.5	45.7	44.8
Payment-Only	111	2.7	46.8	50.5
Wave 2				
Overall	228	8.3	45.2	46.5
Clinical + Payment	111	7.2	45.0	47.7
Payment-Only	117	9.4	45.3	45.3
Inadequacy of payment				
Wave 1				
Overall	226	9.3	27.0	63.7
Clinical + Payment	115	10.4	27.8	61.7
Payment-Only	111	8.1	26.1	65.8
Wave 2				
Overall	228	12.7	21.5	65.8
Clinical + Payment	111	14.4	22.5	63.1
Payment-Only	117	11.1	20.5	68.4

SOURCE: RTI analysis of survey data.

Table H-38. Challenge experienced related to care coordination

Question	N (Practitioner)	Percent		
		Major challenge	Somewhat of a challenge	Not a challenge
Fulfilling specific requirements of the care coordination conferences				
Wave 1				
Overall	225	18.7	39.6	41.8
Clinical + Payment	115	16.5	41.7	41.7
Payment-Only	110	20.9	37.3	41.8
Wave 2				
Overall	228	21.5	33.8	44.7
Clinical + Payment	111	22.5	32.4	45.0
Payment-Only	117	20.5	35.0	44.4
Inadequacy of payment				
Wave 1				
Overall	225	14.2	27.1	58.7
Clinical + Payment	115	17.4	27.8	54.8
Payment-Only	110	10.9	26.4	62.7
Wave 2				
Overall	228	17.1	24.1	58.8
Clinical + Payment	111	20.7	21.6	57.7
Payment-Only	117	13.7	26.5	59.8

SOURCE: RTI analysis of survey data.

Table H-39. Did you experience any of the following as a challenge related to the Initiative?

Question	N (Practitioner)	Percent		
		Major challenge	Somewhat of a challenge	Not a challenge
Having enough eligible long-stay residents at the facility to make billing worthwhile				
Wave 1				
Overall	224	8.5	21.4	70.1
Clinical + Payment	115	10.4	21.7	67.8
Payment-Only	109	6.4	21.1	72.5
Wave 2				
Overall	224	8.0	24.1	67.9
Clinical + Payment	110	9.1	24.5	66.4
Payment-Only	114	7.0	23.7	69.3
Time needed to travel to the facility				
Wave 1				
Overall	223	4.9	19.7	75.3
Clinical + Payment	115	4.3	18.3	77.4
Payment-Only	108	5.6	21.3	73.1
Wave 2				
Overall	224	4.9	16.5	78.6
Clinical + Payment	110	5.5	11.8	82.7
Payment-Only	114	4.4	21.1	74.6
Medical/legal concerns about treating Initiative residents on site				
Wave 1				
Overall	224	8.0	21.4	70.5
Clinical + Payment	115	7.8	18.3	73.9
Payment-Only	109	8.3	24.8	67.0
Wave 2				
Overall	224	5.4	23.7	71.0
Clinical + Payment	110	5.5	21.8	72.7
Payment-Only	114	5.3	25.4	69.3
Hearing about other practitioners' reimbursement challenges with the Initiative practitioner billing codes				
Wave 1				
Overall	223	8.5	22.4	69.1
Clinical + Payment	114	6.1	23.7	70.2
Payment-Only	109	11.0	21.1	67.9
Wave 2				
Overall	224	8.0	18.3	73.7
Clinical + Payment	110	6.4	20.0	73.6
Payment-Only	114	9.6	16.7	73.7

SOURCE: RTI analysis of survey data.

Table H-40. Are any of the following statements a reason you did not bill?

Question	N (Practitioner)	Percent		
		Major reason	Somewhat of a reason	Not a reason
I would not receive any payments from the Initiative practitioner billing codes due to my employment status*				
Wave 1				
Overall	78	12.8	14.1	73.1
Clinical + Payment	43	9.3	16.3	74.4
Payment-Only	35	17.1	11.4	71.4
Wave 2				
Overall	66	13.6	10.6	75.8
Clinical + Payment	40	10.0	7.5	82.5
Payment-Only	26	19.2	15.4	65.4
My billing staff/service would not use the Initiative practitioner billing codes*				
Wave 1				
Overall	78	16.7	16.7	66.7
Clinical + Payment	43	9.3	23.3	67.4
Payment-Only	35	25.7	8.6	65.7
Wave 2				
Overall	66	12.1	27.3	60.6
Clinical + Payment	40	10.0	32.5	57.5
Payment-Only	26	15.4	19.2	65.4
My billing staff/service could not integrate the Initiative practitioner billing codes into our existing processes*				
Wave 1				
Overall	78	20.5	14.1	65.4
Clinical + Payment	43	18.6	20.9	60.5
Payment-Only	35	22.9	5.7	71.4
Wave 2				
Overall	66	18.2	22.7	59.1
Clinical + Payment	40	20.0	27.5	52.5
Payment-Only	26	15.4	15.4	69.2
Practitioner medical group would not endorse the use of the Initiative practitioner billing codes^				
Wave 1				
Overall	25	16.0	8.0	76.0
Clinical + Payment	8	12.5	25.0	62.5
Payment-Only	17	17.6	0.0	82.4
Wave 2				
Overall	21	9.5	14.3	76.2
Clinical + Payment	8	25.0	0.0	75.0
Payment-Only	13	0.0	23.1	76.9

NOTES: * = skip pattern. Respondents indicated they were not or were unsure if they were using billing codes.

^ = skip pattern. Respondents indicated they were not or were unsure if they were using billing codes and were also part of a large medical group.

SOURCE: RTI analysis of survey data.

Table H-41. Wave 2 Only: In your opinion, which of the following changes would be most likely to increase use of the Initiative practitioner billing codes? *Select up to three.*

Response	Percent		
	Overall	**Clinical + Payment**	**Payment-Only**
N (Practitioner)	224	110	114
Better communication from nursing staff about a qualifying change in condition	43.8	44.5	43.0
More education and training about confirming a qualifying diagnosis	35.7	37.3	34.2
Clearer guidelines and identification of resident eligibility for the Initiative	29.5	34.5	24.6
Longer time window to confirm a qualifying diagnosis	28.6	20.0	36.8
Reduced requirements for clinical documentation	27.2	27.3	27.2
Higher payment amount for using the billing codes	18.3	12.7	23.7
Direct receipt of payments for using the billing codes	14.3	16.4	12.3
Changes to the clinical criteria	14.3	11.8	16.7
Better technical support for submitting claims	10.3	12.7	7.9
None of these changes	9.4	11.8	7.0
Additional practitioners to confirm a qualifying diagnosis	4.5	4.5	4.4

SOURCE: RTI analysis of survey data.

APPENDIX I
STRATEGY USED TO EVALUATE THE IMPACT OF NFI 2, FY 2017–FY 2019

I.1   Overview

In **Section II** (**Chapters II.5–II.8**) of the main report, we present results from multivariate regression models that enable us to estimate NFI 2's effect on key outcomes (the effect of the payment intervention alone). Specifically, we use difference-in-differences (DD) models, risk-adjusted for resident- and facility-level characteristics, to calculate the effect of the payment component in the Clinical + Payment (C+P) and Payment-Only (P-O) interventions on participating nursing facility residents, relative to comparison group residents. The key resident-level outcomes evaluated are utilization of hospital-related Medicare-covered services and associated expenditures, MDS-based quality outcomes, and mortality. **Section II** of the main report covers a 6-year period from 2014 to 2019 (all years are Medicare fiscal years [FYs], from October 1 of the year prior to the named calendar year through September 30 of the named year). We use FY 2014 to FY 2016 as baseline years. This appendix details our methods for evaluating the impact of NFI 2 alone. **Appendix X** details our strategy for estimating the combined effects of NFI 1 and NFI 2, as presented in **Section III** of the main report.

- **Appendix Section I.2** provides an overview of our quantitative approach to NFI 2 evaluation analyses.

- **Appendix Section I.3** describes secondary data sources, which are necessary for defining both the Initiative-eligible population and the outcome measures.

- **Appendix Section I.4** documents our process for identifying the population of Initiative-eligible nursing facility residents who are included in the evaluation analyses.

- **Appendix Section I.5** presents the selection of a comparison group.

- **Appendix Section I.6** details the creation of our final study sample.

- **Appendix Sections I.7** and **I.8** describes how the outcome measures are operationalized annually.

- **Appendix Section I.9** details how we select covariates (i.e., independent or control variables).

- **Appendix Section I.10** specifies the DD models used to perform multivariate regression analyses and calculate marginal effects.

- **Appendix Section I.11** discusses the interpretation of Initiative effects.

Descriptive statistics on the final set of model covariates, including percentages for categorical variables and means and standard deviations for continuous variables, are presented in **Appendix T**. Descriptive results on the outcome measures are presented in **Appendix O** (utilization, measured as percentage of individuals using a given type of service), **Appendix P**

(utilization, measured as utilization rate per 1,000 Initiative-eligible resident-days), ***Appendix Q*** (expenditures, by type of service, measured in dollars per Initiative-eligible resident-year), ***Appendix R*** (Minimum Data Set [MDS]-based quality measures, measured as percent of observed quarters with each event), and ***Appendix S*** (resident mortality).

I.2   Overall Analytic Approach to the Evaluation

We used one general model form to provide the framework for the evaluation of all outcomes defined at the resident level. The model follows a DD design with three observation periods (years) before the intervention (FY 2014–FY 2016) and three during the intervention (FY 2017-FY 2019[8]). In prior annual reports (RTI International, 2019a, b, 2021), we estimated NFI 2's effect in one year, and in this final report we re-estimate NFI 2's effect in each of these years, along with estimating NFI 2's effect averaged across three years of the intervention period. The model includes indicator variables for a facility being in the intervention (either C+P or P-O) or comparison group for periods during the intervention and marks those same facilities during the pre-intervention years.

Only fee-for-service (FFS) Medicare enrollees who met eligibility criteria for participation in the Initiative or those in the comparison group who would be eligible for the Initiative were included in the multivariate analyses (see ***Appendix Section I.4*** for detailed criteria and procedures used to identify Initiative-eligible residents). The majority were dually eligible for Medicare and Medicaid.

I.3   Secondary Data Used in Quantitative Analyses

CMS administrative data, primarily used for administering the Medicare program, played a central role in this analysis. They were used for identifying Initiative-eligible residents, selecting the national comparison group, measuring the outcomes, and defining covariates for inclusion in multivariate analysis as risk adjusters.

We obtained Medicare data (eligibility, enrollment, claims, and assessments) from the CMS Integrated Data Repository (IDR). Resident assessment data came from the Minimum Data Set 3.0 (MDS 3.0). The following sections briefly describe these files and additional data sources used in our analyses. Note that as we describe below, some of these data sources are at the individual resident or beneficiary level, while others are at the nursing facility level.

I.3.1   Resident Assessment Data—Minimum Data Set 3.0

We used MDS 3.0 assessments as the main data source for identifying Initiative-eligible residents and Initiative-related exposure periods; defining the resident-level and MDS-based quality outcomes; and identifying some of the resident-level characteristics (used in comparison group

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[8] We initially planned to include FY 2020 as one of the intervention years. We changed these plans due to the COVID-19 pandemic which made it impractical to distinguish between the effect of COVID-19 and the effect of the intervention.

selection and multivariate modeling) associated with these outcomes. We used a 6-week runout time for MDS data. We requested MDS data through 6 weeks after the end of each observation period (fiscal year) so that almost all data for the observation period have been submitted.

Examining the MDS data stream for each resident allowed the identification of the resident's time spent in or out of the facility. All Medicare- and Medicaid-certified nursing facilities are required to collect and submit MDS data to CMS for every resident in a certified bed (regardless of payment sources) on admission, quarterly, annually, and upon a significant change in resident status, and to submit any significant corrections to prior comprehensive or quarterly assessments. Facilities are also required to submit assessments when residents are discharged from the facility, regardless of plan for returning. These data collection and submission requirements are intended to encourage facilities to base a given resident's care planning on a comprehensive set of health and functional information. In addition, providers must complete and submit assessments for Medicare FFS beneficiaries who receive Medicare Part A–covered post-acute care. As of the study period, these assessments were completed at 5, 14, 30, 60, and 90 days of the Medicare Part A stay and upon readmission or return to the facility. Effective October 1, 2016, CMS also requires Medicare Part A Prospective Payment System (PPS) Discharge Assessment when a resident's Medicare Part A stay ends, whether or not the resident leaves or remains in the facility.

MDS items evaluate each resident's demographic characteristics, physical health (e.g., chronic diseases, infections, skin conditions), mental health (e.g., mood, psychological status), and functional and cognitive status (e.g., activities of daily living [ADLs], cognitive performance). MDS 3.0 has excellent to very good reliability, or reproducibility of measurement, when assessments by research nurses are compared to assessments by facility nurses (Saliba & Buchanan, 2012).

I.3.2   Medicare Claims and Eligibility Data

We used Medicare claims as the data source for tracking outcomes on service utilization (e.g., hospitalizations, emergency department [ED] visits) and expenditures. With data updated on a weekly (or at least monthly) basis, the IDR provided timely and complete data that met CMS's timeline for our reports. The IDR also provided up-to-date indicators for both dual-eligible status, which we used to identify dual-eligible residents in our analyses, and for FFS status, which we used to exclude those who were enrolled in Medicare Advantage plans.

We created Medicare utilization and expenditure measures per beneficiary in each observation period (fiscal year). We allowed 3 months for claims runout from the end of the observation period. A longer runout period would have allowed more time for late submissions or adjustments or for longer stays as hospital claims can only be detected once there is a discharge; however, it would leave inadequate time for processing and analyzing those claims for our reports.

We used Medicare data to capture resident-level health characteristics for use in multivariate modeling. For this purpose, we used Medicare Hierarchical Condition Categories (HCCs), which are

updated by CMS annually and are derived from ICD-9-CM and ICD-10-CM codes (ICD-10 started in the United States in FY 2016) on principal hospital inpatient, secondary hospital inpatient, hospital outpatient, physician, and clinically trained nonphysician claims. HCCs are clinically meaningful groupings of ICD-9 or ICD-10 diagnosis codes maintained by CMS to risk-adjust capitation payments to Medicare Advantage insurance plans. HCCs are binary variables: a given Medicare beneficiary is designated as having or not having a condition or diagnosis contained in a given HCC cluster. HCCs have been used to predict readmissions and mortality in the Medicare hospital quality models used for Hospital Compare. They are also used in the CMS readmissions models for skilled nursing facilities, inpatient rehabilitation facilities, and long-term care hospitals. CMS first implemented the RTI-designed HCC model for capitation in 2004.

I.3.3   Nursing Facility Data

We used data from the CMS CASPER (Certification and Survey Provider Enhanced Reports) system and Care Compare/Provider Data Catalogue (formerly known as Nursing Home Compare) to identify facility characteristics. These characteristics, including inspection of survey-based measures of quality and staffing levels, were used for selecting comparison groups and were also included in multivariate analyses of individual-level outcomes.

CASPER (formerly known as OSCAR, or Online Survey Certification and Reporting) is a data system maintained by CMS in cooperation with the state long-term care survey agencies. CASPER includes a compilation of data collected by surveyors during the on-site inspections conducted at nursing facilities for certification and continued participation in the Medicare and Medicaid programs. CASPER is the most comprehensive source of facility-level information on the operations, patient census, and regulatory compliance of nursing facilities.

Staffing data from CASPER are considered to have some accuracy concerns, with the potential for gaming staffing schedules by facilities. Although the Payroll Based Journal (PBJ) system is designed to be more precise and to feed from facility payroll systems, PBJ staffing data were not used in the comparison group selection analysis because these data were unavailable or incomplete for the baseline years and for the first Initiative year. PBJ data is available on the CMS website starting from calendar year 2017.[9]

The Care Compare/Provider Data Catalogue, which is part of public reporting, provides quality of resident care and staffing information for more than 15,000 Medicare- and Medicaid-certified nursing facilities across the country. It includes a compilation of nursing facility inspection results, staffing levels, federal penalties, and quality ratings in specific areas of care. The star rating feature gives each facility a rating between one and five stars, from poor to excellent, based on health inspection, staffing, and quality of resident care measures. Each facility receives a star rating for

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[9] https://data.cms.gov/browse?q=payroll+based+journals

each of the three domains along with an overall star rating. Data about staffing, penalties, nursing facility characteristics, and health deficiencies are reported from CMS's health inspection database. Some of these variables were used in the propensity score models for comparison group selection as described in *Appendix Section I.5*.

I.3.4 MDM Data

Of interest to CMS is the potential for unrelated initiatives and interventions to mask or otherwise distort the estimated effects of this Initiative. To control for overlapping participation in other CMS initiatives and demonstration projects, we used the MDM (Master Data Management) system to identify beneficiary participation in selected CMS initiatives in each year. Although an important source for overlap information, there were some limitations to MDM. It does not provide information on enrollment in all CMS initiatives that can alter utilization of health services. MDM enrollment information often lags because, during the designated periods of the year, demonstration programs and initiatives may not have been able to enter beneficiary and provider information in a timely manner.

I.4 Identification of Initiative-Eligible Residents and Initiative-Eligible Exposure Periods

We identified Initiative-eligible residents on an annual basis, using fiscal years, as those who resided in Initiative facilities and met specific resident-level criteria. We applied the same eligibility criteria to residents in C+P facilities and P-O facilities (and also used these criteria for residents in comparison facilities as described below in *Appendix Section I.5*). We followed these procedures in identifying the study population for each year of FY 2014–FY 2019.

Throughout this report, we use the terms "Initiative-eligible exposure period," and "exposure period" interchangeably. These terms, along with "Initiative-eligible days" and "Initiative-eligible resident-days," all refer to the period of time during which the resident was eligible for the Initiative. In some cases, it includes short periods when the individual was not in the nursing facility as described below.

CMS imposed eligibility requirements for facilities to participate in the Initiative. These included that facilities could not be on the list of Special Focus Facilities (SFFs) and must have been Medicare and Medicaid certified. Those facilities that participated in NFI 1 but did not continue in NFI 2 were excluded from all analyses. For the newly recruited facilities that form the P-O group, CMS imposed additional requirements: an average daily census of at least 80 residents with greater than 40 percent of the facility residents defined as long-stay and enrolled in traditional FFS Medicare, having no survey deficiencies for immediate jeopardy to resident health or safety within the last 12 months, and having at least a three-star overall rating within CMS's Five-Star Quality Rating System.

Initially, 263 facilities participated in the NFI 2 Initiative—115 C+P facilities and 148 P-O facilities. We excluded several of these facilities (and all their residents) from the quantitative evaluation (but they were included in primary data collection activities). We excluded one facility that was a State Veteran's Home, nursing facilities that are generally only available to former active-duty veterans, because we did not have the ability to track utilization in the Veterans Health Administration system. (Some homes admit former reserves, national guard and spouses as well.) We also excluded two facilities that focused on HIV/AIDS patients, because the population is so different from the population in other facilities. Finally, two C+P facilities merged during FY 2017. For the NFI 2 DD analyses presented in *Section II* of the main report, we included 259 Initiative facilities (260 in FY 2017): 111 facilities in the C+P group (112 in FY 2017) and 148 facilities in the P-O group.

In general, we adopted an intent-to-treat approach. We included residents in all facilities that participated in the Initiative in our quantitative evaluation even if the facilities dropped out of the Initiative. There were 16 facilities that dropped out of the Initiative and the residents in these facilities were still included in our administrative data analyses. Of these dropouts, 12 facilities had no facility billing for providing on-site treatment during the entire Initiative and the other 4 billed at least once before dropping out (in total, as noted in *Chapter II.4*, there were 16 facilities that did not bill at all, which means 4 facilities that did not drop out never billed). Facilities that withdrew prior to September 30, 2017, were excluded from primary data collection activities even though they were included in the quantitative analyses. Also, one facility withdrew before the Initiative even began and was excluded from all analyses (and is not counted among the initial 263).

We identified residents in these Initiative facilities by reviewing the CMS Certification Number (CCN) for all Initiative facilities and then selecting MDS records for residents in these facilities. In FY 2019, for one facility in Indiana, we had to use two CCNs to match and derive the MDS data.

In *Table I-1*, we present the individual-level eligibility criteria that CMS defined for NFI 2 and then describe how we implemented these criteria in our secondary data analysis. *Table I-1* also compares these criteria with those applied for NFI 1.

Table I-1.   Comparison of NFI 2 to NFI 1 resident eligibility criteria

NFI 2 criteria	Comparison to NFI 1 criteria
■ Not enrolled in a Medicare managed care (Medicare Advantage) plan	■ Same criterion
■ Have resided in the long-term care facility for 101 cumulative days or more starting from the resident's date of admission to the long-term care facility	■ Different—in NFI 1, either the resident could have resided in the long-term care facility for 101 cumulative days or more (same as NFI 2 criteria) or they could also be eligible by not having an active discharge plan, regardless of time in facility

(continued)

Table I-1.   Comparison of NFI 2 and NFI 1 resident eligibility criteria (continued)

NFI 2 criteria	Comparison to NFI 1 criteria
■ Enrolled in Medicare (Part A and Part B FFS) and Medicaid, or Medicare (Part A and Part B FFS) only	■ Different—in NFI 1 only, also included Medicaid only
■ Not receiving Medicare through Railroad Retirement Board	■ New for NFI 2; not required in NFI 1
■ Not currently using Medicare Hospice benefit (use of hospice benefit ends an exposure period, but if patient discontinues hospice, they can become eligible for a new exposure period)	■ New for NFI 2; not required in NFI 1

FFS = fee-for-service.

To be eligible, residents must have had Medicare Part A and Part B FFS coverage throughout their Initiative-eligible exposure periods during a reporting period (each fiscal year, from October to September). We identified Initiative-eligible residents in Medicare enrollment data to determine their Medicare Advantage and FFS status. We included residents in Medicaid managed care if they were also enrolled in FFS Medicare (Part A and Part B) and met all other Initiative eligibility criteria during each reporting period.

Residents were eligible for the Initiative only if they had resided in the nursing facility for 101 cumulative days or more starting from their date of admission to the facility. We used MDS assessments and Medicare enrollment and claims data to identify Initiative-eligible residents and Initiative-eligible exposure periods. This approach allowed uniformity in determining the periods during which a resident would be eligible for the clinical or payment interventions, whether in a participating facility or in a comparison facility. The diagram in *Figure I-1* shows a hypothetical resident's nursing facility use that can be depicted using the resident's MDS data stream. We use this hypothetical resident to illustrate the 101 days Initiative eligibility criteria. Elements of the diagram are defined below:

- A **stay** was a period between a resident's entry (either admission or reentry) into a nursing facility and either a discharge (with or without anticipation of return) or death. During a stay, a resident was physically in the nursing facility.

- A **gap** was a period between two stays. During a gap, a resident was temporarily out of the nursing facility.

The exposure period started on the 101st day and may have spanned across stays and brief gaps (30 days or fewer) between them. We measured the resident's health care utilization, events, spending, and quality outcomes for the evaluation only if they occurred during any exposure period. For a gap longer than 30 days following a stay in the exposure period, or if the resident did not return after the gap, the exposure period also contained the first 30 days following the stay (illustrated by Exposure Period 1 in *Figure I-1*). Thus, the inclusion of brief gaps and the first 30 days in longer gaps ensured that the hospitalizations or ED visits that triggered these gaps were

captured in the evaluation analysis. A resident may have had multiple Initiative-related nursing facility exposure periods if they had one or more gaps longer than 30 days.

A CMS rule for NFI 2 was that a gap longer than 60 days broke the continuity of the exposure period. If a former resident were readmitted more than 60 days after discharge from a previous stay, the resident was not eligible until an additional 101 days of residence were reached (i.e., the resident would have become eligible again on the 101st cumulative day, as illustrated by Exposure Period 2 in *Figure I-1*).

Figure I-1.   A hypothetical resident's nursing facility use and Initiative-eligible exposure periods
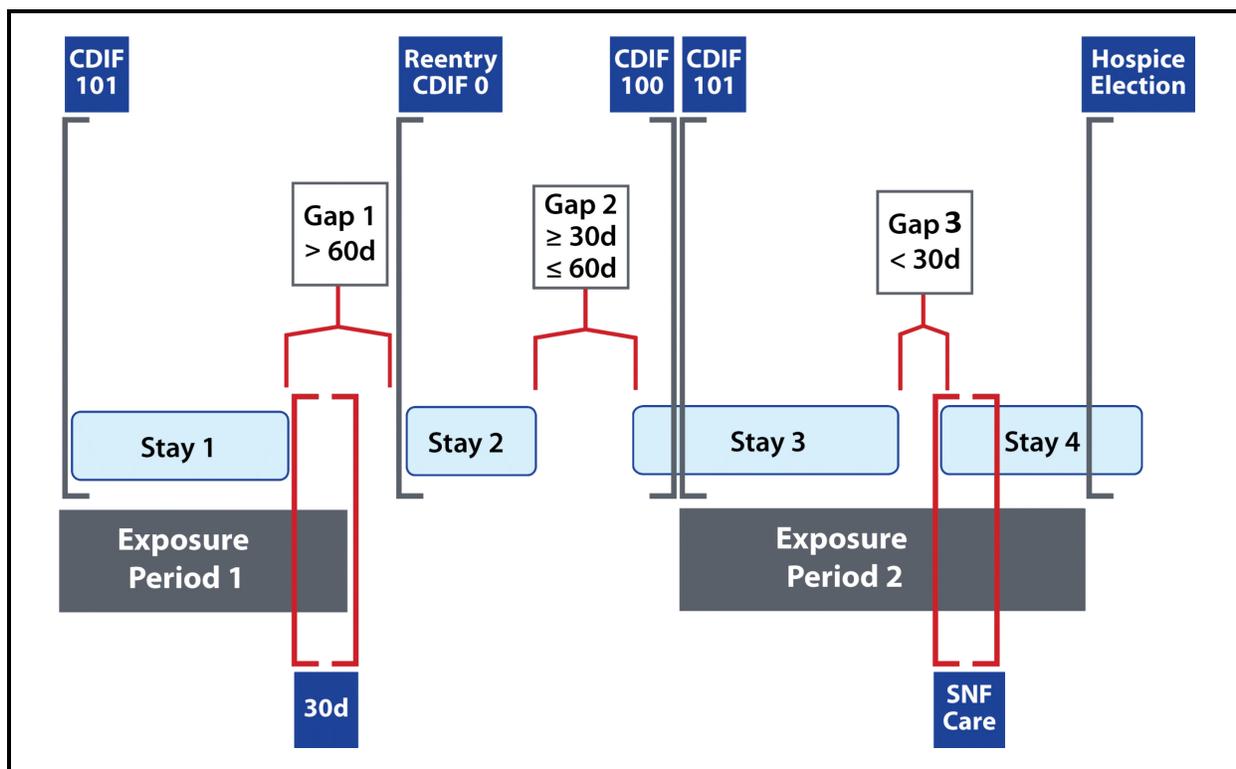
CDIF = cumulative day in facility; SNF = skilled nursing facility; d = day.

NOTES: A stay is a period between a resident's entry (either admission or reentry) into a facility and either a discharge (with or without anticipation of return) or death. During a stay, a resident is physically in the nursing facility. A gap is a period between two stays. During a gap, a resident is temporarily out of the nursing facility.

Finally, an eligible resident who elected the Medicare hospice benefit became ineligible for NFI 2. Thus, the Initiative-eligible exposure period ended with hospice enrollment (illustrated by Exposure Period 2 in *Figure I-1*). If the resident opted out of hospice status or was discharged alive from hospice, the hospice election period was treated as a gap. In that case, the number of days spent under hospice care played a key role in determining the re-eligibility of the resident for NFI 2.

- If the resident opted out of hospice in 59 days or fewer from election, the resident would have been eligible for NFI 2 from the day after the discharge from hospice.[10]
- If the resident opted out after spending longer than 59 days under hospice care, the resident needed to reaccumulate 101 days in the nursing facility to be eligible again for NFI 2.

A narrative of the hypothetical resident's nursing facility use and Initiative-eligible exposure periods illustrated in *Figure I-1* further clarifies our approach. It shows how exposure periods were defined for a resident with different types of gaps in residency. The hypothetical resident started a new stay—Stay 1—after already accumulating the required 101 days previously. Because the resident met the number of days previously, Exposure Period 1 and Stay 1 started on the same day. Although Stay 1 ended when the resident left the facility, Exposure Period 1 continued for 30 days. The resident stayed out of the facility for at least 60 days, resetting the count of cumulative days back to 0.

Upon return to the facility, the cumulative day counter started anew with Stay 2. The resident had not been in the facility for 101 cumulative days when there was another gap, of 60 days or less, which ended Stay 2. The day counter was frozen while the resident was absent during this gap and resumed when the resident returned for Stay 3. During Stay 3 the counter reached 101 cumulative days and the second exposure period began. Stay 3 ended when the resident again left the facility, for fewer than 30 days this time. The 30-day gap was included in Exposure Period 2, so we could capture hospitalizations or other utilization that may have occurred during this short gap. The resident returned for Stay 4, still in Exposure Period 2. Exposure Period 2 ended when the resident elected hospice care. The stay technically continued because the resident did not leave the facility for this care.

Two additional considerations are worth noting:

1. A resident may have had Initiative-eligible exposure periods in more than one nursing facility; the Initiative-eligible exposure period in each nursing facility was determined as previously mentioned. However, due to the requirement of accumulating 101 days, there will inevitably be a gap between the exposure periods. The first 30 days following discharge from the facility would still be counted as part of the exposure time in the first facility.

2. The exposure periods may have contained skilled nursing facility (SNF) care episodes following hospitalizations that were covered under Medicare Part A (illustrated by the SNF care period in Exposure Period 2 in Figure I-1). These SNF stays would in fact count as time spent in the facility if the resident returns to the same facility for SNF care and in any case would be counted as exposure time during the first 30 days of any gaps. Although nursing

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[10] While all other reasons for a gap allow for a 60-day interruption, a gap due to hospice only allows for a 59-day interruption.

facilities were not eligible for the Initiative-related payment during these SNF episodes because they were already paid at the higher SNF rate (compared to the Medicaid or private pay nursing facility rate), practitioners participating in the Initiative were eligible for the higher Initiative-related payment (assuming the resident returns to a participating facility) and in some C+P facilities, the resident would continue to receive any clinical interventions. Thus, there were Initiative-related incentives, albeit smaller than the rest of the exposure period, to reduce hospitalizations during these SNF episodes.

Identifying Initiative-eligible residents and their Initiative-eligible exposure periods was the first step to forming the analytic sample and preparing analytic files to support both comparison group selection and data analyses. We then extracted key covariates capturing demographics, functional status, diagnosis, and enrollment in other federal initiatives or demonstrations from the data sources described in ***Appendix Section I.3***. The final analytic files included Initiative-eligible residents who were successfully linked with Medicare enrollment and claims data, MDM, and who had non-missing values for all the covariates.

I.5   National Comparison Group Selection

We originally planned to create comparison groups from within the same states as the ECCPs to account for state-level variations, such as state policy changes or changes in local market conditions. However, during our evaluation of NFI 1, we identified some spillover effects, which indicated that other within-state facilities also picked up some components of NFI 1 (Ingber et al., 2017). In fact, some ECCPs deliberately encouraged the spread of good Initiative practices beyond facilities participating in NFI 1-participating facilities. This spillover effect created the potential to underestimate the Initiative effects because if within-state comparison facilities implemented some NFI practices, their practice changes over time would be similar to those of the Initiative facilities, minimizing the measurable impact of NFI 2.

Therefore, we concluded that despite the advantages of using a within-state comparison group, this evaluation design might not give full credit to NFI 2 if the within-state comparison facilities were implementing similar interventions. To address this limitation, we determined, with CMS approval, that it would be better to use a national comparison group selected from outside the Initiative-participating states. This group was larger and less subject to random fluctuation than the within-state comparison group of matched facilities used in the evaluation of NFI 1 (Ingber et al., 2017). Because of its large size, using a national comparison group had the important advantage of producing stable estimates for regression model case-mix adjustment parameters.

We created a uniform national comparison group for all ECCPs. The national comparison group was selected from the national sample of residents in non-ECCP states. In this section, we describe how the comparison group was constructed.

We first defined a baseline period for the evaluation. To identify the appropriate baseline years to include in the analysis, we examined trends over time for utilization and Medicare expenditures. Based on these trends, and in consultation with CMS, we determined that FY 2014–FY 2016 would be used as the baseline years. These three years immediately preceded NFI 2 and were the years, for the C+P group, that NFI 1 had been fully implemented.

Figure I-2 depicts our analytic approach to selecting a national comparison group. We first selected states from which the national sample frame was drawn. The national sample was selected from all non-ECCP states, with a few exceptions. Facilities and residents in Alaska; Hawaii; Washington, DC; Puerto Rico; Guam; and the U.S. Virgin Islands were excluded from the national sample because of differences in their nursing facility resident populations compared to those in the 48 contiguous states. We also excluded Nebraska from the national sample because some Nebraska facilities had participated in NFI 1 and did not continue into NFI 2.

Figure I-2.   Analytic approach to selecting national comparison group residents

States	National Sample: Nursing Facilities	National Sample: Residents	Propensity Score Model Trimming
• All non-ECCP states, except Alaska, Hawaii, D.C., Puerto Rico, Guam, the U.S. Virgin Islands, and Nebraska	• Medicare and Medicaid certified • Not on the Special Focus Facility list • Not a veterans' home	• Resided in facility for 101+ cumulative days • Did not elect hospice during exposure period • Did not enroll in Medicare Advantage plan during exposure period	• Resident characteristics • Facility characteristics

The national sample was drawn in each year for FY 2014–FY 2016 (3 baseline years) and for FY 2017 (Initiative Year 1), FY 2018 (Initiative Year 2), and FY 2019 (Initiative Year 3). From all the states included in the national sample in each year, we then selected facilities using the following criteria:

- Medicare and Medicaid certified
- Not an SFF
- Not a State Veteran's Home[11] as explained in *Appendix Section I.4*.

After identifying all facilities meeting the inclusion criteria above, we next selected residents for inclusion in the national sample frame who met the same criteria as we described above for residents in participating facilities.

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[11] We used the list available on this website to help identify these facilities:
https://www.longtermcarelink.net/ref_state_veterans_va_nursing_homes.htm

Residents meeting these criteria during each year comprised the national sample frame from which the final national comparison group of residents was selected using propensity score models. As we detail below, the propensity scores were not used to match individuals, and instead were used to exclude individuals who were very different from the study population.

National Comparison Group Construction—Propensity Score Models to Exclude Outliers. In each year, we combined all eligible residents of the intervention group facilities (both C+P and P-O) into one intervention group. For each of the baseline years (FY 2014–FY 2016), we selected residents of the intervention group based on the intervention eligibility requirements (even though the intervention had not begun at that time). Then, using a combined file that included all residents from the single intervention group and all residents from the national sample frame, separately for each year, we ran a propensity score model to predict the probability of a resident being in the intervention group based on an extensive list of resident characteristics and some facility characteristics. From this model, propensity scores were computed for all intervention group residents and for all residents in the national sample frame. The propensity scores were not used to match individuals, but to exclude individuals who whose propensity score was not within the range of propensity scores of the residents in the Initiative facilities.

Our use of propensity scores to trim outliers from a national comparison group of would-be eligible nursing facility residents, rather than matching specific individuals (or facilities), is different from the typical comparison group selection methods used in some other CMS evaluations. In consultation with CMS, we selected to use extensive risk adjustment in the modeling as the principal approach to control for differences in residents in the intervention and comparison groups. We included a broad list of resident characteristics (demographics and health characteristics measured by HCCs) as risk adjusters in all regression models of outcomes. We believe this approach is preferable and serves our analytic purposes well. The "light-touch" approach to trimming cases with out-of-range propensity scores helped to identify and retain a large-sized national comparison group that ensured stable and robust parameter estimates from DD regression models for impact analysis.

Both resident- and facility-level characteristics were included in a logistic regression model to calculate the propensity score, which was the predicted probability of being in the intervention group. Most variables included in the propensity score models were the same as those included in the DD analytical models. The analytical models included a few additional health conditions, and

the propensity score model included additional facility-level variables, such as several of the facility's rating variables from Care Compare/Provider Data Catalogue.[12]

Within-State Reference Groups. The national comparison group approach did not allow us to sufficiently account for possible state-specific factors that may have impacted our outcomes of interest—such as concurrent within-state efforts (unrelated to NFI) to reduce hospitalizations. This concern was addressed with additional sensitivity analyses that used a within-state reference group (WSRG) to capture possible changes in state policies and local market conditions. For each year, we created a WSRG that included all would-be eligible residents from all nonparticipating facilities within current ECCP states meeting the facility inclusion criteria (e.g., not an SFF, Medicare and Medicaid certified). Facilities that were active participants at any point in NFI 1 but were no longer participating in NFI 2 were excluded from the WSRG. Methodological details for the sensitivity analysis using a WSRG instead of a national comparison group are described in ***Appendix Section I.10***. We recognize that this type of analysis has the limitations related to spillover from NFI 1 during the base period as stated in the beginning of this section and in ***Chapter II.5*** of the main report.

I.6   Final Counts of Eligible Residents After Exclusions: FY 2014–FY 2019 Analytical File

We applied the NFI 2 eligibility criteria to create our sample of Initiative-eligible residents for the two intervention groups, and the national comparison group (and the WSRG), and then applied a final set of exclusion criteria specific to various outcomes of interest. ***Table I-2*** displays the counts before and after exclusions for the two intervention groups and for the national comparison group, for each year separately. We initially began with the sample of nursing facility residents who had resided in a facility for 101 cumulative days or more starting from their date of admission to the facility. The table describes some of the specific exclusions and provides the total number of beneficiaries remaining in the sample after all exclusions had been applied. Although the specific exclusions listed in the table were at the resident level, there were both resident- and facility-level exclusions applied to the initial sample as described above.

Table I-3 explains additional exclusions we applied to derive the final analytic samples for each of the analyses, including the exclusions based on propensity scores. The largest number of beneficiaries were included in the utilization analyses, with slightly smaller numbers in the expenditure and quality measure analyses. We removed a small number of observations with negative expenditures. We removed beneficiaries from quality measure samples if they were missing quality measure data or met measure-specific exclusion criteria. Furthermore, we

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[12] The complete list of variables included in the DD models, along with descriptive statistics, is in ***Appendix U***. Propensity models did not include neurogenic bladder, obstructive uropathy, or ESRD post-transplant status. DD models did not include staffing rating, star rating, survey rating (all from Care Compare), or presence of an on-site clinical lab or x-ray. There were slight differences between the two models in how profit status and rurality were measured.

removed observations where we considered the expenditures to be an outlier, using a cutoff of $500,000 in FY 2014 for total Medicare expenditures, which was subsequently adjusted every year for overall expense growth in the national comparison group.

Table I-2.   Counts of eligible residents and residents excluded due to select exclusion criteria, FY 2014–FY 2019

Sample	2014			2015			2016			2017			2018			2019		
	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG
Initial sample	24,074	24,429	1,396,872	24,035	24,401	1,390,608	24,257	23,905	1,358,649	24,158	23,994	1,346,724	24,158	23,880	1,344,218	23,982	23,462	1,322,076
Selected exclusion criteria (exclusions are not mutually exclusive)																		
Enrolled in a Medicare Advantage Plan	4,663	3,758	189,128	5,020	4,143	232,485	5,687	4,390	236,027	5,870	5,028	248,307	6,398	5,886	263,678	6,757	6,508	276,654
Not enrolled in Medicare A and B	2,699	2,047	137,339	2,811	2,008	140,087	2,999	2,077	146,198	3,056	1,930	141,671	3,120	1,894	143,632	3,155	1,961	146,759
No exposure during the year	2,186	1,981	113,954	1,913	1,853	108,017	1,750	1,681	102,070	1,766	1,718	103,639	1,860	1,838	105,710	1,805	1,809	102,459
The MDS resident did not match to Medicare data	1,701	1,236	90,776	1,813	1,231	95,014	2,113	1,330	105,365	2,212	1,321	106,781	2,265	1,335	108,773	2,306	1,329	110,397
Total number of excluded beneficiaries	10,845	9,296	623,441	11,042	9,507	655,693	11,752	9,590	654,090	12,070	10,200	661,589	12,874	11,174	680,366	13,215	11,793	694,208
Total number of eligible beneficiaries	**13,229**	**15,133**	**773,531**	**12,993**	**14,894**	**734,915**	**12,505**	**14,315**	**704,559**	**12,088**	**13,794**	**685,135**	**11,284**	**12,706**	**663,852**	**10,767**	**11,669**	**627,868**

C+P = Clinical + Payment; NCG = national comparison group; P-O = Payment-Only; MDS = Minimum Data Set.

SOURCE: RTI analysis of Medicare claims data.

NOTES: This table shows only selected exclusions. Exclusions are not mutually exclusive.

Table I-3.   Counts of residents used for specific analyses, FY 2014–FY 2019

Sample	2014			2015			2016			2017			2018			2019		
	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG	C+P	P-O	NCG
Total number of eligible beneficiaries	13,229	15,133	773,531	12,993	14,894	734,915	12,505	14,315	704,559	12,088	13,794	685,135	11,284	12,706	663,852	10,767	11,669	627,868
Overall exclusions applied for analytic sample																		
Excluded due to out-of-range propensity scores	—	—	4,111	—	—	11,539	—	—	979	—	—	2,679	—	—	288	—	—	1,241
Excluded due to missing covariate	648	629	40,704	647	707	40,256	718	620	37,426	594	694	35,531	662	720	38,371	616	591	33,690
Total number used for utilization analyses	**12,581**	**14,504**	**728,716**	**12,346**	**14,187**	**683,120**	**11,787**	**13,695**	**666,154**	**11,494**	**13,100**	**646,925**	**10,622**	**11,986**	**625,193**	**10,151**	**11,078**	**592,937**
Exclusions applied for expenditure analyses																		
Excluded due to outlier expenditures	56	34	1,917	48	36	1,612	53	33	1,645	44	35	1,461	34	26	1,290	41	23	1,231
Excluded due to negative expenditures	—	—	10	—	—	7	—	—	10	—	—	12	1	1	6	—	—	7
Total number used for expenditure analyses	**12,525**	**14,470**	**726,789**	**12,298**	**14,151**	**681,501**	**11,734**	**13,662**	**664,499**	**11,450**	**13,065**	**645,452**	**10,587**	**11,959**	**623,897**	**10,110**	**11,055**	**591,699**
Exclusions applied for QM analyses																		
Excluded due to missing QM outcome data	226	262	13,272	227	239	12,951	207	232	12,249	213	250	11,893	134	100	8,160	143	106	6,945
Total number used for QMs	**12,355**	**14,242**	**715,444**	**12,119**	**13,948**	**670,169**	**11,580**	**13,463**	**653,905**	**11,281**	**12,850**	**635,032**	**10,488**	**11,886**	**617,033**	**10,008**	**10,972**	**585,992**

C+P = Clinical + Payment; MDS = Minimum Data Set; NCG = national comparison group; P-O = Payment-Only; QM = quality measure.

— = data not available.

SOURCE: RTI analysis of Medicare claims data.

NOTES: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The numbers for QMs in the table reflect the majority of QMs. The total number of beneficiaries excluded due to negative expenditures includes only those beneficiaries that had negative total Medicare expenditures. Additional beneficiaries were excluded from some of the specific category expenditure models due to having negative expenditures in that category.

I.7 Defining Outcome Measures

The outcome measures we considered in this report fell into four broad categories: service utilization, Medicare expenditures, MDS-based quality outcomes, and resident mortality. Service utilization included hospitalizations, ED visits, and acute care transitions (which includes hospitalizations, ED visits, and observation stays). These included both resident-level outcome variables that are used in multivariate regression analyses and aggregated outcome variables used for descriptive analyses. Below are a few general notes on these measures, followed by a more detailed description of them.

- Unless otherwise specified, measures are calculated per fiscal year.

- All measures were based on the portion of the reporting period during which the individual was Initiative eligible (Initiative-eligible exposure period[13]) so that events that occurred (or dollars spent) were only counted if they occurred during this period, unless otherwise specified. This was determined based on whether the admission date on the claim fell within a resident's Initiative-eligible exposure period. The exception was that for the mortality outcome we counted resident deaths occurring within the fiscal year, even if the death occurred after the Initiative-eligible exposure period.

- We accounted for the length of the individual's Initiative-eligible exposure period in several ways, with differences between the measures, as detailed below. Techniques included annualizing the outcome variable, incorporating exposure as a covariate in the regression model, and using weights in the regression model, as explained in ***Appendix Section I.9***.

- Descriptive results, calculated at the aggregate level, are presented for the following groups of nursing facility residents (see ***Appendices O–S***):

  – National comparison group residents

  – C+P group residents, all ECCPs combined

  – C+P group residents, each ECCP separately

  – P-O group residents, all ECCPs combined

  – P-O group residents, each ECCP separately.

I.7.1 Medicare Utilization

As described in ***Table I-4***, we tracked the utilization of Medicare-covered services and report the following descriptive measures in each year:

- The percentage of residents who experienced an event during their Initiative-eligible exposure period.

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[13] The Initiative-eligible exposure period could be the entire reporting period or some portion thereof.

- The rate of events (e.g., hospitalizations) per 1,000 Initiative-eligible resident-days.

We calculated these measures at the aggregate level for each of the groups of residents defined above. They are reported in tables of descriptive statistics (in **Appendices O** and **P**); these results were not adjusted for resident characteristics.

For multivariate regression analyses, we defined a series of individual resident-level utilization measures two ways, as either a probability or a count, as described in **Table I-4**.

- For the probability model, a dichotomous (1/0) variable indicated whether a resident experienced an event over her or his Initiative-eligible exposure period in each year.
- For the count model, we used the count of events during the resident's Initiative-eligible exposure period in each year.

Table I-4.   Utilization measures for descriptive and multivariate analyses

Outcome measure	Specifications	Descriptive/ multivariate
Aggregate level: percentage of residents who experienced an event[1]	Sum (residents who experienced the event) / Sum (all residents), per reporting period. Only events that occur during the Initiative-eligible exposure period are counted. This measure does not account for length of exposure period.	Descriptive
Aggregate level: rate of events[1] per 1,000 resident-days	Sum (events)*1,000 / Sum (Initiative-eligible resident-days), per reporting period. Only events that occur during the Initiative-eligible exposure period are counted. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.	Descriptive
Individual level: whether an event[1] occurred	Dichotomous (1/0) variable indicating whether a resident experienced an event during their Initiative-eligible exposure period.	Multivariate[2]
Individual level: count of events[1]	Number of events experienced by the individual during reporting period. Only events that occur during the Initiative-eligible exposure period are counted.	Multivariate[2]

[1] Includes each of the types of hospital-related events (hospitalizations, emergency department visits, observation stays, and any of these acute care transitions), whether all-cause, potentially avoidable, potentially avoidable because of any of the six qualifying conditions, or potentially avoidable because of one of the six qualifying conditions.

[2] Potentially avoidable utilization because of each of the six qualifying conditions separately is not included in multivariate analyses because of the relatively low frequency of events related to each individual condition.

The utilization measures of Medicare-covered services included hospitalizations, ED visits, observation stays, and any of these acute care transitions, all defined using Medicare claims. These hospital-related events are described further in **Table I-5**.

Table I-5.   Identifying types of hospital-related utilization events in claims

Outcome	Specifications	Data source
Hospitalizations	Hospitalizations are identified based on FFS inpatient bills.	Medicare inpatient claims
ED visits	Includes ED visits that did not result in inpatient admission identified from institutional outpatient claims, as Revenue Center Code (RCC) = 045X or 0981 or HCPCS (CPT) code = 99281–99285.	Medicare hospital outpatient (institutional) claims
Acute care transitions	Includes hospitalizations, ED visits, or observation stays. Hospitalizations and ED visits identified as above. Observation stays are identified in the outpatient claims as RCC = 0760 or 0762 and HCPCS = G0378 or G0379. In general, outpatient visits that result in inpatient admissions are billed only as inpatient claims so there will be no double counting. We count just once those claims that would be considered both ED visits and observation stays. Note that because of the unique billing practices of critical access hospitals (CAH), there could be some double counting of events in CAH. This occurrence is rare.	Medicare inpatient claims; Medicare hospital outpatient (institutional) claims

ED = emergency department; FFS = fee-for-service; HCPCS = Healthcare Common Procedure Coding System; CPT = Current Procedural Terminology.

For the hospital-related utilization events just described, we examined all-cause events, potentially avoidable events, potentially avoidable events due to any of the six qualifying conditions, and potentially avoidable events due to each of the six qualifying conditions separately (*Table I-6*). We determined the classification of events by the diagnoses on the hospital claim. In most cases, this classification was based on the principal diagnosis, and sometimes it was based on a combination of principal and secondary diagnoses. The potentially avoidable category was based on the definition of potentially avoidable hospitalization diagnoses as developed by Walsh et al. (2010, 2012) in their study of high-cost dually eligible populations and was a broader group that includes diagnoses like falls and trauma, and poor glycemic control, among others (including the six qualifying conditions), whereas the six qualifying conditions are a narrower group with principal diagnosis specific to the NFI 2 conditions: pneumonia, congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD)/asthma, skin infection, dehydration, and urinary tract infection (UTI). Events related to each of the six qualifying conditions separately were not included in multivariate analysis—we only present descriptive results. Additional details on identifying potentially avoidable events and potentially avoidable events because of the six qualifying conditions are in *Appendix Section I.8*.

Table I-6. **Types of hospital-related utilization events**

Outcome	Specifications
All-cause event[1]	Event is counted regardless of primary discharge diagnosis.
Potentially avoidable event[1]	We started from the definition of potentially avoidable hospitalization diagnoses as developed by Walsh et al. (2010, 2012) in their study of high-cost dually eligible populations. The list was converted from ICD-9 to ICD-10 for use with data beginning October 1, 2015, and refinements were made because of the increased specificity of ICD-10. Events were considered as potentially avoidable if the primary discharge diagnosis had any of the ICD-9/ICD-10 codes considered potentially avoidable or if the event had one of a group of specified combinations of primary and secondary ICD-10 diagnoses.
Potentially avoidable event[1] because of any of the six qualifying conditions as a group	An event was considered attributable to any of the six NFI 2 qualifying conditions if its primary discharge diagnosis had any of the ICD-9/ICD-10 codes deemed to be associated with these conditions, or if the event had one of a group of specified combinations of primary and secondary diagnoses, which indicate these six qualifying conditions.
Potentially avoidable event[1] because of each of the six qualifying conditions[2]	Same as above except that this measure is calculated separately for each of the six NFI 2 conditions.

[1] Applies to hospitalizations, emergency department visits, observation stays, or any of these acute care transitions.

[2] Events because of each of the six qualifying conditions separately are not included in multivariate analyses.

I.7.2 Medicare Expenditures

We report both total expenditures and expenditures for select service categories. Total expenditure was the sum of Medicare-paid amounts, including the following types of Medicare claims: inpatient, outpatient (institutional), SNF, hospice, home health, durable medical equipment, carrier file services (e.g., professional, lab), and total payments for Part D drugs. While home health claims were less likely for long-stay nursing facility residents, they could occur during the times when the resident was outside the facility but still in an exposure period.

For reporting expenditures for specific categories, we closely mirrored the categories we used for utilization measures, described above. Institutional claims did not include spending for related professional services, which were in the carrier file. ED and observation stay expenditures were based on the outpatient claims only.

For the multivariate models, we annualized the measures used for multivariate analyses based on the length of each resident's Initiative-eligible exposure period, as described further in ***Appendix Section I.10***. We calculated measures per beneficiary per fiscal year. We calculated measures at the aggregate level to display descriptive results, and at the individual level for use in multivariate models (***Table I-7***).

Table I-7. Expenditure measures for descriptive and multivariate analyses

Outcome measure	Specifications	Descriptive/ multivariate
Aggregate level: Total Medicare expenditures per resident-year	Sum (Medicare-paid dollar amount for all covered services) * 365 / Sum (Initiative-eligible days), per reporting period. The numerator counts Medicare payments for all services included in the following types of Medicare claims: inpatient, outpatient (institutional), SNF, hospice, home health, DME, carrier file, and Part D drugs. Only payments that are incurred during the Initiative-eligible exposure period are counted. Each individual resident contributes their count of dollars to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.	Descriptive
Aggregate level: Medicare expenditures per resident-year for a specific expenditure category[1]	Sum (Medicare-paid dollar amount for a specific category of service) * 365 / Sum (Initiative-eligible days), per reporting period. Only payments that are incurred during the Initiative-eligible exposure period are counted. Each individual resident contributes their count of dollars to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.	Descriptive
Individual level: Total Medicare expenditures per resident-year	(Medicare-paid dollar amount for all covered services * 365) / Count (Initiative-eligible days[2]), per reporting period. Medicare payments for all services included in the following types of Medicare claims: inpatient, outpatient (institutional), SNF, hospice, home health, DME, carrier file, and Part D drugs. Only payments that are incurred during the Initiative-eligible exposure period are counted.	Multivariate[3]
Individual level: Medicare expenditures per resident-year for a specific expenditure category[1]	(Medicare-paid dollar amount for a specific category of service) * 365 / Count (Initiative-eligible days[2]), per reporting period. Only payments that are incurred during the Initiative-eligible exposure period are counted.	Multivariate[3]

DME = durable medical equipment; SNF = skilled nursing facility.

[1] Includes each of the types of hospital-related events (hospitalizations, emergency department visits, observation stays, and any of these acute care transitions), whether all-cause, potentially avoidable, potentially avoidable because of any of the six qualifying conditions, or potentially avoidable because of each of the six qualifying conditions separately.

[2] If the count of Initiative-eligible days was < 30, the denominator was equal to 30.

[3] Multivariate analyses for each of the six qualifying conditions separately are not performed because of their relatively low frequency.

I.7.3 MDS-Based Quality Measures

We defined resident-level quality measures using the nursing home resident assessment MDS, Version 3.0 (hereinafter referred to as MDS-based quality measures). MDS-based quality measures assess quality of care, health, and functional outcomes. Together with CMS, we selected quality measures based on two major criteria: (1) clinical relevance to potentially avoidable hospitalizations and the six qualifying NFI 2 conditions, and (2) alignment with other CMS initiatives (e.g., nursing home Care Compare, the Nursing Home Value-Based Purchasing Program, the Five-Star Quality Rating system) or partnering initiatives (e.g., Advancing Excellence in America's Nursing Homes). These measures are presented in *Table I-8*. We analyzed all selected

measures descriptively and included a subset of measures in multivariate analyses. Measures not included in the multivariate analyses have statistical characteristics (e.g., extremely low prevalence, potential measurement issues) that do not allow for stable or meaningful results.

Table I-8.   MDS-based quality measures for descriptive and multivariate analyses

Measure	Definition (proportion of observed quarters)	Descriptive/ Multivariate
Catheter inserted and left in bladder	The proportion of observed quarters with data on the presence of indwelling catheters.	Descriptive and multivariate
One or more falls with injury	The proportion of observed quarters with data on the presence of one or more look-back scan assessments that indicate one or more falls that resulted in injury.	Descriptive and multivariate
Self-report moderate to severe pain	The proportion of observed quarters with data on the presence of either (1) almost constant or frequent moderate to severe pain in the last 5 days or (2) any very severe/horrible pain in the last 5 days.	Descriptive and multivariate
Pressure ulcers stage II or higher	The proportion of observed quarters with data on the presence of Stage II–IV pressure ulcers.	Descriptive and multivariate
Decline in ADLs	The proportion of observed quarters with data indicating that a resident's need for help with late-loss ADLs has increased. An increase is defined as an increase in two or more coding points in one late-loss ADL item or one-point increase in coding points in two or more late-loss ADL items.	Descriptive and multivariate
Urinary tract infection	The proportion of observed quarters with data on the presence of urinary tract infection within the last 30 days.	Descriptive and multivariate
Antipsychotic medication use	The proportion of observed quarters with data indicating that a resident received an antipsychotic medication.	Descriptive and multivariate
Antianxiety or hypnotic medication use	The proportion of observed quarters with data indicating that a resident received antianxiety or hypnotic medications.	Descriptive
Weight loss	The proportion of observed quarters with data indicating that a resident has a weight loss of 5 percent or more in the last month or 10 percent or more in the last 6 months and was not on a physician prescribed weight-loss regimen.	Descriptive
Physically restrained	The proportion of observed quarters with data on the presence of daily physical restraints (trunk restraint used in bed, limb restraint used in bed, trunk restraint used in chair or out of bed, limb restraint used in chair or out of bed, or chair prevents rising used in chair or out of bed).	Descriptive

ADL = activity of daily living; MDS = Minimum Data Set.

We defined each MDS-based quality measure as the proportion of observed quarters with the presence of each adverse event for each resident, producing an annual score for each resident ranging from 0 to 1. We present these proportions as percentages in descriptive tables (***Tables R-1*** to ***R-8***) in ***Appendix R***. Because Initiative-eligible residents can be observed for different lengths of time depending on their residence and eligibility in the nursing facilities, the measures were

weighted by their exposure as a proportion of a year. The weighted values were reported in our descriptive analysis and included in the multivariate analyses.

I.7.4   End-of-Life Outcomes

We measured resident mortality within the fiscal year. We examined deaths occurring within the fiscal year to capture deaths occurring after a resident's exposure period ended. For example, a resident's Initiative-eligible period ended if the resident elected hospice, and the outcome of mortality within the fiscal year includes deaths following the start of a hospice stay. Hospice use varied across states with some states using less hospice and possibly providing palliative care in other ways. Because this impacted the distribution of hospice use in the Initiative and comparison groups, we felt it was important to capture deaths occurring after hospice election. This is discussed further in *Chapter II.8*.

We conducted descriptive and multivariate analyses to evaluate and understand resident mortality. The measure is described in *Table I-9*.

Table I-9.   End-of-life measure for descriptive and multivariate analyses

Outcome measure	Specifications	Descriptive/multivariate
Mortality within fiscal year	Dichotomous (1/0) variable indicating whether a resident has date of death in the fiscal year. The date of death was derived from Medicare enrollment data.	Descriptive and multivariate

I.8   Definition of Potentially Avoidable Hospitalizations and Identification of Six Qualifying Conditions

As explained in *Appendix Section I.7*, we started with the list of potentially avoidable hospitalization conditions and corresponding ICD-9-CM diagnosis codes developed by Walsh et al. (2010, 2012) in their study of high-cost Medicare-Medicaid dually eligible populations to define potentially avoidable hospitalizations, ED visits, and acute care transitions. We updated this initial list to reflect subsequent updates to the coding system and ongoing evaluation of codes clinically appropriate for inclusion in the list. Also, as previously explained, under NFI 2, the payment incentives were specifically targeted for the in-house treatment of acute changes in six qualifying conditions that were a subset of conditions deemed potentially avoidable for hospital admissions. We thus developed a shorter list of ICD-CM codes, a subset of the original list for all potentially avoidable conditions, to capture hospitalizations for the six qualifying conditions.

I.8.1   Sets of Potentially Avoidable Hospitalizations (ICD-9-CM and ICD-10-CM)

Initial lists of potentially avoidable hospitalization conditions have undergone a series of revisions since the start of the base period used in the evaluation. The transition to ICD-10-CM diagnosis codes effective October 1, 2015, necessitated mapping previously identified ICD-9-CM codes for potentially avoidable hospitalization conditions to the new code system. One-to-many relationships were identified by mapping ICD-9-CM codes to ICD-10-CM codes and by mapping ICD-10-CM codes to ICD-9-CM codes.

An updated list of ICD-9-CM codes, created in spring 2018 and validated in fall 2019, reflected potentially avoidable hospitalizations and captures additional ICD-9-CM codes identified in:

- ICD-9-CM code files, updated for FY 2014, available on the CMS website

- One-to-many relationships of ICD-10-CM codes to ICD-9-CM (e.g., the ICD-10 code for Essential [primary] hypertension [I10] maps to ICD-9 codes for Malignant essential hypertension [401.0] and Benign essential hypertension [401.1])

- Ongoing evaluation for codes clinically appropriate for inclusion in the potentially avoidable hospitalization list (e.g., addition to the list of ICD-9-CM code for Methicillin-susceptible *Staphylococcus aureus* in conditions classified elsewhere and of unspecified site [041.11]). RTI clinicians, including physician Dr. Christopher Beadles, provided clinical input and decisional support on appropriateness of codes.

Listings of ICD-10-CM codes for potentially avoidable hospitalizations were created/updated in spring 2018, and updated again in fall 2019, to reflect the following:

- Mapping of ICD-9-CM potentially avoidable hospitalization codes to ICD-10-CM annual update code files for FY 2019. The mapping captured codes added, deleted, and modified in FY 2019 ICD-10-CM code files, and the clinical appropriateness of including such changes in the list of potentially avoidable hospitalization conditions.

- One-to-many relationships of ICD-9-CM codes to ICD-10-CM (e.g., the ICD-9-CM code for Closed fracture of acetabulum [808.0] maps to 54 unique ICD-10-CM codes that describe closed fractures of the acetabulum in terms such as anatomy of the acetabulum, displaced/nondisplaced, and laterality).

- Ongoing evaluation for codes clinically appropriate for inclusion in the potentially avoidable hospitalization conditions list (e.g., addition to the list of ICD-10-CM code for Periorbital cellulitis [L03.213]). RTI clinicians, including physician Dr. Beadles, provided clinical input and decisional support on appropriateness of codes. All clinical concepts identified as additional potentially avoidable hospitalization conditions were incorporated into both ICD-10-CM lists for FY 2019 and the ICD-9-CM lists.

Several overarching considerations were applied across the ICD-9-CM and ICD-10-CM lists of potentially avoidable hospitalization conditions, including the following:

- Only valid ICD-9-CM and ICD-10-CM code numbers were included on the lists. Header codes were not included.

- ICD-10-CM "subsequent encounter" and "sequela" codes were determined to be inappropriate for the lists. ICD-9-CM "late effect" codes were in the original list of potentially avoidable hospitalization conditions developed by Walsh et al. (2010, 2012) Because there was no specified look-back period for late effect (sequela) codes, these were not good indicators of the recency of the incident conditions, and they did not specify the nature of the sequela. Based on clinical review and consultant recommendations, we did not include ICD-10-CM "subsequent encounter" or "sequela" codes for any conditions (including those that were mapped to ICD-9-CM "late effect" codes). We did include any ICD-10-CM "initial encounter" codes related to conditions for which an ICD-9-CM "late effect" was originally listed.

- Certain conditions requiring more than one ICD-9 or ICD-10 code had special treatment. Coding manuals provided instructions such as "code first" and "code also." In addition, RTI clinical experts advised that certain combinations of codes were indicative of potentially avoidable hospitalization conditions (e.g., nonchronic pressure ulcer code in combination with cellulitis code). Examples include the following:

  – For certain codes related to fractures that were identified as the principal diagnosis in the ICD-9-CM list of potentially avoidable conditions, the ICD-10-CM instructions for the parallel codes were to *code first* any spinal cord injury—including injury of nerves and spinal cord at neck level or at thorax level and injury of lumbar and sacral spinal cord and nerves at abdomen, lower back, or pelvis level—if it occurred. To properly identify these codes, it was necessary to detect the spinal cord lesion in the principal diagnosis (e.g., S14.XXXX, S24.XXXX, S34.XXXX) *and* detect one of the fracture codes in the secondary diagnosis (e.g., S12.XXXX, S22.XXXX, S32.XXXX). We added such combinations of codes to our updated ICD-10-CM list of potentially avoidable hospitalization conditions. The fractures may also have occurred as a principal diagnosis if there was no spinal cord lesion.

  – Certain electrolyte disorder codes reflected dehydration if they appear in combination with codes indicating volume depletion. To identify these codes, it was necessary to detect the electrolyte disorder in the principal diagnosis (e.g., E87.X) *and* detect one of the codes for volume depletion in secondary diagnosis (e.g., E86.X). We added such combinations of codes to our updated ICD-10-CM list of potentially avoidable hospitalization conditions. The volume depletion may also have occurred as a principal diagnosis.

The finalized set of **ICD-9-CM** codes for potentially avoidable hospitalization conditions, applicable for claims services during FY 2014 and FY 2015, contained 1,930 standalone principal diagnosis codes. An additional 29 principal diagnosis codes, each to be identified in conjunction with one appropriate secondary diagnosis code, were also included in the set. The full list of these ICD-9-CM codes is not included in this report for reasons of space.

The finalized set of **FY 2016 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2016—contained 11,408 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code.

The finalized set of **FY 2017 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2017—contained 11,584 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code.

The finalized set of **FY 2018 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2018—contained a total of 11,655 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code.

The finalized set of **FY 2019 ICD-10-CM** codes for potentially avoidable hospitalization conditions—with codes updated through September 2019—contained a total of 11,660 standalone principal diagnosis codes and 104 additional principal diagnosis codes each to be identified in conjunction with one appropriate secondary diagnosis code.

The full lists of the FY 2016 – FY 2019 ICD-10-CM codes are not included in this report for reasons of space.

Because of the transition from ICD-9-CM to ICD-10-CM, there could be a potential issue with comparability of the codes for potentially avoidable conditions between the two coding systems. We exercised diligence in the mapping process, including clinician advisement, to ensure both completeness and accuracy in the code sets across all years. This was for the transition to ICD-10 and the updates that followed. All longitudinal studies must accommodate coding system revisions. We did not observe any unusual fluctuations or irregularities in the rates of potentially avoidable hospitalizations before or after the transition to ICD-10-CM.

I.8.2   Identifying Subsets of ICD-9-CM and ICD-10-CM Codes Specific to the Six Qualifying Conditions

Each of the six qualifying conditions had qualifying criteria defining the clinical or diagnostic conditions of a beneficiary that could trigger the benefit. Although CMS specified the clinical criteria for each of the six qualifying conditions, as described in *Section I* of the main report, it provided no guidance on which specific ICD-10-CM (or ICD-9-CM for baseline years) codes should be used to identify those conditions. The final list of potentially avoidable hospitalization conditions identified by the RTI team contained subsets of ICD-9-CM and ICD-10-CM codes that generally matched each of the six broadly categorized NFI 2 qualifying conditions—pneumonia, CHF, COPD/asthma, skin infection, dehydration, and UTI—though there was not always exact

correspondence between those codes, the categorization of each condition, and the clinical criteria for each condition as specified by CMS. The symptoms of acute change in each condition, as described in the clinical criteria, were observable to the clinicians who treated a resident in the facility and may be in the medical record; they are not available in the claims. With clinical guidance from our consultant, Dr. Beadles, the RTI team identified, reviewed, and finalized a subset of ICD-9-CM and ICD-10-CM codes for potentially avoidable hospitalization conditions that, for practical purposes, matched the CMS-specified clinical criteria for each qualifying condition, briefly summarized below.

- *Pneumonia*: The symptomatic and treatment guidance specified by CMS suggested that bacterial pneumonia was the focus here, not viral pneumonia. Thus, we removed any diagnosis codes for viral pneumonia.

- *CHF*: The qualifying diagnosis, symptoms, and treatment guidance, as specified by CMS, were not limiting to a type of CHF.

- *COPD/Asthma*: The qualifying diagnosis, symptoms, and treatment guidance, as specified by CMS, were not limiting in the type of asthma.

- *Skin Infection*: The qualifying diagnosis, as specified by CMS, focused on "new onset of painful, warm and/or swollen/indurated skin infection requiring oral or parenteral antibiotic or antiviral therapy." It further clarified that "if associated with a skin ulcer or wound there is an acute change in condition with signs of infection such as purulence, exudate, fever, new onset of pain, and/or induration." Therefore, the presence of skin ulcers alone but without infection did not meet the clinical criteria for the qualifying condition. We identified cellulitis, acute lymphadenitis, and other specified local infections of the skin that met the qualifying criteria. However, certain skin ulcer codes reflect infection if they appear in combination with codes indicating cellulitis, acute lymphadenitis, and other specified local infections of the skin. These codes were identified by the presence of skin ulcers in the principal diagnosis in conjunction with a secondary diagnosis code for cellulitis, acute lymphadenitis, or other specified skin infections.

- *Dehydration*: The qualifying diagnosis and treatment guidance, as specified by CMS, pertained to fluid/electrolyte disorder or dehydration, and the focus was on dehydration or volume depletion. As noted earlier, certain electrolyte disorder codes reflected dehydration if they appear in combination with codes indicating volume depletion. These codes were identified by the presence of electrolyte disorder in the principal diagnosis *and* presence of volume depletion in the secondary diagnosis.

- *UTI*: The symptomatic and treatment guidance provided by CMS focused on dysuria, frequency, new incontinence, altered mental status, hematuria, and costovertebral angle tenderness. As with the other conditions, all the possible signs and symptoms related to the diagnosis of the condition were not observed in the codes. We note while there was no need for a change to our list of codes to detect UTI, CMS removed altered mental status from the list of criteria used to define UTI in FY 2019.

I.9　Independent Variables

The selection of covariates (i.e., independent or control variables) as risk adjusters in our final regression models was guided by literature review and was also shaped by limitations of the administrative data used in our analyses. Descriptive statistics on the final set of model covariates, including percentages for categorical variables and means and standard deviations for continuous variables, are summarized in **Appendix T**.

Resident-Level Characteristics. Selected covariates at the individual level included residents' demographic characteristics, and health and functional status derived from the MDS and Medicare claims. Age and sex were combined to create groupings by 5-year age brackets (except for the under-65 group and 95-or-older group) for both sexes. Resident race/ethnicity was coded in five categories, including non-Hispanic White (reference category), non-Hispanic Black, non-Hispanic Asian, Hispanic, and all other racial/ethnic groups. In all models, we included an indicator for Medicare-Medicaid dual-eligible status (any episode-month) and whether their original Medicare eligibility was because of a disability.

Comorbidities were included as clustered by the CMS HCCs as described in **Appendix Section I.3**. In a few cases, we aggregated HCC groups that were clinically related because one of the groups had a very small number of residents with that characteristic. Combining clinically related HCC groups when some groups have very few residents made these groups more stable. We also excluded a few HCC categories from the model where the prediction was not clinically plausible or where the number of residents with the characteristic was zero or very small and aggregation with another variable was not appropriate. Finally, we included the HCC count per resident as a covariate. This was the total number of HCCs for which a beneficiary had diagnoses. A higher number of HCCs indicated a higher comorbidity burden, reflecting a higher level of medical complexity beyond the individual conditions. We included four categories (i.e., HCC count 0–2, 3–4, 5–7, and 8 or more) to allow for a nonlinear effect and ensure comparable sample size across categories.

We included several additional diagnoses documented in the MDS: anemia (which is one of the potentially avoidable conditions for hospitalization), dementia (Alzheimer's or other types), neurogenic bladder, and obstructive neuropathy. There were a few additional MDS-based covariates, including a 4-level categorical variable for degree of ADL dependence; a 4-level categorical variable for body mass index (BMI); a 4-level Cognitive Function Scale (Thomas et al., 2017) capturing cognitive function; and depression status measured by the Patient Health Questionnaire (PHQ)-9 (either self-report or staff assessment scores), which were included as risk adjusters. We included flags for patients with end-stage renal disease (ESRD) with dialysis and ESRD after receiving a transplant, both derived from the IDR.

It is important to note that all resident-level covariates from the MDS were based on the first MDS assessment (limiting to certain types such as admission, quarterly, annual, discharge, and PPS)

starting from middle of the year *prior* to the one containing a resident's Initiative-eligible episode. This way, we used lagged individual-level risk factors to predict current outcome variables in each year, thereby mitigating potential endogeneity in the relationship between them. In a similar way, we used HCCs that were defined using diagnoses documented in Medicare claims from the *previous* year.

In our analysis, we also controlled for enrollment in the following CMS demonstrations from information obtained from the MDM:

- Community-Based Care Transition Program (CCTP)
- Comprehensive ESRD Care (CEC)
- Comprehensive Primary Care Initiative (CPCI)
- Comprehensive Primary Care Plus (CPC+), non-Shared Saving Program (SSP) participants
- Comprehensive Primary Care Plus (CPC+), SSP participants
- Financial Alignment Initiative
- Maryland Total Cost of Care, Primary Care Program
- Medicare Shared Savings Program
- Next Generation Accountable Care Organization (NGACO)
- Pioneer Accountable Care Organization
- Vermont All-Payer ACO Model.

Because information was lacking on other CMS demonstrations in the MDM, including Bundled Payment Care Initiatives and State Innovation Models, we were unable to control for the potential impacts of these programs on NFI 2 in our models. We did not control for participation in the Multi-Payer Advanced Primary Care Practice demonstration, which ended in 2016. Although we accounted for enrollment in the above national demonstrations systematically through the MDM, we were unable to account for impacts of other changes to usual care that may have occurred at the state or facility levels.

Facility-Level Characteristics. In addition to resident-level risk factors specified above, we further controlled for facility-level variables that may have had an impact on hospital use and the quality of care provided to nursing facility residents: the profit status of the facility, whether the facility was hospital based, and whether the facility was in a rural, urban, or metropolitan location. Additionally, we included a facility-level Medicare Advantage (MA) penetration covariate. This was a variable indicating the proportion of long-stay residents enrolled in an MA plan in each facility. We included MA penetration in the model as a set of categorical variables to allow for a nonlinear effect. For the propensity score analysis performed to aid the selection of national comparison group residents (*Appendix Section I.5*), we included additional facility-level variables. For risk

adjustment purposes in our regression models of resident outcomes, facility-level factors were less important than individual-level characteristics specified above.

State-Level Characteristics. In addition to the resident- and facility-level covariates, we further controlled for the yearly state-level proportion of deaths related to influenza or pneumonia, FY 2014–FY 2019. Influenza and pneumonia deaths could vary significantly by year and location and affect hospitalization rates within nursing facilities.

I.10   Statistical Methods for Multivariate Analyses

We used various forms of regression modeling to assess the effects of the payment incentive within the C+P and the P-O interventions separately. We ran similar models (just using different study samples) when measuring the combined impact of the ECCPs for a given intervention or for each ECCP separately. We describe the study population for these regression models, including both the Initiative-eligible residents and the comparison group residents, in ***Appendix Sections I.4– I.6***, the main outcome variables of interest, including hospital-related utilization and Medicare expenditures, in ***Appendix Sections I.7–I.8***, and the covariates included in the models in ***Appendix Section I.9***.

I.10.1   Accounting for Differences in Exposure Time

We used several methods to address differences between residents' exposure times within the reporting period. First, we modified the outcome variable where appropriate. We annualized expenditure outcomes, as indicated in ***Appendix Section I.7***. This assumed the expenditure patterns would be the same for the full 365-day period as they were for the shorter period during which residents were observed and eligible for the Initiative. Second, in the probability and count models, and quality measure models, we controlled for exposure time. Because we observed nonlinearity in the relationship between exposure and hospitalization,[14] we used categories of exposure time. Third, we used weights in the regression models, weighting observations based on exposure time (with a floor of 30 days so even individuals with fewer than 30 days of exposure time were considered to have 30 days), so that residents with longer exposure times exerted greater impact on the coefficient estimates. In the mortality models, we did not control for exposure time, and we did not weight observations based on exposure time, because exposure time is endogenous with the outcome.

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[14] Increasing exposure time was associated with increased hospitalizations (both proportion of residents with a hospitalization and number of hospitalizations per resident) for those with less than a full year of exposure time. However, those with a full year of exposure time had reduced hospitalizations compared to those in several of the categories with less than a year of exposure time.

I.10.2 Accounting for Clustering

Note that in the models we describe, we adjusted the standard errors to account for correlations among observations from each facility. As we explain in each of the sections below dedicated to each of the specific outcomes, we accounted for the "clustering" effect by using robust standard errors that accounted for nursing facility clustering. When discussing the utilization probability models below, we also explain other approaches that we tested.

I.10.3 State Fixed Effects

We included indicator variables for each of the states in the national comparison group (California was left as the reference group). In the models that combined all the intervention states, we included indicator variables for the individual intervention states in the model. We avoided collinearity because there were seven states, and we included only six indicators (omitting Colorado and Nevada for the C+P and P-O models, respectively). We did not include any interactions with these state dummies. Thus, the changes we captured over time to estimate the effect of the Initiative were based on an average of all the residents in the national comparison group, regardless of state.

I.10.4 Multivariate Regression Model: General Specification

We first present a general form of the model, followed by specifications suitable for each of the types of outcome variables. It is a DD design with multiple observation periods before the NFI 2 Initiative began (FY 2014–FY 2016) and multiple observations after. In this report, we present pooled FY 2017–FY 2019 results, as well as results from each of these years individually.

We began with a simplified model and then explain how we adapted the simplified model to specific analytic considerations. The simplest DD model we could use for each payment model would be the following[15]:

Model 1:

$$Y_{ijt} = \beta_0 + \beta_x \times X_{ijt} + \beta_z \times Z_{jt} + \beta_{IG} \times IG + \beta_p \times Post + \beta_{IG,p} \times (IG \times Post) + State_{ij} + \varepsilon_{ijt}$$

In this model, Y_{ijt} represents an outcome variable measured for individual i in facility j for year t. The X_{ijt} are resident characteristics, such as age, sex, clinical characteristics, and participation in other initiatives that may impact the outcome. Z_{jt} are selected facility characteristics (e.g., for-profit status), and state$_{ij}$ is the state fixed effect. The term $\beta_{IG} \times IG$ accounts for baseline differences between the intervention group (IG) and the national comparison group that are based on the average differences during the entire base period, consisting of multiple years (FY 2014–FY 2016).

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[15] For simplicity, we are ignoring the yearly state-level percentage of deaths related to influenza or pneumonia, which is used as a state-level continuous variable.

The term $\beta_p \times$ Post is used to account for changes over time common to all groups and not because of the intervention. In the above model, we include a single "Post" term to account for the post-intervention period, which could be a single year or could be all the years combined. We can also include multiple terms to account for separate post-intervention years. $\beta_{IG,p} \times$ (IG $\times$ Post) is the "DD term" and represents the difference between the change in the intervention group relative to its baseline and the change in the national comparison group relative to its baseline. The last term ε_{ijt} in the equation is a resident-level residual term that represents error in the prediction.

I.10.5   Adjusting for Baseline Trends

Model 1, above, would require us to make a key assumption that in the absence of the intervention, the difference between the respective means of the outcome variable in the intervention and comparison groups, controlling for the differences in the covariates, remained the same over time (the "parallel trends" assumption). In other words, the effect on the outcome variable of being in the intervention group as opposed to the comparison group, absent the intervention itself, would not change over time. Given this assumption, the effect of the intervention itself is captured by $\beta_{IG,p} \times$ (IG $\times$ Post).

The parallel trends assumption may be questionable under some circumstances. In fact, in our evaluation, the C+P group, which participated in NFI 1, would be expected to have trends related to the specifics of each ECCP intervention.

An alternative approach was to explicitly allow for the possibility that there could be different linear trends in the intervention group and in the comparison group. Based on our use of multiple years in the baseline period, we could employ the following model:

Model 2:

$$Y_{ijt} = \beta_0 + \beta_x \times X_{ijt} + \beta_z \times Z_{jt} + \beta_{IG} \times IG + \beta_t \times YC_t + \beta_{t\_IG} \times YC_t \times IG + \beta_p \times Post \\ + \beta_{IG,p} \times (IG \times Post) + State_{ij} + \varepsilon_{ijt}$$

The variable YC is a count of the years since the first baseline year, FY 2014 (thus, YC = 0 for FY 2014, YC = 1 for FY 2015, and so on). The term $\beta_t \times YC_t$ represents the linear trend in the comparison group and the term $\beta_{t\_IG} \times YC_t \times IG$ allows for a different baseline trend in the intervention group. The "DD term" $\beta_{IG,p} \times$ (IG $\times$ Post) estimates the difference in the outcome in the intervention group in the post-intervention period from its expected value. Note that the expected value incorporates the different baseline trends in the intervention group and in the comparison group.

In Appendix K of Annual Report 2 (FY 2017; RTI International, 2019a), we argued based on empirical evidence, that it was appropriate to use a model that allowed for different linear trends. We estimated the coefficient for the term $\beta_{t\_IG} \times YC_t \times IG$ in the model above, respectively for each

intervention group. This term represented the difference in linear trends over the baseline years FY 2014–FY 2016 between the national comparison group and the intervention group. These coefficients were mostly negative in the C+P group and often statistically significant, indicating a decline in the intervention groups relative to the national comparison group. This was particularly apparent in three ECCPs: MOQI, RAVEN, and NY-RAH. We also reexamined these coefficients based on the FY 2018 models and found a similar pattern. These findings led us to adopt the structure of the model above for our primary analysis, with 3 years (FY 2014–FY 2016) of baseline data and different linear trends in the intervention and comparison groups.

As we noted in Annual Report 2 (RTI International, 2019a), this model also required an assumption that the intervention and comparison groups would continue to change by the degree indicated in their own baseline trends. One reason to challenge this assumption was that the impact of the NFI 1 interventions could have plateaued in FY 2015 or FY 2016, in which case the trends from the baseline period would differ going forward. Another related reason was that hospitalization rates had declined to a point where further reductions would be difficult. Although still plausible for FY 2017, it was not plausible to assume that the relatively high rate of reductions in the C+P group would continue indefinitely.

As a result, we applied an approach that incorporated our assumption that the past trends would continue—but only up until a point in time. Specifically, we used the trend in projecting the expected outcome value in FY 2017 and then assumed no further influence from the prior trend for 2018. Thus, the projected trendline for FY 2018 became horizontal. In terms of the model equation above, we assigned YC for FY 2014 = 0; YC for FY 2015 = 1; YC for FY 2016 = 2; YC for FY 2017 = 3; YC for FY 2018 = 3; and YC for FY 2019 = 3.

Figure I-3 illustrates the evaluation concept underlying our <u>annual</u> analyses (for our pooled analysis, where we estimated a single intervention effect for FY 2017–FY 2019, we followed the same approach for modeling the linear trend terms). Solid red diamonds represent hypothetical outcome values for both comparison and intervention groups for the pre-intervention period (FY 2014–FY 2016). We used these data points to create trendlines: the solid line depicts the trendline for the pre-intervention period, and the dashed line depicts the projected trendline for the post-intervention period (FY 2017–FY 2019).

Open red diamonds denote <u>predicted</u> values for both comparison and intervention groups for the post-intervention period. These values were derived using the trends established in the pre-intervention period. The solid blue circles for the comparison group represent the <u>observed</u> values for the post-intervention period. We are specifically interested in the <u>difference</u> between predicted and observed values.

The vertical solid blue lines, or the difference between predicted and observed values in the comparison group, signifies the change that occurred in the comparison group, which was not

exposed to the Initiative. The light blue circles represent the <u>observed</u> values for the post-intervention period in the intervention group. The vertical solid black lines depict the difference in the intervention group between predicted and observed values for the post-intervention period, <u>minus</u> the non-intervention change in outcome (the solid blue line). In other words, the vertical solid black line shows the <u>intervention effect</u>: the change in outcome because of the Initiative.

Figure I-3. The use of baseline trends in calculating difference-in-differences estimates for annual analyses

Pre-Intervention Period

Post-Intervention Period

2014   2015   2016   2017   2018   2019

Comparison Group

Intervention Group

Outcome change in comparison group

Intervention effect =
[Outcome change in intervention group] –
[Outcome change in comparison group]

◆ Pre-intervention observed outcome values

◇ Projected outcome values based on pre-intervention trend

● Post-intervention observed comparison group outcome values

◉ Post-intervention observed intervention group outcome values

— Pre-intervention trendline

- - - Projected trendline based on pre-intervention trend

— Outcome change in comparison group

···· Intervention effect

In addition to the main analysis just described, we conducted two <u>sensitivity analyses</u> using the national comparison group, shown in **Appendix W**: one with FY 2016 alone used as the baseline period (this is essentially Model 1 above with FY 2016 as the baseline) and parallel trends assumed, and another with the average of FY 2014–FY 2016 as the baseline and parallel trends assumed. We consider the analysis with three baseline years and a linear trend to be primary because this approach is realistic and more conservative.

I.10.6 Incorporating a Within-State Reference Group

When conducting the sensitivity analysis using would-be eligible residents in non-intervention group facilities in the seven states (the WSRG) as our comparison group as described above in **Appendix Section I.5**, we included both the national comparison group residents and the WSRG residents. In this sensitivity analysis we ignored potentially confounding spillover effects of NFI 1 on nonparticipants in the ECCP states. We then employed this model:

Model 3:

$$Y_{ijt} = \beta_0 + \beta_x \times X_{ijt} + \beta_z \times Z_{jt} + \beta_{state} \times state + \beta_{IG} \times IG + \beta_t \times YC_t + \beta_{t\_state} \times YC_t \times state$$
$$+ \beta_{t\_IG} \times YC_t \times IG + \beta_p \times Post + \beta_{state,p} \times (state \times Post) + \beta_{IG,p} \times (IG \times Post)$$
$$+ state_{ij} + \varepsilon_{ijt}$$

The indicator variable, state, equals 1 for all eligible and would-be eligible residents in the given Initiative-participating state, whether they reside in an intervention facility or in a WSRG facility. In the case where all ECCPs were combined in the same model, this indicator variable was assigned the value of 1 for all eligible and would-be eligible residents in any of the ECCP states and 0 otherwise. The term $\beta_t \times YC_t$ represents the linear trend in the national comparison group and the terms $\beta_{t\_state} \times YC_t \times state$ and $\beta_{t\_IG} \times YC_t \times IG$ allow for different baseline trends in the state and in the intervention group, respectively. The term $\beta_{state,p} \times (state \times Post)$ would indicate if, following the intervention, there was a change in the state relative to the national comparison group because of state-specific factors to reduce hospitalizations, including possible concurrent within-state efforts unrelated to NFI. The "DD term" $\beta_{IG,p} \times (IG \times Post)$ captures the effect of the NFI 2 intervention above and beyond the effect of other state-specific factors; <u>it is the Initiative effect relative to the WSRG</u>.

Note that we view the Initiative effect relative to the WSRG as a <u>sensitivity analysis</u>. Our <u>primary analysis</u> was calculated with respect to the national comparison group and is based on this model[16]:

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[16] In theory, we could use Model 3 and simply sum the terms $\beta_{IG,p} + \beta_{state,p}$. Note also that Model 4 and Model 2 both obtain the effect of the Initiative relative to the national sample. The only difference is whether nursing facility residents in the WSRG are included in the analysis (Model 4) or altogether omitted (Model 2).

Model 4:

$$Y_{ijt} = \beta_0 + \beta_x \times X_{ijt} + \beta_z \times Z_{jt} + \beta_{WSRG} \times WRSG + \beta_{IG} \times IG + \beta_t \times YC_t + \beta_{t\_WSRG} \times YC_t \times WRSG$$

$$+ \beta_{t\_IG} \times YC_t \times IG + \beta_p \times Post + \beta_{WSRG,p} \times (WSRG \times Post) + \beta_{IG,p} \times (IG \times Post)$$

$$+ state_{ij} + \varepsilon_{ijt}$$

This model is analogous to the prior model except that we used an indicator for WSRG instead of an indicator for the whole state. The indicator variable, WSRG, equals 1 for would-be eligible residents in non-intervention group facilities in an Initiative-participating state, and WSRG equals 0 both for residents in intervention group facilities and residents in other states (from the national comparison group). Here, $\beta_{IG,p} \times (IG \times Post)$ functions like a standard DD coefficient, identifying the effect of the intervention as the difference between change in the intervention group relative to its baseline and the change in the national comparison group relative to its baseline, and not accounting for the effect of being in the specific state. It is the effect relative to the national comparison group. Note that Model 4 estimates the same effect as Model 2, but Model 4 includes the WSRG in the analysis, distinguishing this group from the national comparison group. In **Appendix W**, we present the effect relative to the WSRG. In the main report, we focus on the effect relative to the national comparison group.

To summarize, we present four regression analyses, considering the first one primary and the others to be sensitivity analyses:

1. Adjusting for baseline trends and using a national comparison group (Model 4)
2. Adjusting for baseline trends and using a WSRG (Model 3)
3. Using FY 2016 as the baseline year and using a national comparison group (Model 1 except that the members of the WSRG were included in the analytical sample as they are in Model 4)
4. Using the average of FY 2014–FY 2016 as the baseline period and using a national comparison group (Model 1 except that the members of the WSRG are included in the analytical sample as they are in Model 4)

I.10.7 Utilization Probability Models

For the probability of discrete events, such as the probability of a hospitalization, we used the general equation above to fit a logistic regression model that predicted the probability of the event. We estimated robust standard errors that accounted for clustering at the nursing facility level.

As a sensitivity analysis based on data from 2017, we ran two other models that addressed the clustering issue differently:

- We employed a Generalized Estimating Equation model approach, with the binomial distribution and the logit link function specified. We further specified an exchangeable working correlation structure, which allowed us to obtain parameter estimates and standard errors that accounted for within-facility correlation of observations. We estimated robust standard errors, which were valid even if the correlation structure was not exactly as specified. This approach corrected the standard errors of the coefficients in the models and impacted the parameter estimates themselves.

- We employed a model with nursing facility-level random effects.

With these models, weighting the observations based on exposure time was not possible. Because the sensitivity analyses results were similar to the original logistic regression model (results not shown), we used the original model in the final analysis.

I.10.8   Utilization Count Models

To account for the fact that some residents used a given type of service more than once during their Initiative-eligible exposure period over the course of a given year, we also estimated a parallel set of models where the dependent variable was defined as the count of utilization events. The count results are presented in the **Appendix U** for all ECCPs combined. We considered both a Poisson model and a negative binomial model. Because preliminary analysis suggested that the simple Poisson models were inadequate, given the overdispersion of the data—that is, greater variability in the dataset than would be expected from a Poisson model—we ultimately used negative binomial models. We estimated robust standard errors that accounted for clustering at the nursing facility level.

I.10.9   Medicare Expenditure Models

For total Medicare expenditures, the values exceed zero in virtually all cases. To predict total Medicare spending, we employed a Generalized Linear Model (GLM) with the log link function and Gamma distribution specified, which is a widely used approach to modeling expenditure data that tend to be highly skewed. We estimated robust standard errors that accounted for clustering at the nursing facility level.

For specific types of service utilization such as all-cause hospitalizations, many residents had zero utilization and expenditure. To overcome this issue, we employed a two-part model rather than a simple GLM model. The first part predicted the probability of service utilization, whereby the outcome equaled 1 if a resident had any positive expenditure for the service and 0 otherwise. The second part was conditional on having any positive expenditure and incorporated a GLM model (log link function and Gamma distribution) for service users only that predicts their expected spending. For both parts of the model, we adjusted the standard errors to account for facility-level clustering. Then, using predicted values obtained from these two models, we calculated the predicted expenditure per resident by multiplying the probability of having any positive

expenditure (from the part-one model) by the expected amount of expenditure (from the part-two model). At the end of this process, the two-part model yielded a predicted amount of spending on the service for all residents in the first part of the model, including both actual users and nonusers.

I.10.10 MDS-based Quality Measure Models

We specified the MDS-based quality outcomes as the proportion of observed quarters with the presence of each adverse event or outcome for each resident, producing an annual score for each resident ranging from 0 to 1. These proportion variables can be conceptualized as a sequence of Bernoulli trials (a resident can have up to four target assessments, each of which indicates presence [1] or absence [0] of an event). We used a GLM model with a logit link function and the binomial distribution for these outcomes. Furthermore, we accounted for facility clustering to allow for intra-facility correlation among residents within the same facilities.

I.10.11 Mortality Models

For the probability of mortality within the fiscal year, a discrete event, we used the same technique that we used to model the probability of other discrete events described above. We used a logistic regression model and estimated robust standard errors that accounted for clustering at the nursing facility level.

I.10.12 Estimation of Initiative Effects

For presentation of multivariate regression model results, we calculated and reported the Initiative effect, or the marginal effect of the intervention, on each outcome in meaningful units, such as dollars or percentage points. (The estimated values of coefficients in some models were not in easily interpretable units.) Conceptually, the marginal effect was the effect of a change in a given predictor variable on the conditional mean of the dependent variable. In a linear regression model, the marginal effect for a given covariate equaled the change in the outcome for a unit change in that covariate (a slope coefficient). It was the incremental change related to a binary 1/0 variable being set to 1. In the DD context with a linear model, the intervention effect was equal to the change related to the IG $\times$ Post term with a value of 1. However, for nonlinear models, such as those in our analyses, it is not as straightforward to obtain the marginal effects in useful units; this form of an effect can be different for each observed case (Karaca-Mandic et al., 2012).

Various methods exist to calculate average marginal effects; we followed a widely adopted method. We computed the predicted outcome and the marginal effect for each observation in the treatment group in the post period with respect to a predictor variable of primary interest (which in our case was IG $\times$ Post). More specifically, we followed these steps, using Medicare expenditure as an example outcome:

1. For each observation with IG = 1 and Post = 1, we forced the term IG × Post to equal 0, leaving the values for all other independent variables as is, and we used the inverse link function to compute the predicted expenditure. This is the expected expenditure in the absence of the intervention.

2. For the same observation, we repeated everything in the first step, except resetting IG × Post to 1, to compute the predicted amount of expenditure after accounting for the intervention.

3. We took the difference between the two predicted expenditure amounts obtained in steps 1 and 2. This was the marginal effect for that observation.

4. We repeated the two steps above for all observations with IG = 1 and Post = 1.

5. We computed the average of all the marginal effects, which was the average marginal effect related to IG × Post. We compared two populations that have the same values on all the independent variables in the model except IG × Post. Because the only difference between them was whether the intervention effect was included in the prediction, the difference in their expected expenditure amounts could be attributed to the effect of the intervention.

6. Going back to step 1, we computed the average of all the predicted values for all observations with IG = 1 and Post = 1 to obtain the group-level average predicted expenditure.

7. We divided the marginal effect by the predicted mean to obtain the relative effect. This helps to facilitate comparison of effect sizes across outcomes and states. Thus, if the predicted mean expenditure in the absence of the intervention was $10,000 and the marginal effect was a reduction in expenditure of $1,000, the relative effect would be a 10 percent reduction in expenditure.

I.11   Interpreting the Initiative Effects

The marginal effect for the interaction term IG × Post indicated the average effect of the intervention on the outcome. For a dichotomous utilization outcome, the marginal effect is the difference in the predicted probabilities of the outcome event with and without the intervention. It represented the average effect of the Initiative on the probability of the event occurring during the resident's Initiative-eligible exposure period, which we found to be, on average, less than 365 days (about 250 days).

For count outcomes, the intervention effect represented the average effect of the Initiative on the count of events per resident during their Initiative-eligible exposure period.

For expenditure outcomes, the intervention effect represented the average effect of the Initiative on expenditures per resident-year. This was the anticipated effect of the Initiative if all residents were eligible for all 365 days in an intervention year (and assuming their expenditure patterns

would be the same for the 365 days as they were for the shorter period during which we observed them).

For MDS-based quality measures, the intervention effect represented the average effect of the Initiative on the probability of the event occurring during a quarter over the course of the resident's most recent year.

For mortality, the intervention effect represented the average effect of the Initiative on the probability of a resident dying during the fiscal year.

APPENDIX J
METHODS AND ADDITIONAL RESULTS, FACILITY AND RESIDENT OUTCOMES DURING THE COVID-19 PANDEMIC IN 2020

J.1   Overview

As described in *Section IV*, we performed a descriptive analysis of FY 2020 data compared to FY 2017–FY 2019 data to understand facility billing rates and resident outcomes during the COVID-19 pandemic. In addition to analyses of yearly resident utilization and expenditures, we created monthly measures of both sets of outcomes, tracked ECCP facilities through FY 2020 (through September 30, 2020), and compared against previous Initiative years.

This appendix includes details about the study sample, the methods used to define our monthly sample, and additional results on monthly resident outcomes and facility billing beyond what we presented in *Section IV*.

- *Appendix Section J.1* discusses differences between the analytic sample used for the FY 2020 analysis presented in *Section IV* and the sample used for the analyses presented in *Sections II* and *III*.

- *Appendix Section J.2* describes the creation of monthly Initiative billing, service utilization, and mortality measures.

- *Appendix Section J.3* discusses potential data concerns related to the COVID-19 pandemic and Public Health Emergency (PHE).

- *Appendix Section J.4* presents additional measures of monthly facility billing during the Initiative than those presented in *Chapter IV.2* to understand differential rates potentially attributable to the pandemic.

J.2   Sample Creation for the Set of Analyses Which Include 2020

The sample use to calculate descriptive measures for FY 2020 in *Chapters IV.2* and *IV.3* differs slightly from the samples used in the analyses presented in *Sections II* and *III* of the report and described more fully in *Appendix Section I.4.* Since we did not perform multivariate analysis for FY 2020, we did not exclude residents based on propensity score or missing covariates. Although we reported descriptive measures in *Chapters IV.2* and *IV.3* for the years FY 2017 – FY 2019 based on the more restricted sample consistent with elsewhere in the report (such as in *Appendices O – S*), in *Table J-1* we provide the number of eligible residents based on the less restricted sample for consistency with FY 2020, and because this sample was used for the monthly statistics reported in *Table J-2* and in other places in *Chapters IV.2* and the present appendix. As noted previously in *Chapter II.4*, the number of eligible residents declined throughout the Initiative. This trend continued throughout FY 2020 with an observed decline in the Clinical + Payment (C+P), Payment-Only (P-O), and the National Comparison Group (NCG).

Table J-1. **Number of eligible residents used in analyses, which include 2020, FY 2017–FY 2020**

Group	Fiscal Year			
	2017	**2018**	**2019**	**2020**
Clinical + Payment	12,088	11,284	10,767	10,086
Payment-Only	13,794	12,706	11,669	10,807
National Comparison Group	685,135	663,852	627,868	575,273

SOURCE: RTI analysis of Medicare claims data.

Table J-2 shows the monthly count of eligible residents throughout the Initiative period. Since the majority of eligibility criteria described in *Appendix I* are yearly resident characteristics, these monthly measures were created by determining the count of unique residents with an eligible exposure period within a given month (see *Appendix Section I.4* for a detailed definition of eligible exposure period).

Overall, these results corroborate the prior findings of declines in the numbers of eligible residents throughout the Initiative and show large declines in the eligible population during the latter months of FY 2020, most likely as a result of the pandemic. The number of residents in the C+P group declined from 7,078 residents in January of 2020 to 6,132 in September of 2020, the last month we tracked. Likewise, the number in the P-O and NCG decreased from 7,634 to 6,744 and 409,755 to 367,22, respectively, over the same period. The decreases in the last six months of FY 2020 are larger than in any other 6 months within the Initiative period.

Table J-2.   Monthly counts of eligible residents used in analyses, which include 2020, FY 2017–FY 2020

Month	Group											
	C+P				P-O				NCG			
	2017	2018	2019	2020	2017	2018	2019	2020	2017	2018	2019	2020
October	8,481	7,755	7,446	7,127	9,865	9,083	8,198	7,695	476,788	462,806	437,080	415,564
November	8,427	7,713	7,386	7,109	9,751	9,055	8,163	7,672	474,136	460,238	434,815	413,132
December	8,358	7,683	7,355	7,107	9,723	8,986	8,138	7,672	473,221	459,445	433,233	411,483
January	8,317	7,570	7,290	7,078	9,644	8,912	8,116	7,634	470,741	456,714	431,564	409,755
February	8,261	7,453	7,273	7,041	9,529	8,744	8,039	7,576	465,349	449,661	428,959	407,163
March	8,234	7,423	7,288	7,062	9,503	8,690	8,050	7,564	463,574	448,422	428,817	405,898
April	8,187	7,432	7,199	7,012	9,413	8,596	7,986	7,470	459,037	445,543	425,319	402,822
May	8,182	7,447	7,198	6,565	9,455	8,600	7,980	7,183	459,357	446,651	425,700	396,824
June	8,174	7,479	7,173	6,335	9,444	8,602	7,997	7,056	460,213	447,400	425,547	391,727
July	8,170	7,523	7,184	6,265	9,503	8,604	8,005	6,942	462,670	449,270	426,652	384,787
August	8,163	7,562	7,203	6,195	9,481	8,627	8,029	6,791	463,752	450,559	428,235	375,086
September	8,163	7,632	7,251	6,132	9,452	8,628	8,032	6,744	464,586	450,784	429,168	367,226

C + P = Clinical + Payment; NCG = national comparison group; PO = Payment-Only.

SOURCE: RTI analysis of Medicare claims data.

J.3   Creation of Monthly Measures

For the 2020 descriptive measures we utilized many of the same Initiative billing and service utilization measures described in **Appendices L** and **I.7** but tracked them monthly across all groups. For events such as hospitalizations, which can span more than one month, we attributed an event to a month if the start date of a given event began in that month.

For facility and practitioner billing for on-site treatment, we began with the analytic sample described in **Appendix Section L.1** and examined the start date of the treatment episode constructed from facility claims. Likewise, in constructing monthly service utilization measures, we began with the analytic sample described above and with measures detailed in **Appendix I**. For each eligible resident, we identified the beginning of a treatment episode using the claim and aggregated those by group, monthly. As described in **Appendix T**, we used the death date of residents from the Integrated Data Repository to attribute resident mortality to a given month.

J.4   Potential Data Limitations Related to the Public Health Emergency

Significant policy differences due COVID-19 pandemic and PHE declared by the Centers for Disease Control resulted in concerns with the data and potential substantial variations from previous measures for the study of resident service utilization in FY 2020. CMS waived 42 CFR 483.30 and allowed facilities to submit MDS data at a later date due to the difficulties that the COVID-19 pandemic imposed upon nursing facilities' ability to collect and submit data. While this waiver relaxed the timeframe, allowing nursing facilities (NFs) and skilled nursing facilities (SNFs) to submit these data whenever they were able, facilities were still required to complete and submit these data. This waiver lasted from January 1, 2020 to May 10, 2021. To alleviate these concerns, CMS reported to RTI that based on aggregate assessments of data submission, it is likely that the vast majority of facilities continued to submit MDS assessments. Specifically, CMS concluded that it is unlikely that a long-stay resident missed an assessment and appeared in the dataset as a short-stay resident.

In addition to the timeframe waiver, CMS also waived 42 CFR 482.41 and 42 CFR 485.623, which outline physical environment requirements of facilities, to increase flexibilities for capacity and cohorting. This allowed facilities to partner with other facilities or use an alternate care site. An alternate care site is any building or structure that is temporarily converted or newly erected for health care use. This flexibility could have affected residents' long-stay status or obscured some facility-level characteristics. In situations where a facility had partnered with another facility to enable cohorting of residents, the NF or SNF provider that was responsible for the location where the resident resided at the time was responsible for completing the MDS assessments. The responsible facility would use their CMS Certification Number (CCN) on the Minimum Data Set (MDS) assessments. There were potentially residents who, having been transferred to another facility amidst the cohorting process, lost their long-stay status and would therefore would not be

included in the study sample due to our eligibility criteria (see *Appendix I* for full discussion on resident eligibility).

In situations where a facility was using an alternate care site, the alternate site was required to follow the same guidelines for completing resident assessments as would have been followed at the facility's primary location. In this case, the facility would use their CCN on the MDS assessments completed in both the primary and alternate locations. Because the resident would have appeared to be residing at the same facility despite potentially being treated at an alternate location, some facility characteristics could differ between the primary location and the alternate location.

Finally, the pandemic itself affected some of the MDS quality measures. Several quality measures showed a departure from past trends, and there were more undesirable outcomes in FY 2020. The decrease in staff availability and time, as well as prohibition for family visits due to the COVID-19 pandemic likely negatively affected these quality measures. More details are reported in *Chapter IV.3*.

J.5   Monthly Billing for On-site Treatment

Chapter IV.2 presents monthly counts of billing for onsite treatment during the Initiative; this appendix section expands on that by providing underlying counts of facility billing episodes by ECCP. As highlighted in *Chapter IV.2*, there was a notable decline in billing during the onset of the COVID pandemic with the notable exception of NY-RAH.

Table J-3.   AQAF (AL): Monthly counts of facility billing for on-site treatment, FY 2017– FY 2020

Month	Group							
	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
October	0	47	46	17	0	21	14	25
November	0	45	38	20	0	17	15	15
December	89	43	37	23	79	23	13	9
January	69	47	32	25	75	22	10	13
February	82	30	32	21	34	27	21	12
March	82	16	22	9	46	20	15	9
April	53	26	24	10	36	18	13	10
May	60	35	42	3	28	25	13	4
June	76	37	24	2	40	20	11	1
July	83	36	24	7	44	22	9	2
August	80	27	12	2	44	25	8	1
September	67	21	22	1	36	17	6	0

SOURCE: RTI analysis of Medicare claims data.

Table J-4. ATOP (NV/CO): Monthly counts of facility billing for on-site treatment, FY 2017–FY 2020

Month	Group							
	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
October	0	44	39	25	0	47	31	32
November	0	42	41	14	0	43	29	23
December	28	45	30	22	6	35	24	26
January	48	41	38	23	34	49	25	36
February	31	43	38	13	26	44	24	25
March	55	37	29	13	53	41	25	19
April	42	37	26	15	28	40	27	21
May	65	28	24	11	34	36	20	15
June	43	29	21	11	42	34	23	17
July	48	14	20	10	39	23	20	14
August	46	19	18	3	47	25	20	16
September	37	15	22	2	29	26	34	15

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP is composed of Nevada facilities in the C+P group and Colorado facilities in the P-O group

Table J-5. MOQI (MO): Monthly counts of facility for on-site treatment, FY 2017–FY 2020

Month	Group							
	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
October	92	69	43	49	35	57	16	2
November	62	75	44	40	47	38	11	4
December	57	51	55	32	53	26	19	5
January	73	64	32	44	53	29	9	12
February	51	70	44	26	30	35	12	6
March	70	64	44	27	61	34	7	7
April	53	60	44	15	29	23	10	11
May	64	62	29	12	32	16	7	2
June	50	32	30	18	43	12	5	2
July	61	58	43	15	41	19	5	1
August	63	59	36	12	39	11	12	1
September	60	45	43	6	28	8	5	0

SOURCE: RTI analysis of Medicare claims data.

Table J-6. **NY-RAH (NY): Monthly counts of facility billing for on-site treatment, FY 2017–FY 2020**

Month	Group							
	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
October	0	135	93	88	0	168	131	98
November	74	94	74	74	77	150	74	98
December	114	70	80	69	85	103	94	83
January	141	107	83	71	115	144	101	84
February	98	89	64	50	83	104	70	77
March	112	82	76	60	114	115	87	59
April	107	88	59	88	99	123	80	46
May	106	80	70	59	122	103	83	34
June	98	93	61	46	110	93	82	32
July	89	91	48	55	113	69	92	22
August	80	66	57	29	107	77	91	12
September	72	57	45	23	65	63	58	13

SOURCE: RTI analysis of Medicare claims data.

Table J-7. **OPTIMISTIC (IN): Monthly counts of facility billing for on-site treatment, FY 2017–FY 2020**

Month	Group							
	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
October	35	70	43	19	46	56	54	25
November	58	54	50	17	52	60	48	15
December	43	46	36	11	65	49	38	31
January	56	62	31	25	54	51	43	23
February	53	60	23	10	63	46	41	11
March	76	49	20	3	71	69	27	14
April	57	46	32	2	36	68	44	17
May	57	44	24	4	51	47	29	10
June	39	33	36	7	59	46	24	12
July	62	34	25	6	48	55	37	8
August	56	28	24	3	44	56	26	4
September	58	28	16	0	30	37	26	5

SOURCE: RTI analysis of Medicare claims data.

Table J-8. RAVEN (PA): Monthly counts of facility billing for on-site treatment, FY 2017–FY 2020

Month	Group							
	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
October	0	80	50	28	0	76	41	31
November	53	62	55	24	30	61	23	16
December	66	78	47	22	36	65	29	19
January	76	68	58	26	43	92	35	28
February	64	54	50	23	37	66	22	27
March	61	63	28	22	42	54	28	26
April	44	62	50	17	48	59	24	17
May	59	57	34	14	40	47	27	20
June	70	61	29	10	45	63	20	9
July	65	54	36	6	61	55	25	9
August	71	45	18	8	63	46	31	9
September	68	50	27	7	60	31	32	5

SOURCE: RTI analysis of Medicare claims data.

Table J-9. All ECCPs: Monthly counts of facility billing for on-site treatment, FY 2017–FY 2020

Month	Group							
	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
October	127	445	314	226	81	425	287	213
November	247	372	302	189	206	369	200	171
December	397	333	285	179	324	301	217	173
January	463	389	274	214	374	387	223	196
February	379	346	251	143	273	322	190	158
March	456	311	219	134	387	333	189	134
April	356	319	235	147	276	331	198	122
May	411	306	223	103	307	274	179	85
June	376	285	201	94	339	268	165	73
July	408	287	196	99	346	243	188	56
August	396	244	165	57	344	240	188	43
September	362	216	175	39	248	182	161	38

SOURCE: RTI analysis of Medicare claims data.

APPENDIX K
ANALYSES OF BILLING FOR ON-SITE TREATMENT

K.1   Overview

In this appendix, we present analyses of the use of the billing codes that allowed facilities and practitioners to bill once per acute treatment episode of on-site treatment for the six conditions as part of NFI 2. This material supplements what we presented in *Chapter II.3* and *Chapter II.4*. This appendix is organized as follows:

- *Appendix Section K.2* presents technical details of the selection of Initiative-related claims and creation of episodes of care for facility- and resident-level analyses.

- *Appendix Section K.3* relates to *Chapter II.3* of the main report and presents additional resident outcome measures and resident characteristics by treatment type for fiscal years (FYs) 2017, 2018, and 2019.

- *Appendix Section K.4* relates to *Chapter II.4* and *Chapter IV.2* (for FY 2020) of the main report and presents facility and practitioner use of NFI 2 billing codes across Clinical + Payment (C+P) and Payment-Only (P-O) groups, and across ECCPs for FY2017–FY2020.

- *Appendix Section K.5* describes Medicare payments to facilities and practitioners for FY 2017–FY 2020.

K.2   Sample Selection and Creation of Episodes

The Healthcare Common Procedure Coding System (HCPCS) codes corresponding to the six qualifying conditions that we analyzed are listed in *Table K-1*.

We identified practitioner visits for the confirmation and treatment of conditions and for care coordination conferences from claims in the carrier file with HCPCS codes G9685 and G9686, respectively; note that due to low practitioner uptake and other charge codes for similar care, the G9686 care coordination code was discontinued by CMS at the end of calendar year 2018. Each claim line with one of these codes corresponds to a single visit by a practitioner.

We identified nursing facility payments for providing acute care from claims in the outpatient file (Type of Bill 22x or 23x) with HCPCS codes G9679–G9684. Claims consist of claim lines, which typically each represent an acute care day—a day that acute care was provided in the nursing facility. Using these claim lines, we created episodes that consist of consecutive days with the same HCPCS code billed. Episodes can span multiple claims representing multiple acute treatment days for the same occurrence of a qualifying condition.

Table K-1. Billing codes used in NFI 2

HCPCS code	Condition	Service
G9679		On-site acute care treatment of a nursing facility resident with **pneumonia**
G9680		On-site acute care treatment of a nursing facility resident with **congestive heart failure**
G9681		On-site acute care treatment of a nursing facility resident with **chronic obstructive pulmonary disease/asthma**
G9682		On-site acute care treatment of a nursing facility resident with a **skin infection**
G9683		On-site acute care treatment of a nursing facility resident with **fluid/electrolyte disorder or dehydration**
G9684		On-site acute care treatment of a nursing facility resident with a **urinary tract infection**
G9685		**Practitioner payment** for the confirmation and treatment of conditions on-site at a nursing facility
G9686*		**Practitioner payment** for care coordination conference

* The G9686 code was discontinued by CMS at the end of calendar year 2018.

NFI = Nursing Facility Initiative; HCPCS = Healthcare Common Procedure Coding System.

NOTE: The first six codes are for facility use; the last two are for practitioners.

In our analyses, we considered counts of both on-site treatment days and episodes, and practitioner visits. We focused on on-site treatment days, episodes, and visits that were attributable to individuals who met our study inclusion criteria.[17]

To construct the sample used in these analyses, we applied a number of exclusions to claims made by Initiative facilities. First, a relatively small number of duplicates, where the same person met the 101-day requirement for two facilities, were excluded each year. Second, we eliminated claim lines for residents in nonparticipating facilities (these are typically, but not always, the duplicates referenced above) and for those who did not match to the file of Initiative-eligible residents that we created from the Minimum Data Set (MDS). Third, we eliminated episodes that were not fully within the resident's Initiative-eligible exposure period, or where the resident did not meet the eligibility criteria (see *Appendix I* for descriptions of the inclusion criteria and the Initiative-eligible period). Finally, for selected analyses we applied an additional exclusion criterion and excluded

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[17] Examples of where the criteria were not met include instances where the resident could not be matched to the file of Initiative-eligible residents that we created from the Minimum Data Set (MDS) because the resident did not meet the fee-for-service (FFS) requirement, had not yet met the 101-day requirement before the first day that acute nursing facility treatment was billed (although they may have met it for a subsequent day), or was associated with a facility that was not included in the RTI quantitative evaluation as an intervention facility. Note that claims improperly billed to CMS are subject to recoupment.

episodes for residents for which analysis variables were missing. The final episodes and practitioner visits used in analysis for FY 2017–FY 2020 (not including the final criterion) are provided in *Table K-2*.

For nursing facility payments for providing acute care in FY 2020, we began with 19,654 claim lines (this is far fewer than in years past due both to the decline over time and to the COVID-19 pandemic, as explained in *Chapter IV.2*). This included duplicates where the same person met the 101-day requirement for two facilities. After eliminating claim lines for residents in nonparticipating facilities and for those who did not match to the file of Initiative-eligible residents that we created from the MDS, we used 19,183 claim lines to create 3,238 episodes. After eliminating episodes that were not fully within the resident's Initiative-eligible exposure period, or where the resident did not meet the eligibility criteria (such as the fee-for-service [FFS] requirement), we were left with 3,086 episodes that were used in the analysis.[18] For analysis of practitioner use, we began with 2,185 claim lines associated with the HCPCS code G9685, and after applying similar exclusions as with nursing facility payments, we had a total of 2,057 visits in the analysis.

The sample construction for FY 2017–FY 2019 was similar, and details are provided in *Table K-2*. Note that for selected FY 2017–FY 2019 analyses we applied an additional exclusion. For FY 2019, 5,096 episodes and 2,890 visits were used in these selected analyses.

Table K-2. Construction of analytical sample for analysis of on-site treatment episodes and practitioner visits

Topic	2017	2018	2019	2020
Facility billing				
Number of claim lines	**58,010**	**52,460**	**34,922**	**19,654**
Data anomalies including claim lines for non-Initiative-eligible residents	*2,410*	*1,790*	*1,275*	*471*
Number of claim lines used to create episodes	55,600	50,670	33,647	19,183
Number of episodes created	8,443	8,100	5,572	3,238
Episodes outside exposure period or did not meet eligibility criteria excluded	560	572	347	152
Episodes/visits used in analysis	**7,883**	**7,528**	**5,225**	**3,086**
Practitioner visits				
Number of claim lines	**4,883**	**4,523**	**3,325**	**2,185**
Episodes/visits used in analysis	**4,298**	**4,048**	**2,966**	**2,057**

SOURCE: RTI analysis of Medicare claims data.

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[18] Claims for ineligible residents are subject to recoupment by CMS. Thus, some of these claims may be recouped.

K.3 Comparing Residents Treated On-Site to Those Treated in the Hospital[19]

We present three figures that complement *Figure II-3* in *Chapter II.3*. *Figure K-1* presents the percentage of Initiative-eligible residents who underwent inpatient treatment for any of the six conditions in the hospital or on-site, as well as those treated for all-causes in the hospital. *Figures K-2* and *K-3* display hospitalization (inpatient and acute care transition [ACT]) rates per 1,000 Initiative-eligible resident-days. Following NFI 2 implementation, the rate of hospitalization (inpatient admissions) was about the same as prior to the Initiative, although a higher percentage of residents were treated on-site than were treated in the hospital for the six conditions (*Figure K-1*). The percentage of residents treated in the hospital changed relatively little over the course of Initiative implementation, indicating low amounts of substitution between on-site and hospital treatment. The same pattern can be seen in *Figures K-2* and *K-3.* Note that we display only FY 2017–FY 2019 to study these relationships before the COVID-19 pandemic during which billing for on-site treatment changed dramatically.

Figure K-1. Percentage of Initiative-eligible residents treated on-site and in hospital (inpatient admissions), FY 2014–FY 2019
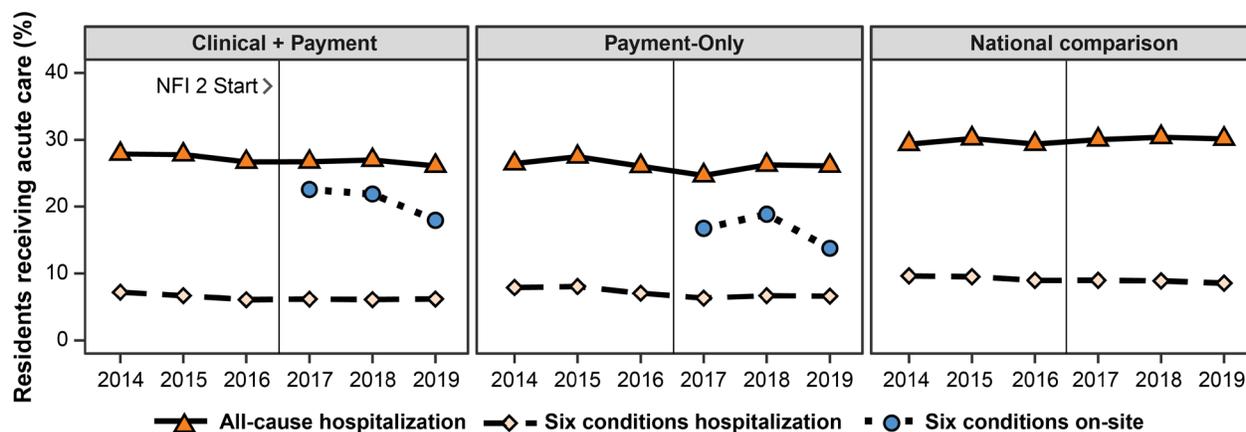
SOURCE: RTI analysis of Medicare claims data.

Note: Values presented here are based on inpatient hospitalizations. *Figure II-3* in *Chapter II.3* is based on acute care transitions (ACTs) and not merely inpatient hospitalizations.

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[19] Key results presented in Chapter II.3.

Figure K-2. Rates of inpatient admissions and treatment on-site, FY 2014–FY 2019

(events per 1,000 Initiative-eligible resident-days)
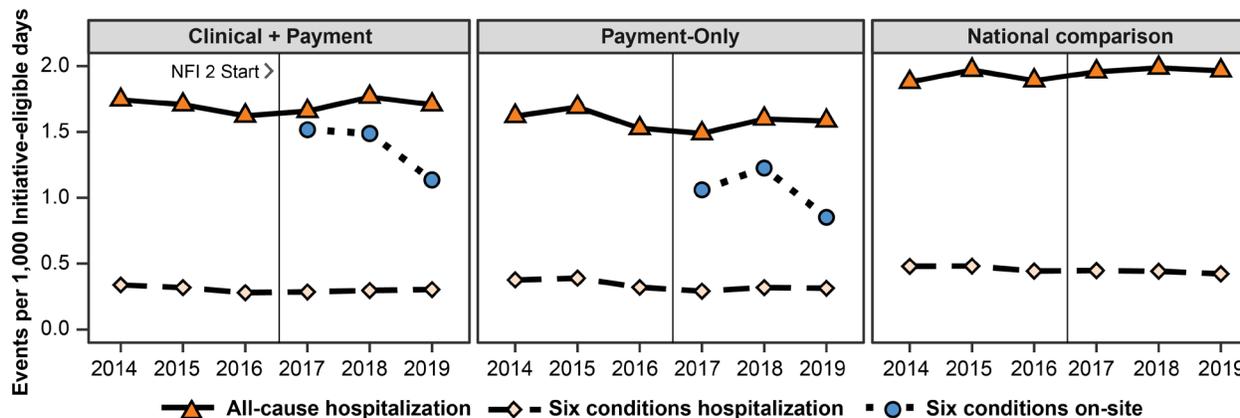
SOURCE: RTI analysis of Medicare claims data.

Figure K-3. Rates of ACT and treatment on-site, FY 2014–FY 2019

(events per 1,000 Initiative-eligible resident-days)
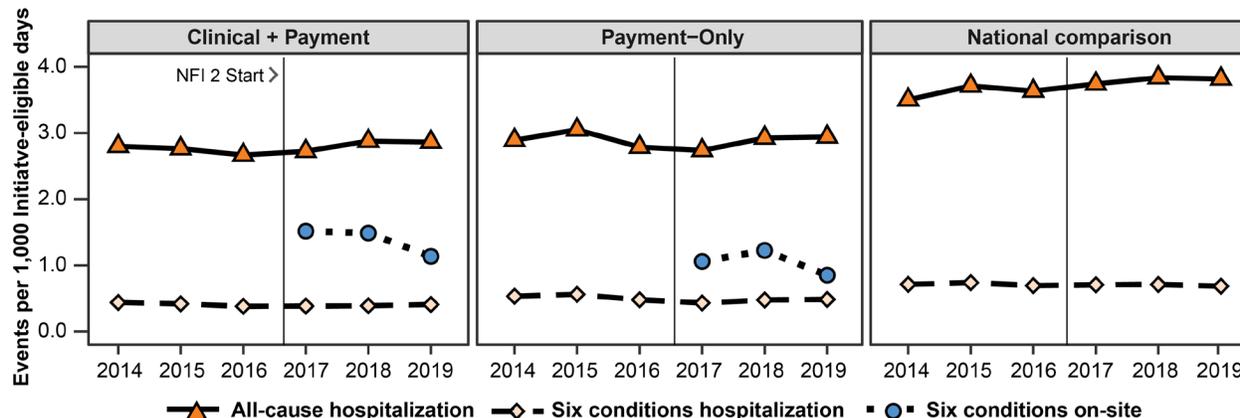
SOURCE: RTI analysis of Medicare claims data.

In **Table K-3**, we present descriptive statistics, including means of continuous variables and percentages of categorical variables, for residents in the C+P and P-O facilities, grouped by status of treatment for the six qualifying conditions. **Table II-3** in **Chapter II.3** of the main report presents similar demographic characteristics and patient comorbidities for all conditions combined. Residents are categorized as follows: residents who (1) did not receive on-site acute care and were not transferred to the hospital for the specific condition, (2) received care on-site only for the specific condition, and (3) were treated in the hospital (any ACT) for the specific condition.

The characteristics for this descriptive analysis, derived from Medicare data and Nursing Home MDS assessments, include:

- Average age

- Percentage of residents who died

- Percentage of residents with dementia

- Average count of hierarchical condition categories (HCC)

- Average cognitive function scale (CFS) score to measure cognitive impairment

- Percentage of residents who experienced an ACT

- Average total Medicare expenditures per resident-year.

Note that we reported on additional characteristics in our previous annual report (RTI International, 2021).

Table K-3.   Characteristics of residents by status of acute care received for six qualifying conditions, FY 2017–FY 2019

(all conditions combined and each condition separately)

| NFI 2 Condition | Status of acute care received | N | Average age (years) | Percent | | Average HCC count | Average CFS | Percent with any acute care transition | Average total Medicare expenditures per resident-year ($) |
				Died	Dementia				
All conditions	No acute care	51,385	79.8	21.7	54.3	4.4	1.2	30.5	16,803
	On-site treatment only	11,185	81.6	23.6	55.4	4.7	1.2	35.8	24,284
	Any hospital treatment	5,861	78.8	34.8	43.6	6.5	1.0	100.0	47,981
Pneumonia	No acute care	62,253	79.9	22.2	53.8	4.5	1.2	35.3	19,330
	On-site treatment only	4,345	82.5	27.9	54.0	5.0	1.2	40.3	26,591
	Any hospital treatment	1,833	78.7	42.3	45.4	6.7	1.1	100.0	53,123
CHF	No acute care	66,302	80.0	22.6	54.1	4.6	1.2	36.1	19,891
	On-site treatment only	859	84.9	32.3	46.5	5.4	1.0	40.5	27,234
	Any hospital treatment	1,270	79.4	43.5	32.3	7.7	0.7	100.0	58,299
COPD/ asthma	No acute care	67,045	80.0	23.1	53.9	4.6	1.2	36.7	20,281
	On-site treatment only	773	81.4	21.7	47.7	5.6	0.9	44.6	31,883
	Any hospital treatment	613	77.1	27.2	31.5	7.1	0.6	100.0	52,022
Skin infection	No acute care	64,928	80.1	23.3	53.9	4.6	1.2	36.6	19,991
	On-site treatment only	3,125	79.1	19.9	50.9	5.2	1.2	44.2	31,427
	Any hospital treatment	378	74.1	22.5	29.6	7.0	0.7	100.0	53,163
Dehydration	No acute care	67,171	80.0	22.7	53.4	4.6	1.2	36.9	20,516
	On-site treatment only	891	83.4	44.4	64.9	4.8	1.5	42.3	27,466
	Any hospital treatment	369	81.5	39.8	64.8	5.0	1.5	100.0	37,080
UTI	No acute care	61,537	79.9	23.3	53.6	4.6	1.2	35.0	19,534
	On-site treatment only	4,945	81.4	20.2	55.3	4.8	1.2	40.7	26,544
	Any hospital treatment	1,949	79.1	26.3	48.8	5.9	1.1	100.0	42,567

HCC= hierarchical condition categories; CFS = cognitive function scale; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection

SOURCE: RTI analysis of Medicare claims data.

NOTE: Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized.

K.4   Facility and Practitioner Use of NFI 2 Billing Codes

Complete results for use of nursing facility NFI 2 billing codes for the C+P facilities and P-O facilities are presented in **Tables K-4** through **K-11**, respectively, for FYs 2017, 2018, 2019, and 2020. Complete results for use of practitioner new billing codes for FY 2017–FY 2020 are presented in **Table K-12**. For related graphical representations of the trends for FY 2017–FY 2019, see **Figures K-4** and **K-5.** We calculated the rates of episodes, days, and visits, per 1,000 Initiative-eligible resident-days.[20] We calculated rates separately for the C+P group and P-O group, for each ECCP, and for all ECCPs combined. For nursing facility payments, we calculated these rates for codes G9679–G9684 separately and for all of them combined. The major takeaways from these results are presented in **Chapter II.4** and **Chapter IV.2** (for FY 2020) of the main report.

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[20] For each group, the numerator is the number of episodes (or days or visits) among all residents in the group. The denominator is the number of Initiative-eligible days among all eligible residents in the group divided by 1,000.

Table K-4.   Clinical + Payment: Use of nursing facility billing codes, FY 2017

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (NV)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	12,088	2,272	1,169	1,500	3,654	1,908	1,585
Mean exposure period (days)	239.42	250.98	238.32	249.9	221.48	228.31	268.46
On-site acute treatment for any of the six qualifying conditions, combined (days)	10.03	8.53	11.15	13.11	9.31	9.54	10.44
On-site acute treatment for each of the six qualifying conditions (days)							
Pneumonia (G9679)	2.67	2.64	2.39	3.76	2.27	2.86	2.53
CHF (G9680)	0.48	0.26	0.12	1.05	0.33	0.71	0.54
COPD/asthma (G9681)	0.43	0.44	0.30	0.27	0.43	0.48	0.60
Skin infection (G9682)	2.64	1.60	4.21	3.35	2.90	2.02	2.51
Dehydration (G9683)	0.46	0.21	0.45	0.43	0.59	0.37	0.69
UTI (G9684)	3.34	3.38	3.67	4.26	2.79	3.10	3.57
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	1.51	1.30	1.59	2.02	1.35	1.49	1.64
On-site acute treatment for each of the six qualifying conditions (episodes)							
Pneumonia (G9679)	0.40	0.38	0.33	0.57	0.33	0.44	0.38
CHF (G9680)	0.08	0.04	0.02	0.17	0.05	0.11	0.09
COPD/asthma (G9681)	0.07	0.06	0.05	0.04	0.07	0.08	0.09
Skin infection (G9682)	0.37	0.22	0.54	0.49	0.38	0.31	0.37
Dehydration (G9683)	0.10	0.05	0.11	0.09	0.12	0.08	0.16
UTI (G9684)	0.51	0.54	0.54	0.67	0.40	0.46	0.54

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-5.   Payment-Only: Use of nursing facility billing codes, FY 2017

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (CO)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	13,974	1,874	1,682	1,987	4,252	2,231	1,768
Mean exposure period (days)	243.33	253.59	232.16	257.12	241.6	231.69	246.42
On-site acute treatment for any of the six qualifying conditions, combined (days)	6.79	5.45	6.15	6.26	7.18	7.94	7.22
On-site acute treatment for each of the six qualifying conditions **(days)**							
Pneumonia (G9679)	1.88	1.54	1.53	1.64	1.78	2.60	2.25
CHF (G9680)	0.45	0.26	0.32	0.36	0.44	0.88	0.40
COPD/asthma (G9681)	0.44	0.33	0.48	0.42	0.53	0.27	0.53
Skin infection (G9682)	1.60	1.35	1.46	1.59	2.03	1.07	1.62
Dehydration (G9683)	0.20	0.12	0.15	0.11	0.31	0.22	0.15
UTI (G9684)	2.22	1.85	2.20	2.14	2.09	2.90	2.27
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	1.04	0.97	0.87	0.96	1.06	1.20	1.16
On-site acute treatment for each of the six qualifying conditions **(episodes)**							
Pneumonia (G9679)	0.29	0.27	0.22	0.24	0.26	0.38	0.37
CHF (G9680)	0.07	0.04	0.05	0.06	0.06	0.13	0.06
COPD/asthma (G9681)	0.07	0.05	0.06	0.06	0.08	0.04	0.09
Skin infection (G9682)	0.23	0.25	0.17	0.24	0.28	0.15	0.25
Dehydration (G9683)	0.05	0.03	0.04	0.02	0.07	0.05	0.03
UTI (G9684)	0.34	0.33	0.32	0.34	0.31	0.44	0.35

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-6.   Clinical + Payment: Use of nursing facility billing codes, FY 2018

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (NV)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	11,284	1,601	1,174	1,428	3,781	1,763	1,537
Mean exposure period (days)	234.08	222.09	242.54	246.48	222.38	226.54	266.04
On-site acute treatment for any of the six qualifying conditions, combined (days)	9.04	7.25	9.04	11.94	7.63	8.77	11.28
On-site acute treatment for each of the six qualifying conditions (days)							
Pneumonia (G9679)	2.64	2.37	2.16	3.88	2.45	2.53	2.63
CHF (G9680)	0.43	0.13	0.07	0.80	0.26	0.27	1.11
COPD/asthma (G9681)	0.33	0.39	0.41	0.30	0.22	0.19	0.58
Skin infection (G9682)	2.40	1.76	2.71	2.83	1.94	2.51	3.19
Dehydration (G9683)	0.31	0.06	0.20	0.15	0.36	0.38	0.56
UTI (G9684)	2.95	2.53	3.49	3.98	2.40	2.89	3.21
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	1.46	1.15	1.38	2.01	1.25	1.39	1.8
On-site acute treatment for each of the six qualifying conditions (episodes)							
Pneumonia (G9679)	0.41	0.35	0.33	0.59	0.39	0.39	0.41
CHF (G9680)	0.07	0.02	0.01	0.13	0.05	0.04	0.17
COPD/asthma (G9681)	0.05	0.06	0.06	0.05	0.04	0.03	0.1
Skin infection (G9682)	0.36	0.26	0.39	0.43	0.29	0.37	0.47
Dehydration (G9683)	0.07	0.01	0.06	0.04	0.09	0.08	0.12
UTI (G9684)	0.50	0.45	0.53	0.78	0.39	0.47	0.52

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-7.   Payment-Only: Use of nursing facility billing codes, FY 2018

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (CO)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	12,706	1,466	1,603	1,853	4,034	2,033	1,717
Mean exposure period (days)	241.83	248.18	236.33	246.1	240.14	233.95	250.22
On-site acute treatment for any of the six qualifying conditions, combined (days)	7.52	4.49	7.87	4.17	8.51	8.61	9.86
On-site acute treatment for each of the six qualifying conditions (days)							
Pneumonia (G9679)	2.02	1.15	2.03	0.71	2.19	2.78	2.96
CHF (G9680)	0.50	0.19	0.82	0.07	0.40	0.78	0.88
COPD/asthma (G9681)	0.46	0.09	0.45	0.24	0.46	0.42	1.10
Skin infection (G9682)	1.68	1.50	1.59	1.55	1.78	1.36	2.18
Dehydration (G9683)	0.27	0.01	0.11	0.14	0.45	0.19	0.44
UTI (G9684)	2.57	1.56	2.86	1.45	3.23	3.08	2.30
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	1.20	0.71	1.17	0.68	1.35	1.35	1.66
On-site acute treatment for each of the six qualifying conditions (episodes)							
Pneumonia (G9679)	0.32	0.19	0.31	0.12	0.33	0.43	0.51
CHF (G9680)	0.08	0.03	0.13	0.02	0.07	0.11	0.14
COPD/asthma (G9681)	0.07	0.01	0.06	0.04	0.07	0.07	0.18
Skin infection (G9682)	0.26	0.23	0.23	0.23	0.27	0.20	0.36
Dehydration (G9683)	0.06	0.00	0.03	0.03	0.10	0.05	0.10
UTI (G9684)	0.40	0.24	0.41	0.25	0.51	0.49	0.38

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-8.   Clinical + Payment: Use of nursing facility billing codes, FY 2019

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (NV)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	10,767	1,405	1,118	1,357	3,828	1,607	1,452
Mean exposure period (days)	236.12	234.73	246.46	250.92	217.01	231.14	271.53
On-site acute treatment for any of the six qualifying conditions, combined (days)	6.65	6.53	7.73	8.1	5.91	5.75	7.16
On-site acute treatment for each of the six qualifying conditions (days)							
Pneumonia (G9679)	2.39	2.76	2.03	2.92	2.14	2.21	2.59
CHF (G9680)	0.33	0.30	0.13	0.69	0.28	0.34	0.28
COPD/asthma (G9681)	0.36	0.69	0.59	0.14	0.25	0.24	0.44
Skin infection (G9682)	0.96	0.64	1.04	0.73	1.02	0.85	1.34
Dehydration (G9683)	0.25	0.07	0.23	0.26	0.27	0.26	0.33
UTI (G9684)	2.36	2.08	3.72	3.36	1.95	1.83	2.17
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	1.12	1.08	1.26	1.43	0.98	0.97	1.22
On-site acute treatment for each of the six qualifying conditions (episodes)							
Pneumonia (G9679)	0.38	0.42	0.32	0.46	0.33	0.37	0.42
CHF (G9680)	0.06	0.05	0.02	0.12	0.05	0.05	0.06
COPD/asthma (G9681)	0.06	0.10	0.09	0.02	0.05	0.04	0.08
Skin infection (G9682)	0.15	0.09	0.16	0.12	0.16	0.13	0.22
Dehydration (G9683)	0.06	0.02	0.06	0.06	0.07	0.05	0.08
UTI (G9684)	0.41	0.39	0.60	0.65	0.32	0.32	0.36

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-9.   Payment-Only: Use of nursing facility billing codes, FY 2019

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (CO)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	11,669	1,106	1,447	1,693	3,914	1,869	1,640
Mean exposure period (days)	242.21	241.34	244.21	246.72	237.66	237.55	252.54
On-site acute treatment for any of the six qualifying conditions, combined (days)	5.15	3.55	5.39	1.61	6.78	6.13	4.81
On-site acute treatment for each of the six qualifying conditions (days)							
Pneumonia (G9679)	1.63	0.88	1.48	0.46	2.35	1.55	1.87
CHF (G9680)	0.32	0.16	1.02	0.07	0.25	0.30	0.27
COPD/asthma (G9681)	0.31	0.16	0.52	0.04	0.34	0.37	0.41
Skin infection (G9682)	0.71	0.48	0.46	0.36	0.92	0.89	0.75
Dehydration (G9683)	0.15	0.07	0.07	0.00	0.18	0.43	0.05
UTI (G9684)	2.02	1.80	1.84	0.68	2.74	2.59	1.46
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	0.84	0.55	0.85	0.28	1.12	0.98	0.81
On-site acute treatment for each of the six qualifying conditions (episodes)							
Pneumonia (G9679)	0.26	0.14	0.23	0.08	0.38	0.24	0.31
CHF (G9680)	0.05	0.03	0.15	0.01	0.04	0.06	0.06
COPD/asthma (G9681)	0.05	0.03	0.08	0.01	0.06	0.06	0.07
Skin infection (G9682)	0.11	0.07	0.07	0.05	0.14	0.14	0.13
Dehydration (G9683)	0.03	0.02	0.03	0.00	0.04	0.09	0.01
UTI (G9684)	0.34	0.27	0.30	0.13	0.46	0.40	0.25

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-10. Clinical + Payment: Use of nursing facility billing codes, FY 2020

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (NV)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	10,086	1,255	1,057	1,183	4,045	1,291	1,255
Mean exposure period (days)	233.86	236.98	260.70	254.29	209.84	231.79	268.44
On-site acute treatment for any of the six qualifying conditions, combined (days)	3.96	2.79	3.30	5.34	4.87	2.22	3.56
On-site acute treatment for each of the six qualifying conditions (days)							
Pneumonia (G9679)	1.55	1.42	0.94	1.67	2.01	0.73	1.66
CHF (G9680)	0.23	0.00	0.07	0.69	0.15	0.29	0.28
COPD/asthma (G9681)	0.14	0.21	0.11	0.04	0.17	0.13	0.17
Skin infection (G9682)	0.29	0.12	0.40	0.17	0.50	0.05	0.17
Dehydration (G9683)	0.21	0.14	0.26	0.11	0.31	0.14	0.13
UTI (G9684)	1.54	0.91	1.51	2.66	1.75	0.88	1.15
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	0.69	0.47	0.59	0.98	0.84	0.36	0.61
On-site acute treatment for each of the six qualifying conditions (episodes)							
Pneumonia (G9679)	0.25	0.23	0.15	0.26	0.33	0.11	0.26
CHF (G9680)	0.04	0.00	0.01	0.11	0.02	0.04	0.05
COPD/asthma (G9681)	0.02	0.03	0.02	0.01	0.03	0.02	0.03
Skin infection (G9682)	0.05	0.02	0.07	0.03	0.08	0.01	0.03
Dehydration (G9683)	0.05	0.03	0.07	0.02	0.07	0.03	0.04
UTI (G9684)	0.28	0.16	0.28	0.56	0.31	0.14	0.20

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-11. Payment-Only: Use of nursing facility billing codes, FY 2020

(number of events reported per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679–G9684)	All ECCPs (all states)	AQAF (AL)	ATOP2 (CO)	MOQI (MO)	NY-RAH (NY)	OPTIMISTIC (IN)	RAVEN (PA)
Residents meeting eligibility criteria (#)	10,807	984	1,292	1,481	3,870	1,714	1,466
Mean exposure period (days)	237.37	255.96	241.49	253.00	218.54	241.43	250.45
On-site acute treatment for any of the six qualifying conditions, combined (days)	3.47	2.56	5.49	0.76	4.69	2.48	3.48
On-site acute treatment for each of the six qualifying conditions **(days)**							
Pneumonia (G9679)	1.19	0.76	1.37	0.23	1.86	0.71	1.29
CHF (G9680)	0.27	0.12	1.04	0.07	0.16	0.12	0.37
COPD/asthma (G9681)	0.24	0.19	0.42	0.03	0.23	0.29	0.33
Skin infection (G9682)	0.33	0.17	0.33	0.11	0.45	0.38	0.34
Dehydration (G9683)	0.13	0.10	0.28	0.03	0.17	0.10	0.08
UTI (G9684)	1.30	1.22	2.05	0.29	1.81	0.88	1.07
On-site acute treatment for any of the six qualifying conditions, combined (episodes)	0.57	0.40	0.83	0.14	0.78	0.42	0.59
On-site acute treatment for each of the six qualifying conditions **(episodes)**							
Pneumonia (G9679)	0.19	0.12	0.20	0.04	0.30	0.11	0.21
CHF (G9680)	0.04	0.02	0.15	0.01	0.03	0.02	0.07
COPD/asthma (G9681)	0.04	0.03	0.07	0.01	0.04	0.04	0.06
Skin infection (G9682)	0.05	0.03	0.05	0.02	0.07	0.06	0.05
Dehydration (G9683)	0.03	0.02	0.06	0.01	0.04	0.03	0.02
UTI (G9684)	0.22	0.18	0.31	0.06	0.30	0.15	0.19

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-12.   Use of practitioner billing codes, FY 2017–FY 2020

(number of events reported per 1,000 Initiative-eligible resident-days)

Practitioner billing codes (G9685–G9686)	Practitioner services: confirmation and treatment of conditions (G9685)				Practitioner services: care coordination conference (G9686)		
	2017	2018	2019	2020	2017	2018	2019
All ECCPs (6 states): C+P	0.74	0.49	0.36	0.23	0.01	0.02	0.00
All ECCPs (6 states): P-O	0.64	0.89	0.73	0.59	0.04	0.02	0.01
AQAF (Alabama): C+P	1.35	0.92	0.85	0.45	0.01	0.00	0.00
AQAF (Alabama): P-O	0.87	0.45	0.30	0.16	0.00	0.00	0.00
ATOP2 (Nevada): C+P	0.18	0.40	0.44	0.22	0.00	0.00	0.00
ATOP2 (Colorado): P-O	0.24	0.52	0.77	1.08	0.00	0.00	0.00
MOQI (Missouri): C+P	0.28	0.16	0.01	0.03	0.10	0.00	0.00
MOQI (Missouri): P-O	0.41	0.31	0.21	0.10	0.03	0.00	0.00
NY-RAH (New York): C+P	1.07	0.49	0.27	0.26	0.01	0.05	0.00
NY-RAH (New York): P-O	0.55	1.13	0.92	0.77	0.04	0.03	0.03
OPTIMISTIC (Indiana): C+P	0.65	0.73	0.67	0.36	0.66	0.01	0.00
OPTIMISTIC (Indiana): P-O	0.83	1.15	1.00	0.66	0.36	0.02	0.00
RAVEN (Pennsylvania): C+P	0.13	0.26	0.09	0.03	0.47	0.00	0.00
RAVEN (Pennsylvania): P-O	1.05	1.40	0.78	0.47	0.03	0.06	0.00

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. The care coordination conference code (G9686) was discontinued at the end of calendar year 2018.

Figure K-4. Clinical + Payment: Facility and practitioner billing for on-site treatment by ECCP, FY 2017–FY 2019
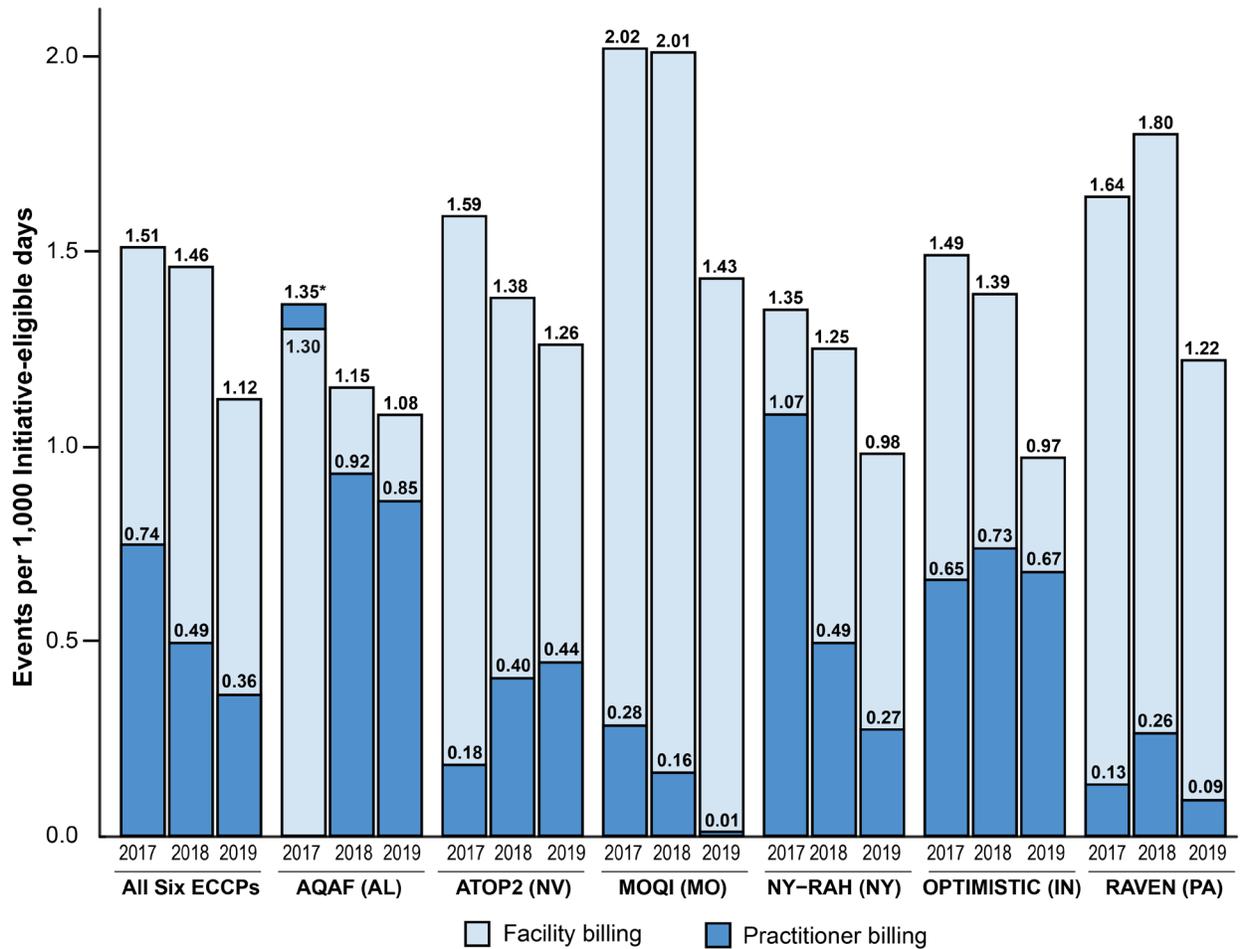
*In FY 2017 practitioner billing rates were higher on average than facility billing rates in AQAF.

SOURCE: RTI analysis of Medicare claims data.

NOTE: The sample used here includes all residents meeting NFI 2 eligibility requirements. This sample is slightly larger than the final analytic sample used in most of this report's analyses, which further excludes any resident with a missing covariate of interest. For further details on the sample selection process, please see Table I-3 in *Appendix I*.

Figure K-5.   Payment-Only: Facility and practitioner billing for on-site treatment by ECCP, FY 2017–FY 2019
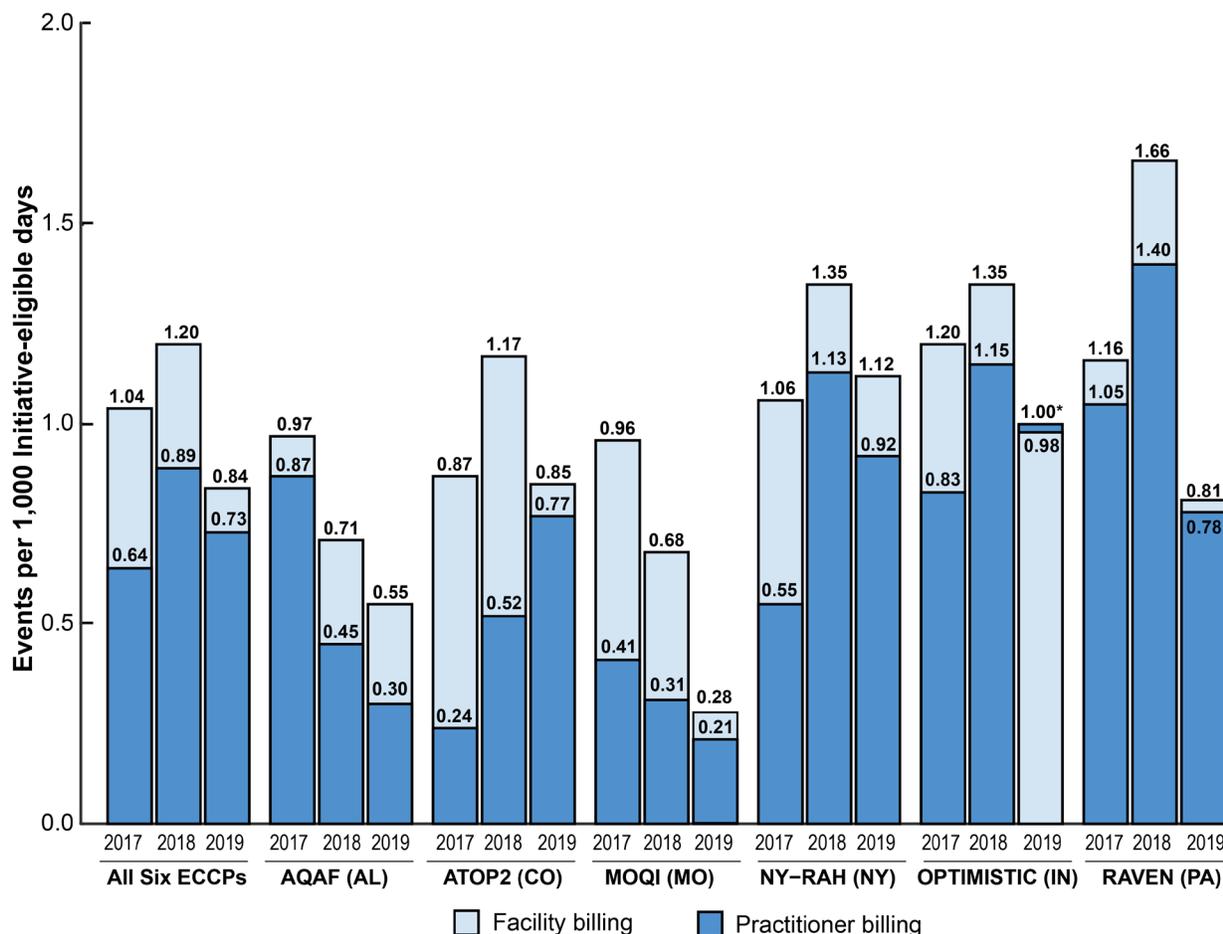
*In FY 2019 practitioner billing rates were higher on average than facility billing rates for OPTIMISTIC (IN).

SOURCE: RTI analysis of Medicare claims data

NOTE: The sample used here includes all residents meeting NFI 2 eligibility requirements. This sample is slightly larger than the final analytic sample used in this report's multivariate analyses, which further excludes any resident with a missing covariate of interest. For further details on the sample selection process, please see Table I-3 in **Appendix I**.

In **Tables K-13** through **K-20,** we present results of a facility-level analysis for combined NFI 2 billing for codes G9679–G9684, for all four years by C+P and P-O groups. In **Chapter II.4** we discuss the implications of these results—that there was substantial variability in facility billing and that billing was concentrated among a relatively small groups of facilities. We also note the decrease in billing in FY 2019, discussed in **Chapter II.4,** and even more so in FY 2020, as explained in **Chapter IV.2**. Instead of calculating rates at the aggregate group level as we reported above, we calculate rates at the facility level and present the distribution of these rates across facilities. This allows us to see to what extent the use of the new billing codes varied across facilities within the same ECCP states. For example, with all ECCPs combined, in FY 2020, the C+P facilities in the 25th percentile did not bill any episodes per resident day for providing acute care on-site for any of the qualifying conditions. Facilities at the 75th percentile provided 0.8 episodes per 1,000 Initiative-eligible

resident-days. In the P-O facilities, the 75th and 25th percentiles were 0.7 episodes and 0.0 episodes per 1,000 Initiative-eligible resident-days, respectively.

As explained in **Appendix I**, we adopted an intent-to-treat approach. Therefore, even though 16 of the facilities opted out of the Initiative and could not bill, they were still included.

Table K-13. Clinical + Payment: Facility-level distribution of on-site treatment events, FY 2017

(all six qualifying conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), days	112	9.8	7.2	0.0	0.0	0.7	4.5	9.1	13.8	19.7	22.7	37.1
AQAF (Alabama)	23	7.7	7.4	0.0	0.0	0.0	0.0	7.2	12.3	19.7	21.8	22.7
ATOP2 (Nevada)	14	10.5	6.7	0.1	0.1	2.2	5.8	8.2	18.0	19.8	21.1	21.1
MOQI (Missouri)	16	12.8	6.6	2.4	2.4	2.6	9.3	13.0	16.5	21.6	27.2	27.2
NY-RAH (New York)	25	10.0	8.7	0.0	2.3	2.8	4.4	7.3	12.6	23.7	28.2	37.1
OPTIMISTIC (Indiana)	19	8.8	6.1	0.0	0.0	0.0	4.0	9.3	13.1	17.3	18.7	18.7
RAVEN (Pennsylvania)	15	10.4	6.6	1.6	1.6	3.2	5.9	9.0	14.4	21.8	25.4	25.4
All ECCPs (6 states), episodes	112	1.5	1.1	0.0	0.0	0.1	0.7	1.4	2.2	2.9	3.6	4.3
AQAF (Alabama)	23	1.2	1.2	0.0	0.0	0.0	0.0	1.1	2.0	2.9	3.5	3.6
ATOP2 (Nevada)	14	1.5	1.0	0.1	0.1	0.3	0.8	1.3	2.5	2.8	3.0	3.0
MOQI (Missouri)	16	2.0	1.0	0.4	0.4	0.5	1.4	2.0	2.5	3.4	4.2	4.2
NY-RAH (New York)	25	1.4	1.2	0.0	0.3	0.3	0.6	1.1	1.7	3.9	4.2	4.3
OPTIMISTIC (Indiana)	19	1.4	1.0	0.0	0.0	0.0	0.6	1.5	2.1	2.8	2.9	2.9
RAVEN (Pennsylvania)	15	1.6	0.9	0.2	0.2	0.6	0.9	1.5	2.3	3.1	3.6	3.6

SOURCE: RTI analysis of Medicare claims data

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator

Table K-14.   Payment-Only: Facility-level distribution of on-site treatment events, FY 2017

(all six qualifying conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), days	148	6.9	7.5	0.0	0.0	0.0	1.4	4.7	10.5	15.3	20.6	53.6
AQAF (Alabama)	22	5.6	6.5	0.0	0.0	0.0	1.3	3.2	8.3	13.1	20.6	22.1
ATOP2 (Colorado)	24	4.9	6.0	0.0	0.0	0.0	0.0	2.5	10.1	15.1	16.5	18.0
MOQI (Missouri)	24	6.7	4.7	0.3	1.0	1.0	2.6	6.5	10.4	13.5	13.7	15.2
NY-RAH (New York)	33	8.2	6.7	0.0	0.0	0.6	3.6	6.3	11.1	17.1	19.7	29.9
OPTIMISTIC (Indiana)	25	8.1	12.2	0.0	0.0	0.0	0.2	3.5	10.5	22.4	27.4	53.6
RAVEN (Pennsylvania)	20	7.2	6.3	0.0	0.4	1.5	3.2	4.6	10.0	16.6	22.6	23.4
All ECCPs (6 states), episodes	148	1.1	1.1	0.0	0.0	0.0	0.2	0.8	1.5	2.3	3.3	7.7
AQAF (Alabama)	22	1.0	1.2	0.0	0.0	0.0	0.2	0.6	1.4	2.1	3.3	4.6
ATOP2 (Colorado)	24	0.7	0.8	0.0	0.0	0.0	0.0	0.3	1.3	1.9	2.3	2.7
MOQI (Missouri)	24	1.0	0.7	0.0	0.2	0.2	0.4	1.0	1.5	2.1	2.1	2.2
NY-RAH (New York)	33	1.2	1.0	0.0	0.0	0.1	0.6	1.0	1.5	2.5	3.3	4.2
OPTIMISTIC (Indiana)	25	1.2	1.8	0.0	0.0	0.0	0.2	0.6	1.6	3.5	4.0	7.7
RAVEN (Pennsylvania)	20	1.1	1.0	0.0	0.1	0.3	0.6	0.9	1.5	2.6	3.5	3.7

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator

Table K-15.   Clinical + Payment: Facility-level distribution of on-site treatment events, FY 2018

(all six qualifying conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), days	111	8.7	7.5	0.0	0.0	0.0	2.6	7.5	12.7	17.8	23.1	40.4
AQAF (Alabama)	23	7.1	8.6	0.0	0.0	0.0	0.0	3.5	11.0	22.0	26.3	26.3
ATOP2 (Nevada)	14	8.4	7.0	0.0	0.0	0.0	4.1	6.9	10.5	20.4	23.1	23.1
MOQI (Missouri)	16	11.4	5.1	2.0	2.0	2.8	9.0	12.4	14.6	17.2	18.7	18.7
NY-RAH (New York)	24	7.7	6.5	0.8	1.4	1.4	3.1	5.1	11.4	17.7	17.8	26.1
OPTIMISTIC (Indiana)	19	8.3	6.5	0.0	0.0	0.0	2.2	7.6	14.2	19.4	20.8	20.8
RAVEN (Pennsylvania)	15	10.9	10.4	0.5	0.5	2.0	3.2	9.6	11.5	26.2	40.4	40.4
All ECCPs (6 states), episodes	111	1.4	1.2	0.0	0.0	0.0	0.4	1.3	2.1	3.1	3.7	6.1
AQAF (Alabama)	23	1.1	1.4	0.0	0.0	0.0	0.0	0.8	1.6	3.7	3.8	4.2
ATOP2 (Nevada)	14	1.3	1.0	0.0	0.0	0.0	0.7	1.2	1.5	2.7	3.5	3.5
MOQI (Missouri)	16	1.9	0.9	0.4	0.4	0.4	1.5	2.1	2.5	3.1	3.3	3.3
NY-RAH (New York)	24	1.3	1.1	0.1	0.2	0.2	0.5	0.9	1.9	2.8	3.3	4.4
OPTIMISTIC (Indiana)	19	1.3	1.0	0.0	0.0	0.0	0.3	1.3	2.3	3.1	3.3	3.3
RAVEN (Pennsylvania)	15	1.7	1.6	0.1	0.1	0.3	0.7	1.5	1.9	4.0	6.1	6.1

SOURCE: RTI analysis of Medicare claims data

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-16.   Payment-Only: Facility-level distribution of on-site treatment events, FY 2018

(all six qualifying conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing code (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), days	148	7.3	7.3	0.0	0.0	0.0	1.8	6.1	9.6	17.0	20.6	46.4
AQAF (Alabama)	22	4.3	5.3	0.0	0.0	0.0	0.0	2.1	6.5	13.3	15.0	17.0
ATOP2 (Colorado)	24	6.4	7.9	0.0	0.0	0.0	0.4	4.9	8.7	13.5	24.6	32.3
MOQI (Missouri)	24	4.6	4.5	0.0	0.0	0.5	1.4	2.7	7.3	11.1	13.9	17.0
NY-RAH (New York)	33	9.1	6.4	0.0	0.0	0.8	5.5	9.0	12.3	18.5	20.6	24.3
OPTIMISTIC (Indiana)	25	8.4	9.7	0.0	0.0	0.0	2.7	6.2	8.5	18.9	21.5	46.4
RAVEN (Pennsylvania)	20	10.1	7.7	1.4	1.6	2.2	5.1	8.7	12.5	20.6	29.6	32.6
All ECCPs (6 states), episodes	148	1.2	1.1	0.0	0.0	0.0	0.3	1.0	1.6	2.6	3.3	6.9
AQAF (Alabama)	22	0.7	0.9	0.0	0.0	0.0	0.0	0.3	1.1	2.2	2.5	2.6
ATOP2 (Colorado)	24	0.9	1.2	0.0	0.0	0.0	0.1	0.7	1.3	2.2	4.0	4.6
MOQI (Missouri)	24	0.8	0.7	0.0	0.0	0.1	0.3	0.5	1.1	1.8	2.1	2.8
NY-RAH (New York)	33	1.5	1.0	0.0	0.0	0.2	0.9	1.3	1.8	3.0	3.7	3.7
OPTIMISTIC (Indiana)	25	1.3	1.4	0.0	0.0	0.0	0.5	1.0	1.4	2.8	3.1	6.9
RAVEN (Pennsylvania)	20	1.7	1.2	0.3	0.3	0.4	0.9	1.5	2.2	3.3	4.5	5.0

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator

Table K-17. Clinical + Payment: Facility-level distribution of on-site treatment events, FY 2019

(all six conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), *days*	111	6.0	5.5	0.0	0.0	0.0	1.3	5.1	9.8	13.9	17.0	22.6
AQAF (Alabama)	23	5.4	6.3	0.0	0.0	0.0	0.0	4.1	9.3	15.8	16.0	22.6
ATOP2 (Nevada)	14	6.7	5.0	0.0	0.0	0.0	2.7	8.2	10.8	12.7	14.7	14.7
MOQI (Missouri)	16	7.5	5.7	0.1	0.1	1.3	1.8	7.6	11.5	16.7	17.0	17.0
NY-RAH (New York)	24	5.7	6.0	0.0	0.0	0.2	1.0	3.4	9.5	15.0	17.9	18.3
OPTIMISTIC (Indiana)	19	5.3	4.4	0.0	0.0	0.0	0.9	5.2	7.9	9.8	17.6	17.6
RAVEN (Pennsylvania)	15	6.5	5.6	0.0	0.0	0.8	1.9	5.6	10.0	12.1	21.9	21.9
All ECCPs (6 states), *episodes*	111	1.0	0.9	0.0	0.0	0.0	0.2	0.8	1.7	2.6	2.9	3.6
AQAF (Alabama)	23	0.9	1.1	0.0	0.0	0.0	0.0	0.7	1.5	2.8	2.9	3.6
ATOP2 (Nevada)	14	1.1	0.8	0.0	0.0	0.0	0.4	1.1	1.7	2.1	2.3	2.3
MOQI (Missouri)	16	1.3	1.0	0.1	0.1	0.2	0.3	1.3	2.0	2.7	2.9	2.9
NY-RAH (New York)	24	1.0	1.0	0.0	0.0	0.0	0.2	0.5	1.5	2.8	3.0	3.0
OPTIMISTIC (Indiana)	19	0.9	0.7	0.0	0.0	0.0	0.2	0.9	1.3	1.7	2.8	2.8
RAVEN (Pennsylvania)	15	1.1	0.9	0.0	0.0	0.1	0.4	1.0	1.7	2.1	3.6	3.6

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-18. Payment-Only: Facility-level distribution of on-site treatment events, FY 2019

(all six conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), *days*	148	4.5	6.4	0.0	0.0	0.0	0.0	1.8	7.1	12.3	19.1	29.8
AQAF (Alabama)	22	3.4	5.0	0.0	0.0	0.0	0.0	1.1	7.0	8.4	12.0	19.1
ATOP2 (Colorado)	24	3.8	8.6	0.0	0.0	0.0	0.0	0.0	2.0	23.2	26.3	28.1
MOQI (Missouri)	24	1.8	2.9	0.0	0.0	0.0	0.0	0.4	1.8	6.1	8.5	10.6
NY-RAH (New York)	33	6.4	5.0	0.0	0.0	0.0	2.0	6.2	9.3	12.2	15.1	21.8
OPTIMISTIC (Indiana)	25	6.3	8.6	0.0	0.0	0.0	0.0	3.1	8.8	18.7	27.8	29.8
RAVEN (Pennsylvania)	20	4.8	5.7	0.0	0.0	0.0	0.5	2.5	7.4	13.3	18.8	19.7
All ECCPs (6 states), *episodes*	148	0.7	1.0	0.0	0.0	0.0	0.0	0.3	1.1	2.0	3.1	4.3
AQAF (Alabama)	22	0.6	0.8	0.0	0.0	0.0	0.0	0.2	1.0	1.7	1.8	2.8
ATOP2 (Colorado)	24	0.6	1.4	0.0	0.0	0.0	0.0	0.0	0.3	3.9	4.2	4.3
MOQI (Missouri)	24	0.3	0.5	0.0	0.0	0.0	0.0	0.1	0.4	1.0	1.5	1.9
NY-RAH (New York)	33	1.1	0.8	0.0	0.0	0.0	0.3	1.1	1.5	2.0	2.4	3.9
OPTIMISTIC (Indiana)	25	1.0	1.3	0.0	0.0	0.0	0.0	0.5	1.6	2.7	4.1	4.3
RAVEN (Pennsylvania)	20	0.8	1.0	0.0	0.0	0.0	0.1	0.4	1.2	2.3	3.2	3.3

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-19. Clinical + Payment: Facility-level distribution of on-site treatment events, FY 2020

(all six conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), *days*	111	3.5	4.9	0.0	0.0	0.0	0.0	1.4	4.4	10.3	14.1	23.1
AQAF (Alabama)	23	2.6	5.5	0.0	0.0	0.0	0.0	0.0	3.7	5.5	14.6	22.9
ATOP2 (Colorado)	19	2.0	2.8	0.0	0.0	0.0	0.0	0.5	3.3	6.2	10.3	10.3
MOQI (Missouri)	16	4.7	4.0	0.0	0.0	0.4	1.3	3.3	9.0	10.4	12.2	12.2
NY-RAH (New York)	14	2.9	2.9	0.0	0.0	0.0	0.1	2.2	5.7	6.1	8.5	8.5
OPTIMISTIC (Indiana)	24	4.8	6.2	0.0	0.0	0.0	0.2	1.3	10.6	14.1	17.5	17.6
RAVEN (Pennsylvania)	15	3.6	5.8	0.0	0.0	0.0	0.6	1.8	3.6	7.8	23.1	23.1
All ECCPs (6 states), *episodes*	111	0.6	0.8	0.0	0.0	0.0	0.0	0.3	0.8	1.7	2.6	3.6
AQAF (Alabama)	23	0.5	0.9	0.0	0.0	0.0	0.0	0.0	0.7	1.1	2.3	3.5
ATOP2 (Colorado)	19	0.3	0.5	0.0	0.0	0.0	0.0	0.1	0.6	1.1	1.7	1.7
MOQI (Missouri)	16	0.9	0.8	0.0	0.0	0.1	0.2	0.6	1.7	1.8	2.6	2.6
NY-RAH (New York)	14	0.5	0.5	0.0	0.0	0.0	0.0	0.5	1.0	1.1	1.5	1.5
OPTIMISTIC (Indiana)	24	0.8	1.1	0.0	0.0	0.0	0.0	0.2	1.5	2.7	3.0	3.1
RAVEN (Pennsylvania)	15	0.6	0.9	0.0	0.0	0.0	0.1	0.4	0.6	1.4	3.6	3.6

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Table K-20.   Payment-Only: Facility-level distribution of on-site treatment events, FY 2020

(all six conditions combined, number of events per 1,000 Initiative-eligible resident-days)

Nursing facility billing codes (G9679-G9684 combined)	Number of facilities	Mean	SD	Min	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Max
All ECCPs (6 states), *days*	148	2.8	5.2	0.0	0.0	0.0	0.0	0.0	4.0	7.9	12.2	31.6
AQAF (Alabama)	22	2.5	3.6	0.0	0.0	0.0	0.0	0.0	4.4	6.4	10.2	12.2
ATOP2 (Colorado)	25	2.1	3.5	0.0	0.0	0.0	0.0	0.0	1.6	7.4	10.2	12.6
MOQI (Missouri)	24	0.9	1.7	0.0	0.0	0.0	0.0	0.0	0.6	3.9	4.4	6.2
NY-RAH (New York)	24	4.0	9.7	0.0	0.0	0.0	0.0	0.0	0.9	23.2	30.7	31.6
OPTIMISTIC (Indiana)	33	4.0	4.1	0.0	0.0	0.0	0.8	3.3	5.2	8.4	12.5	19.2
RAVEN (Pennsylvania)	20	3.2	4.4	0.0	0.0	0.0	0.0	1.6	4.6	10.2	13.9	15.7
All ECCPs (6 states), *episodes*	148	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.7	1.3	1.8	4.8
AQAF (Alabama)	22	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.8	1.2	1.7	1.8
ATOP2 (Colorado)	25	0.4	0.6	0.0	0.0	0.0	0.0	0.0	0.4	1.2	1.6	2.1
MOQI (Missouri)	24	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.7	1.2
NY-RAH (New York)	24	0.6	1.4	0.0	0.0	0.0	0.0	0.0	0.1	3.9	4.2	4.8
OPTIMISTIC (Indiana)	33	0.7	0.7	0.0	0.0	0.0	0.1	0.6	0.9	1.4	1.9	3.4
RAVEN (Pennsylvania)	20	0.5	0.7	0.0	0.0	0.0	0.0	0.3	0.8	1.5	2.0	2.4

SOURCE: RTI analysis of Medicare claims data.

NOTES: ATOP2 consists of a C+P group in Nevada and P-O group in Colorado. Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator.

Tables K-21 through *K-24* present facility billing among the top 10 percent of billing facilities along with percent of non-billing facilities. The data are presented by ECCP in the C+P and P-O groups, in each year separately for FY 2017–FY 2020. In the C+P group, the number of non-billing facilities increased steadily over FY 2017–FY 2019; whereas in the P-O group, in FY 2019 there was a steep increase in non-billers compared to previous years. In both groups there was a large increase in non-billers in FY 2020, largely due to the lower levels of engagement due to the COVID-19 pandemic, as explained in *Chapter IV.2.*

Table K-21. Facility billing patterns, by ECCP, FY 2017

State	C+P					P-O				
	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing by Top 10%	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing by Top 10%
All	112	9	8.0	12	24.0	148	23	15.5	15	31.0
AL	23	6	26.1	3	40.4	22	3	13.6	3	50.6
CO	—	—	—	—	—	24	10	41.7	3	47.3
IN	19	2	10.5	2	28.0	25	6	24.0	3	48.5
MO	16	0	0.0	2	22.2	24	0	0.0	3	24.0
NV	14	0	0.0	2	30.5	—	—	—	—	—
NY	25	1	4.0	3	27.3	33	3	9.1	4	23.1
PA	15	0	0.0	2	20.8	20	1	5.0	2	24.0

SOURCE: RTI analysis of Medicare claims data.

NOTE: Billing was measured based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions combined. The top 10 percent of facilities across all ECCPs were identified for each of the C+P and P-O groups, within each state and across all state. For example, for the C+P group, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

— = NV/CO each are only part of one Intervention Group

Table K-22.   Facility billing patterns, by ECCP, FY 2018

State	C+P					P-O				
	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing Due to Top 10%	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing Due to Top 10%
All	111	12	10.8	12	26.7	148	22	14.9	15	29.9
AL	23	8	34.8	3	49.0	22	10	45.5	3	57.2
CO	—	—	—	—	—	24	5	20.8	3	54.4
IN	19	2	10.5	2	28.3	25	3	12.0	3	38.6
MO	16	0	0.0	2	18.5	24	2	8.3	3	29.2
NV	14	2	14.3	2	42.1	—	—	—	—	—
NY	24	0	0.0	3	29.5	33	2	6.1	4	24
PA	15	0	0.0	2	29.4	20	0	0.0	2	19.7

SOURCE: RTI analysis of Medicare claims data.

NOTE: Billing was measured based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions combined. The top 10 percent of facilities across all ECCPs were identified for each of the C+P and P-O groups, within each state and across all state. For example, for the C+P group, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

— = NV/CO each are only part of one Intervention Group

Table K-23. Facility billing patterns, by ECCP, FY 2019

State	C+P					P-O				
	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing Due to Top 10%	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing Due to Top 10%
All	111	17	15.3	12	29.5	148	49	33.1	15	39.1
AL	23	7	30.4	3	47.3	22	8	36.4	3	68.2
CO	—	—	—	—	—	24	15	62.5	3	86.8
IN	19	4	21.1	2	27.8	25	9	36.0	3	33.9
MO	16	0	0.0	2	25.5	24	8	33.3	3	63.6
NV	14	3	21.4	2	39.9	—	—	—	—	—
NY	24	2	8.3	3	34.6	33	5	15.2	4	25.4
PA	15	1	6.7	2	28.8	20	4	20.0	2	30.0

SOURCE: RTI analysis of Medicare claims data.

NOTE: Billing was measured based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions combined. The top 10 percent of facilities across all ECCPs were identified for each of the C+P and P-O groups, within each state and across all state. For example, for the C+P group, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

— = NV/CO each are only part of one Intervention Group

Table K-24. Facility billing patterns, by ECCP, FY 2020

State	C+P					P-O				
	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing Due to Top 10%	# of Facilities	# of Non-Billing Facilities	% of Non-Billing Facilities	# of Facilities in Top 10%	% of Billing Due to Top 10%
All	111	32	28.8	12	54.5	148	75	50.7	15	56.5
AL	23	12	52.2	3	63.6	22	12	54.5	3	67.3
CO	—	—	—	—	—	24	16	66.7	3	91.1
IN	19	9	47.4	2	50.5	25	13	52.0	3	67.4
MO	16	1	6.3	2	27.7	24	18	75.0	3	58.5
NV	14	3	21.4	2	54.9	—	—	—	—	—
NY	24	5	20.8	3	54.5	33	7	21.2	4	39.4
PA	15	2	13.3	2	46.4	20	9	45.0	2	29.6

SOURCE: RTI analysis of Medicare claims data.

NOTE: Billing was measured based on the rate per 1,000 Initiative-eligible resident-days for all six qualifying conditions combined. The top 10 percent of facilities across all ECCPs were identified for each of the C+P and P-O groups, within each state and across all state. For example, for the C+P group, we selected the 12 facilities with the highest billing based on the rate of per 1,000 Initiative-eligible resident-days.

— = NV/CO each are only part of one Intervention Group

K.5   Medicare Payments to Facilities and Practitioners

In **Tables K-25** through **K-27** we present total Medicare payments for the NFI2 billing codes for FY 2017–FY 2020. These are based on the dates when the on-site treatment took place. Unlike the prior analysis where we applied exclusion criteria as explained above, here we include all claim lines in the Medicare data with no exclusions applied. In 2019, Medicare paid over $7 million to facilities and about $0.6 million to practitioners for Initiative episodes. These numbers fell in 2020, and Medicare paid only about $4 million to facilities and $0.4 million to practitioners. Total Medicare payments for all Initiative episodes for ECCPs in the C+P group consistently decreased over the years (about $7 million in FY 2017 and about $2 million in FY 2020). Payments for ECCPs in the P-O group also fell in FY 2019 (over $3 million) and FY 2020 (over $2 million) (**Table K-27**). The decline in FY 2020 was largely due to the COVID-19 pandemic.

Table K-25.   Medicare NFI2 payments to participating facilities for treatment of six qualifying conditions, FY 2017–FY 2020

Facility payments for acute care of NFI 2 conditions	HCPCS code	Number of claim lines				Total Medicare payment ($)			
		2017	2018	2019	2020	2017	2018	2019	2020
Pneumonia	G9679	15,611	14,840	11,842	7,278	3,296,472	3,145,773	2,509,339	1,539,048
CHF	G9680	3,261	2,872	2,020	1,305	694,582	611,553	429,233	279,594
COPD /asthma	G9681	3,011	2,496	1,956	995	634,891	530,242	413,438	210,932
Skin infection	G9682	14,479	12,849	4,983	1,672	3,071,409	2,725,516	1,061,080	357,728
Dehydration	G9683	2,236	1,771	1,125	880	472,720	369,170	239,666	185,989
UTI	G9684	19,411	17,632	12,996	7,524	4,130,327	3,739,165	2,768,736	1,605,524
Total		58,009	52,460	34,922	19,654	12,300,401	11,121,419	7,421,492	4,178,815

HCPCS = Healthcare Common Procedure Coding System; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; HCPCS = Healthcare Common Procedure Coding System; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTE: Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized.

Table K-26. Medicare NFI2 payments to practitioners for six qualifying conditions, FY 2017–FY 2020

NFI 2 Practitioner payments	HCPCS code	Number of claim lines				Total Medicare payment ($)			
		2017	2018	2019	2020	2017	2018	2019	2020
Confirmation and treatment of NFI 2 conditions	G9685	4,883	4,523	3,325	2,228	907,836	818,526	600,287	406,221
Care coordination conference	G9686	172	131	36	0	11,907	9,886	2,794	0
Total for practitioners		5,055	4,654	3,361	2,228	919,743	828,411	603,081	406,221

HCPCS = Healthcare Common Procedure Coding System.

SOURCE: RTI analysis of Medicare claims data.

NOTE: Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized. The care coordination conference code (G9686) was discontinued at the end of calendar year 2018.

Table K-27. All ECCPs: Total Medicare spending for on-site treatment by ECCP, FY 2017–FY 2020

Facility	Number of claim lines				Total Medicare payment ($)			
	2017	2018	2019	2020	2017	2018	2019	2020
All ECCPs (6 states): C+P	33,820	27,480	18,831	10,412	7,117,332	5,769,820	3,964,503	2,199,333
All ECCPs (6 states): P-O	26,593	27,734	18,045	10,956	5,553,628	5,778,698	3,764,189	2,277,444
AQAF (AL): C+P	5,951	3,837	2,606	1,129	1,219,267	782,670	529,116	233,168
AQAF (AL): P-O	3,220	2,117	1,189	742	662,569	437,720	249,447	153,205
ATOP2 (NV): C+P	3,261	2,741	2,333	984	692,184	580,715	492,794	208,812
ATOP2 (CO): P-O	2,654	3,410	2,329	2,132	557,209	719,985	483,374	440,901
MOQI (MO): C+P	5,397	4,493	2,908	1,717	1,148,741	958,114	621,716	368,271
MOQI (MO): P-O	3,593	2,112	840	346	768,818	447,247	177,369	73,267
NY-RAH (NY): C+P	9,807	7,517	5,450	4,458	2,081,960	1,582,213	1,154,531	940,159
NY-RAH (NY): P-O	8,581	10,187	7,716	4,863	1,806,119	2,119,940	1,616,917	1,019,362
OPTIMISTIC (IN): C+P	4,674	4,110	2,551	865	979,992	853,643	532,138	179,305
OPTIMISTIC (IN): P-O	4,691	4,924	3,610	1,399	970,660	1,018,362	745,658	285,636
RAVEN (PA): C+P	4,730	4,782	2,983	1,259	995,189	1,012,464	634,207	269,618
RAVEN (PA): P-O	3,854	4,984	2,361	1,474	788,253	1,035,444	491,426	305,073

SOURCE: RTI analysis of Medicare claims data.

NOTE: Unlike Medicare expenditures reported elsewhere in this report, the total Medicare expenditures in this table are not annualized. ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

APPENDIX L
OUTCOMES OF NFI 2 RESIDENTS FOLLOWING ON-SITE AND INPATIENT TREATMENT

L.1   Overview

In this appendix, we present additional results from analyses of outcomes among residents following on-site and inpatient treatment for the six qualifying conditions; this analysis supplements the results in *Chapter II.9*. We seek to understand the effectiveness of on-site treatment for the six conditions by following the post-treatment outcomes for FY 2017–FY 2019. We further present the results of risk-adjusted logistic regression comparing subsequent outcomes among those treated on-site versus those treated in the hospital.

- *Appendix Section L.2* describes the creation of post-treatment outcome measures.

- *Appendix Section L.3* provides a detailed explanation of the total analytic sample, highlighting specific exclusion criteria applied at each stage.

- *Appendix Section L.4* presents the descriptive results of the five post-treatment outcomes across FY 2017–FY 2019.

- *Appendix Section L.5* compares post-treatment acute care transitions (ACTs) and mortality among those treated on-site and those treated in the hospital.

L.2   Measure Construction

The premise of the NFI intervention was that many hospitalizations of nursing facility residents are caused by acute events, which can either be avoided or safely managed on-site. NFI 2 focused specifically on six conditions that were identified as safely treatable on-site, if identified early. To establish the safety of treating residents on-site, we conducted analyses to observe the residents for 30 days following on-site treatment.

We present results for five outcomes for residents treated for the six conditions. For each, we measured occurrence within 7 and 30 days from the end of an episode of on-site treatment. Specifically, we measured:

1. Inpatient use (i.e., all-cause, condition-specific, and sepsis)

2. Emergency department (ED) visits (i.e., all-cause and condition-specific)

3. ACTs (which measures whether residents were treated in the hospital with either an inpatient stay, an ED visit, or an observation stay)

4. Subsequent acute treatment on-site for any of the six conditions

5. Mortality

L.3   Sample Construction

To construct our analytic sample, we followed residents who were treated on-site, in the hospital, or in the ED (including observation stays) (***Table L-1***). Residents could be treated multiple times within and across years and all treatment episodes were included within the initial sample. The initial sample for FY 2017–FY 2019 included 20,636 episodes. We excluded episodes that lacked sufficient follow-up time in the year. Thus, an episode for a resident discharged in September (last month of the fiscal year) would not be included when calculating the percentage of episodes during which the resident died within 30 days, and a resident with an episode during the last week of September would not be included in the 7-day measure. After exclusion, on-site specific analyses included 20,125 episodes in the 7-day follow-up measure and 19,068 for the 30-day follow-up measure for both groups together for FY 2017–FY 2019.

For analyses comparing those treated on-site to those treated in the hospital or ED, we restricted the sample to eligible residents treated for the six qualifying conditions during an eligible exposure period (see ***Appendix I*** for eligibility details). We further excluded episodes with insufficient follow-up or any missing covariates. We allowed resident episodes with prior treatment episodes to be included in the sample, and indicators for prior treatment episodes for any treatment type that occurred 30 days before an episode were included as risk adjusters in the multivariate analysis. Any episode for which prior treatment could not be tracked for 30 days prior was also excluded. Based on these criteria, of the initial 20,636 on-site treatment episodes, a final sample of 16,974 episodes were included in the comparative analysis. Similarly, from an initial sample of 29,197 all-cause hospitalization events, we obtained 5,705 inpatient hospitalizations for six conditions, and the sample for final analysis after applying the same criteria used for on-site treatment episodes included 4,109 episodes. Among those treated at the ED, we began with 23,504 all-cause events and subset to 2,526 events for the six conditions, and eventually obtained an eligible sample of 1,798 episodes. We combined inpatient and ED visits because facility staff could not predict inpatient admission at the time of transfer. Hence, a combined total of 5,907 hospital events were analyzed.

Table L-1. Sample selection criteria for analysis of subsequent outcomes by clinical setting of initial treatment

Criteria	On-site treatment	Inpatient hospitalization	ED visit
Initial sample of episodes for six conditions[a]	20,636	5,705	2,526
Sample for post on-site treatment analysis[b]			
7-day measure	20,125	NA	NA
30-day measure	19,068		
Sample for comparison between on-site and hospital[c]	16,974	4,109	1,798

SOURCE: RTI analysis of Medicare claims data.

[a] Initial sample of episodes for inpatient hospitalization and ED visit includes only six conditions. All-cause inpatient hospitalizations = 29,197 and ED = 23,504.
[b] Exclusion based on insufficient follow-up period in the year.
[c] Exclusion based on insufficient follow-up period in the year, missing covariates, and inability to track prior treatment episodes that occurred 30 days before an episode.

L.4 Outcomes Following On-Site Treatment for the Six Qualifying Conditions

In **Table L-2**, we present the numbers corresponding to **Figures II-31** and **II-32** showing the percent of residents with subsequent hospitalization, ED visit, ACT, mortality, additional on-site treatment, or any such event within 30 days of on-site acute care for the six conditions.

In **Tables L-3 to L-12**, we present detailed results for each of the five outcomes occurring within 7 and 30 days. Each table shows the counts and percentages of residents who experienced a specific event post on-site treatment across all conditions combined and for each condition separately. **Tables L-3 to L-8** also include two other measures for ACT, ED, and inpatient hospitalization within 7 and 30 days: a broader condition-specific measure based on ICD-10 codes that includes additional events with diagnoses similar or directly related to any of the six conditions, and a narrower measure that includes principal diagnosis specific to the six conditions.[21]

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[21] For definitions, see Annual Report 4, Appendix S in RTI International (2021).

Table L-2.   All ECCPs: Residents with events occurring within 30 days following on-site treatment, FY 2017–FY 2019

(corresponds to *Figures II-31* and *II-32* in *Section II.9*)

Condition	Value type	N	Episodes included in 30-day measure	HP within 30 days	ED within 30 days	ACT within 30 days	Death within 30 days	Additional on-site treatment episodes within 30 days	Any subsequent treatment or death in 30 days	No subsequent treatment or death in 30 days
All conditions	N	20,636	19,068	1,889	922	2,576	1,475	3,013	6,069	12,999
	%	100.0	92.4	9.9	4.8	13.5	7.7	15.8	31.8	68.2
Pneumonia	N	5,876	5,479	633	253	820	600	746	1,855	3,624
	%	100.0	93.2	11.6	4.6	15.0	11.0	13.6	33.9	66.1
CHF	N	1,175	1,065	128	43	157	123	237	428	637
	%	100.0	90.6	12.0	4.0	14.7	11.6	22.3	40.2	59.8
COPD/Asthma	N	1,074	981	132	48	166	70	194	356	625
	%	100.0	91.3	13.5	4.9	16.9	7.1	19.8	36.3	63.7
Skin infection	N	4,267	3,950	346	186	485	159	666	1,143	2,807
	%	100.0	92.6	8.8	4.7	12.3	4.0	16.9	28.9	71.1
Dehydration	N	1,089	1,026	135	52	174	215	220	510	516
	%	100.0	94.2	13.2	5.1	17.0	21.0	21.4	49.7	50.3
UTI	N	7,155	6,567	515	340	774	308	950	1,777	4,790
	%	100.0	91.8	7.8	5.2	11.8	4.7	14.5	27.1	72.9

ACT = acute care transition; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department visit or observation stay; HP = inpatient hospitalization; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-3. Clinical + Payment: Residents who had an ACT within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Condition	Value type	N	Episodes included in 7-day measure	ACT within 7 days	Condition-specific (broad definition) ACT within 7 days	Condition-specific (narrow definition) ACT within 7 days	HP for sepsis within 7 days	Episodes included in 30-day measure	ACT within 30 days	Condition-specific (broad definition) ACT within 30 days	Condition-specific (narrow definition) ACT within 30 days	HP for sepsis within 30 days
All conditions	N	11,071	10,775	812	483	187	200	10,205	1,491	835	337	343
	%	100.0	97.3	7.5	4.5	1.7	1.9	92.2	14.6	8.2	3.3	3.36
Pneumonia	N	3,197	3,125	282	143	37	76	2,975	476	228	63	117
	%	100.0	97.8	9.0	4.6	1.2	2.4	93.1	16.0	7.7	2.1	3.9
CHF	N	553	538	56	14	11	13	506	88	18	15	27
	%	100.0	97.3	10.4	2.6	2.0	2.4	91.5	17.4	3.6	3.0	5.3
COPD/ Asthma	N	480	468	44	20	9	4	437	85	42	13	11
	%	100.0	97.5	9.4	4.3	1.9	0.9	91.0	19.5	9.6	3.0	2.5
Skin infection	N	2,383	2,312	134	50	12	27	2,193	282	92	20	55
	%	100.0	97.0	5.8	2.2	0.5	1.2	92.0	12.9	4.2	0.9	2.5
Dehydration	N	640	634	71	1	0	20	607	108	4	2	28
	%	100.0	99.1	11.2	0.2	0.0	3.2	94.8	17.8	0.7	0.3	4.6
UTI	N	3,818	3,698	225	89	25	60	3,487	452	155	44	105
	%	100.0	96.9	6.1	2.4	0.7	1.6	91.3	13.0	4.5	1.3	3.0

ACT = acute care transition; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; HP = inpatient hospitalization; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-4. Payment-Only: Residents who had an ACT within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Condition	Value type	N	Episodes included in 7-day measure	ACT within 7 days	Condition-specific (broad definition) ACT within 7 days	Condition-specific (narrow definition) ACT within 7 days	Inpatient hospitalizations for sepsis within 7 days	Episodes included in 30-day measure	ACT within 30 days	Condition-specific (broad definition) ACT within 30 days	Condition-specific (narrow definition) ACT within 30 days	Inpatient hospitalizations for sepsis within 30 days
All conditions	N	9,565	9,350	565	327	139	122	8,863	1,085	619	277	230
	%	100.0	97.8	6.0	3.5	1.5	1.3	92.7	12.2	7.0	3.1	2.6
Pneumonia	N	2,679	2,626	193	111	33	54	2,504	344	176	53	90
	%	100.0	98.0	7.4	4.2	1.3	2.1	93.5	13.7	7.0	2.1	3.6
CHF	N	622	598	39	13	10	7	559	69	21	16	11
	%	100.0	96.1	6.5	2.2	1.7	1.2	89.9	12.3	3.8	2.9	2.0
COPD/ Asthma	N	594	581	40	17	5	7	544	81	32	8	15
	%	100.0	97.8	6.9	2.9	0.9	1.2	91.6	14.9	5.9	1.5	2.8
Skin infection	N	1,884	1,842	89	26	10	14	1,757	203	62	17	39
	%	100.0	97.8	4.8	1.4	0.5	0.8	93.3	11.6	3.5	1.0	2.2
Dehydration	N	449	442	41	1	1	10	419	66	1	1	11
	%	100.0	98.4	9.3	0.2	0.2	2.3	93.3	15.8	0.2	0.2	2.6
UTI	N	3,337	3,261	163	45	14	30	3,080	322	95	27	64
	%	100.0	97.7	5.0	1.4	0.4	0.9	92.3	10.5	3.1	0.9	2.1

ACT = acute care transition; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-5. Clinical + Payment: Residents who had an ED visit within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Condition	Value type	N	Episodes included in 7-day measure	ED within 7 days	Condition-specific (broad definition) ED within 7 days	Condition-specific (narrow definition) ED within 7 days	Episodes included in 30-day measure	ED within 30 days	Condition-specific (broad definition) ED within 30 days	Condition-specific (narrow definition) ED within 30 days
All conditions	N	11,071	10,775	210	48	27	10,205	507	123	64
	%	100.0	97.3	2.0	0.5	0.3	92.2	5.0	1.2	0.6
Pneumonia	N	3,197	3,125	56	8	1	2,975	134	18	4
	%	100.0	97.8	1.8	0.3	0.03	93.1	4.5	0.6	0.1
CHF	N	553	538	11	1	1	506	22	2	2
	%	100.0	97.3	2.0	0.2	0.2	91.5	4.4	0.4	0.4
COPD/Asthma	N	480	468	9	2	1	437	24	6	1
	%	100.0	97.5	1.9	0.4	0.2	91.0	5.5	1.4	0.2
Skin infection	N	2,383	2,312	37	4	2	2,193	94	8	3
	%	100.0	97.0	1.6	0.2	0.1	92.0	4.3	0.4	0.1
Dehydration	N	640	634	14	0	0	607	34	2	2
	%	100.0	99.1	2.2	0.0	0.0	94.8	5.6	0.3	0.3
UTI	N	3,818	3,698	83	12	10	3,487	199	24	20
	%	100.0	96.9	2.2	0.3	0.3	91.3	5.7	0.7	0.6

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department visit or observation stay; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-6. Payment-Only: Residents who had an ED visit within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Condition	Value type	N	Episodes included in 7-day measure	ED within 7 days	Condition-specific (broad definition) ED within 7 days	Condition-specific (narrow definition) ED within 7 days	Episodes included in 30-day measure	ED within 30 days	Condition-specific (broad definition) ED within 30 days	Condition-specific (narrow definition) ED within 30 days
All conditions	N	9,565	9,350	169	62	32	8,863	415	133	78
	%	100.0	97.8	1.8	0.7	0.3	92.7	4.7	1.5	0.9
Pneumonia	N	2,679	2,626	46	11	4	2,504	119	25	8
	%	100.0	98.0	1.8	0.4	0.2	93.5	4.8	1.0	0.3
CHF	N	622	598	10	0	0	559	21	1	1
	%	100.0	96.1	1.7	0.0	0.0	89.9	3.8	0.2	0.2
COPD/Asthma	N	594	581	10	5	1	544	24	7	1
	%	100.0	97.8	1.7	0.9	0.2	91.6	4.4	1.3	0.2
Skin infection	N	1,884	1,842	34	6	3	1,757	92	10	5
	%	100.0	97.8	1.9	0.3	0.2	93.3	5.2	0.6	0.3
Dehydration	N	449	442	10	0	0	419	18	0	0
	%	100.0	98.4	2.3	0.0	0.0	93.3	4.3	0.0	0.0
UTI	N	3,337	3,261	59	7	4	3,080	141	15	10
	%	100.0	97.7	1.8	0.2	0.1	92.3	4.6	0.5	0.3

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department visit or observation stay; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-7. Clinical + Payment: Percentage of residents who had an inpatient hospitalization within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Condition	Value type	N	Episodes included in 7-day measure	HP within 7 days	Condition-specific (broad definition) HP within 7 days	Condition-specific (narrow definition) HP within 7 days	Episodes included in 30-day measure	HP within 30 days	Condition-specific (broad definition) HP within 30 days	Condition-specific (narrow definition) HP within 30 days
All conditions	N	11,071	10,775	634	447	164	10,205	1,107	752	286
	%	100.0	97.3	5.9	4.2	1.5	92.2	10.9	7.4	2.8
Pneumonia	N	3,197	3,125	235	138	37	2,975	370	220	60
	%	100.0	97.8	7.5	4.4	1.2	93.1	12.4	7.4	2.0
CHF	N	553	538	47	13	10	506	75	16	13
	%	100.0	97.3	8.7	2.4	1.9	91.5	14.8	3.2	2.6
COPD/Asthma	N	480	468	39	18	8	437	72	38	12
	%	100.0	97.5	8.3	3.9	1.7	91.0	16.5	8.7	2.8
Skin infection	N	2,383	2,312	101	46	10	2,193	209	86	17
	%	100.0	97.0	4.4	2.0	0.4	92.0	9.5	3.9	0.8
Dehydration	N	640	634	57	1	0	607	81	2	0
	%	100.0	99.1	9.0	0.2	0.0	94.8	13.3	0.3	0.0
UTI	N	3,818	3,698	155	78	15	3,487	300	136	27
	%	100.0	96.9	4.2	2.1	0.4	91.3	8.6	3.9	0.8

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; HP = inpatient hospitalization; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-8. **Payment-Only: Residents who had an inpatient hospitalization within 7 and 30 days following on-site treatment, FY 2017–FY 2019**

Condition	Value type	N	Episodes included in 7-day measure	HP within 7 days	Condition-specific (broad definition) HP within 7 days	Condition-specific (narrow definition) HP within 7 days	Episodes included in 30-day measure	HP within 30 days	Condition-specific (broad definition) HP within 30 days	Condition-specific (narrow definition) HP within 30 days
All conditions	N	9,565	9,350	439	282	113	8,863	782	524	209
	%	100.0	97.8	4.7	3.0	1.2	92.7	8.8	5.9	2.4
Pneumonia	N	2,679	2,626	164	103	30	2,504	263	159	47
	%	100.0	98.0	6.3	3.9	1.1	93.5	10.5	6.4	1.9
CHF	N	622	598	31	13	10	559	53	20	15
	%	100.0	96.1	5.2	2.2	1.7	89.9	9.5	3.6	2.7
COPD/Asthma	N	594	581	31	12	4	544	60	25	7
	%	100.0	97.8	5.3	2.1	0.7	91.6	11.0	4.6	1.3
Skin infection	N	1,884	1,842	64	22	8	1,757	137	55	13
	%	100.0	97.8	3.5	1.2	0.4	93.3	7.8	3.1	0.7
Dehydration	N	449	442	33	1	1	419	54	1	1
	%	100.0	98.4	7.5	0.2	0.2	93.3	12.9	0.2	0.2
UTI	N	3,337	3,261	116	41	10	3,080	215	84	17
	%	100.0	97.7	3.6	1.3	0.3	92.3	7.0	2.7	0.6

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; HP = inpatient hospitalization; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-9. Clinical + Payment: Residents who had additional on-site treatment within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Condition	Value type	N	Episodes included in 7-day measure	Additional on-site treatment episode within 7 days	Additional on-site treatment episode same cause within 7 days	Episodes included in 30-day measure	Additional on-site treatment episode within 30 days	Additional on-site treatment episode same cause within 30 days
All conditions	N	11,071	10,775	633	-	10,205	1,637	-
	%	100.0	97.3	5.9	-	92.2	16.0	-
Pneumonia	N	3,197	3,125	170	93	2,975	411	225
	%	100.0	97.8	5.4	3.0	93.1	13.8	7.6
CHF	N	553	538	51	7	506	102	33
	%	100.0	97.3	9.5	1.3	91.5	20.2	6.5
COPD/Asthma	N	480	468	41	14	437	84	30
	%	100.0	97.5	8.8	3.0	91.0	19.2	6.9
Skin infection	N	2,383	2,312	140	79	2,193	368	213
	%	100.0	97.0	6.1	3.4	92.0	16.8	9.7
Dehydration	N	640	634	62	9	607	126	43
	%	100.0	99.1	9.8	1.4	94.8	20.8	7.1
UTI	N	3,818	3,698	169	82	3,487	546	317
	%	100.0	96.9	4.6	2.2	91.3	15.7	9.1

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-10. Payment-Only: Residents who had additional on-site treatment within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Condition	Value type	N	Episodes included in 7-day measure	Additional on-site treatment episode within 7 days	Additional on-site treatment episode same cause within 7 days	Episodes included in 30-day measure	Additional on-site treatment episode within 30 days	Additional on-site treatment episode same cause within 30 days
All conditions	N	9,565	9,350	570	-	8,863	1,376	-
	%	100.0	97.8	6.1	-	92.7	15.5	-
Pneumonia	N	2,679	2,626	144	78	2,504	335	172
	%	100.0	98.0	5.5	3.0	93.5	13.4	6.9
CHF	N	622	598	69	18	559	135	51
	%	100.0	96.1	11.5	3.0	89.9	24.2	9.1
COPD/Asthma	N	594	581	39	13	544	110	45
	%	100.0	97.8	6.7	2.2	91.6	20.2	8.3
Skin infection	N	1,884	1,842	114	77	1,757	298	184
	%	100.0	97.8	6.2	4.2	93.3	17.0	10.5
Dehydration	N	449	442	60	19	419	94	44
	%	100.0	98.4	13.6	4.3	93.3	22.4	10.5
UTI	N	3,337	3,261	144	73	3,080	404	251
	%	100.0	97.7	4.4	2.2	92.3	13.1	8.2

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

Table L-11. Clinical + Payment: Residents who died within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Episode	Value type	N	Death during same year	Episodes included in 7-day measure	Death within 7 days	Episodes included in 30-day measure	Death within 30 days
Any condition	N	11,071	2,636	10,775	310	10,205	768
	%	100.0	23.8	97.3	2.9	92.2	7.5
Pneumonia	N	3,197	906	3,125	158	2,975	319
	%	100.0	28.3	97.8	5.1	93.1	10.7
CHF	N	553	196	538	15	506	54
	%	100.0	35.4	97.3	2.8	91.5	10.7
COPD/Asthma	N	480	100	468	9	437	25
	%	100.0	20.8	97.5	1.9	91.0	5.7
Skin infection	N	2,383	454	2,312	23	2,193	90
	%	100.0	19.1	97.0	1.0	92.0	4.1
Dehydration	N	640	280	634	53	607	123
	%	100.0	43.8	99.1	8.4	94.8	20.3
UTI	N	3,818	700	3,698	52	3,487	157
	%	100.0	18.3	96.9	1.4	91.3	4.5

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table L-12. Payment-Only: Residents who died within 7 and 30 days following on-site treatment, FY 2017–FY 2019

Episode	Value type	N	Death during same year	Episodes included in 7-day measure	Death within 7 days	Episodes included in 30-day measure	Death within 30 days
Any condition	N	9,565	2,301	9,350	319	8,863	707
	%	100.0	24.1	97.8	3.4	92.7	8.0
Pneumonia	N	2,679	765	2,626	142	2,504	281
	%	100.0	28.6	98.0	5.4	93.5	11.2
CHF	N	622	195	598	37	559	69
	%	100.0	31.4	96.1	6.2	89.9	12.3
COPD/Asthma	N	594	128	581	19	544	45
	%	100.0	21.6	97.8	3.3	91.6	8.3
Skin infection	N	1,884	351	1,842	18	1,757	69
	%	100.0	18.6	97.8	1.0	93.3	3.9
Dehydration	N	449	200	442	42	419	92
	%	100.0	44.5	98.4	9.5	93.3	22.0
UTI	N	3,337	662	3,261	61	3,080	151
	%	100.0	19.8	97.7	1.9	92.3	4.9

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

L.5   Comparison of Outcomes Following On-Site and Hospital Treatment

We compared the likelihood of an ACT for any of the six conditions or death within 30 days, for residents who were treated for one of the six conditions either on-site or in the hospital. Our sample construction is described above in **Appendix Section L.2**, and our sample is at the episode level. Episodes are classified either as episodes of on-site treatment or episodes of treatment in the hospital. The latter includes inpatient stays, ED visits, and observation stays. We group these together because it is unknown at the transfer time whether residents will be admitted as an inpatient or an outpatient. It is possible for the same resident to have multiple episodes of treatment for the six conditions during the study period.

We used a logistic regression model and estimated standard errors with a method that accounted for facility-level clustering. Separate models were used for the two different outcomes of interest (subsequent ACT and subsequent death). The independent variable of interest was whether the resident was treated on-site or in the hospital, and the resulting odds ratio (OR) indicated the likelihood of a subsequent adverse outcome for residents treated in the hospital relative to those treated on-site. We modeled each of the six conditions separately, as well as all six combined. Similar to how we modeled other outcomes in the difference-in-differences (DD) framework throughout this report, we controlled for resident characteristics such as demographics, functional and cognitive status, comorbidities, and selected facility characteristics. Additionally, we controlled for prior on-site or hospital treatment within 30 days to an episode.

In addition to these regression models, we applied a second approach to account for potential selection of less severely ill residents for on-site treatment by ECCP facilities within the sample. We used propensity score matching to select samples of residents treated on-site that were similar on observable characteristics to residents treated in the hospital. We matched samples for all conditions combined and for each condition separately and used 1:1 nearest neighbor matching without replacement to match between the two groups. After obtaining matched samples, we utilized logistic regression models. From the regression sample, we excluded observations with extreme propensity scores (> 0.95 and < 0.05), as well as observations with covariates that perfectly predict the outcome measure and those covariates. In some cases, we omitted estimates due to unstable results caused by small sample sizes. **Table L-13** shows descriptive results for both outcomes of interest, as well as ORs obtained from the unmatched logistic regressions and from the logistic regressions run on the matched samples.

Table L-13. ACT and mortality within 30 days of on-site or hospital treatment: Selected odds ratios from logistic regression using matched and unmatched cohorts

(corresponds to *Figure II-35* in *Section II.9*)

Condition	Treatment site	Value	Unmatched sample			Matched sample		
			Episodes included	Episodes with ACT within 30 days	Episodes with death within 30 days	Episodes included	Episodes with ACT within 30 days	Episodes with death within 30 days
All Conditions	On-Site		16,974	2,309 (13.6)	1,316 (7.8)	5907	1030 (17.4)	470 (8.0)
	Hospital	N (%)	5,907	1,566 (26.5)	1,002 (17.0)	5907	1566 (26.5)	1002 (17.0)
		OR		1.664***	2.250***		1.589***	2.407***
Pneumonia	On-Site		4,924	746 (15.2)	535 (10.9)	1716	329 (19.2)	168 (9.8)
	Hospital	N (%)	1716	450 (26.2)	408 (23.8)	1716	450 (26.2)	408 (23.8)
		OR		1.474***	2.906***		1.444***	3.113***
CHF§	On-Site		950	143 (15.1)	113 (11.9)	-	-	-
	Hospital	N (%)	1233	339 (27.5)	298 (24.2)	-	-	-
		OR		1.469**	3.045***		-	-
COPD/Asthma§	On-Site		879	151 (17.2)	63 (7.2)	-	-	-
	Hospital	N (%)	601	172 (28.6)	68 (11.3)	-	-	-
		OR		1.392**	2.032***		-	-
Skin§	On-Site		3,420	425 (12.4)	140 (4.1)	319	64 (20.1)	-
	Hospital	N (%)	319	78 (24.5)	17 (5.3)	319	78 (24.5)	-
		OR		1.547***	1.508		1.724**	-
Dehydration	On-Site		944	161 (17.1)	195 (20.7)	310	68 (21.9)	69 (22.3)
	Hospital	N (%)	310	76 (24.5)	68 (21.9)	310	76 (24.5)	68 (21.9)
		OR		1.008	1.062		0.914	0.931
UTI	On-Site		5,857	683 (11.7)	270 (4.6)	1728	253 (14.6)	75 (4.3)
	Hospital	N (%)	1728	451 (26.1)	143 (8.3)	1728	451 (26.1)	143 (8.3)
		OR		2.280***	2.133***		2.190***	2.081***

ACT = acute care transition; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; OR = odds ratio; UTI = urinary tract infection.

SOURCE: RTI analysis of Medicare claims data.

NOTES: ORs in bold. */**/*** = Significantly different from zero based on a p-value cutoff of 0.1/0.05/0.01.

§ The coefficients for certain outcomes are not presented here due to unreliable values. The matched samples for CHF and COPD/Asthma did not yield a balanced match. Similarly, the matched sample for death within 30 days due to treatment for skin infections had N's <20. Control variables that perfectly predict outcomes were excluded and observations were dropped leading to slight differences between the sample used in regressions and the matched sample.

APPENDIX M
HIGH-COST NURSING HOME RESIDENTS AND HOSPITAL USE FOR THE SIX CONDITIONS

M.1   Overview

In this appendix, we present results from an analysis in which we identified high-cost Initiative-eligible residents—defined as those residents with total Medicare expenditures at or above the 90th percentile across the entire analytic sample—and examined their health care utilization and expenditure characteristics, in FY 2016 and FY 2017. Given the focus of NFI 2 on hospitalizations for the six conditions, we conducted an exploratory analysis to understand the degree of overlap between high-cost nursing facility (NF) residents and residents with acute care transitions (ACTs) for the six qualifying conditions.

- **Table M-1** presents counts and percentages of Initiative-eligible residents in our final analytic sample who were high-cost, as well as those who had any ACTs due to the six target conditions, in each, both, and neither of the years.

- **Table M-2** presents a cross-tabulation of Initiative-eligible residents in our final analytic sample who were high-cost in each year only, in both years, and in neither year against those who had any ACTs due to the six target conditions in each year only, in both years, and in neither year.

- **Figures M-1** and **M-2** graphically depict the data presented in **Table M-2. Figure M-1** displays the percentage of residents who had ACTs for the six conditions by their high-cost status. **Figure M-2** displays the percentage of residents who are high-cost by their status of whether they had an ACT for the six conditions. As a contrast, **Figure M-3**, displays the percentage of residents who are high-cost by their status of whether they had an all-cause ACT.

M.2   Results

Table M-1.   Counts and percentages of high-cost residents, and residents that had an ACT due to the six qualifying conditions, FY 2016–FY 2017

Characteristic	Number of residents	Percent of sample
Analytic sample		
Eligible in FY 2016 and FY 2017	580,680	100.0%
High-cost		
In FY 2016, total	56,333	9.7%
In FY 2016 only	32,536	5.6%
In FY 2017, total	71,669	12.3%
In FY 2017 only	47,872	8.2%
In both FY 2016 and FY 2017	23,797	4.1%
Not high-cost in either FY 2016 or FY 2017	476,475	82.1%
ACTs due to six target conditions		
In FY 2016, total	59,324	10.2%
In FY 2016 only	43,044	7.4%
In FY 2017, total	77,354	13.4%
In FY 2017 only	61,254	10.6%
In both FY 2016 and FY 2017	16,280	2.8%
No ACT in either FY 2016 or FY 2017	460,102	79.2%

ACT = acute care transition; FY = fiscal year.
SOURCE: RTI analysis of Medicare claims.
NOTES: "High-cost" refers to beneficiaries whose total Medicare spending fell in the top 10 percent across all beneficiaries in the sample. The high-cost "total" counts and percentages for each year are the sum of those who were high-cost only in that year and those who were high-cost in both years. The analogous is true of the rows pertaining to counts and percentages of ACTs due to the six target conditions in each year.

Table M-2.   Cross-tabulation of Initiative-eligible residents by high-cost status and ACTs due to the six qualifying conditions, FY 2016–FY 2017

HC Status	ACT in FY 2016 only		ACT in FY 2017 only		ACT in both FY 2016 and FY 2017		No ACT in either FY 2016 or FY 2017		Total
HC in FY 2016 only	9,453	*29.1%*	2,295	*7.1%*	2,685	*8.3%*	18,103	*55.6%*	32,536
	22.0%		3.7%		16.5%		3.9%		5.6%
HC in FY 2017 only	2,460	*5.1%*	15,723	*32.8%*	3,111	*6.5%*	26,578	*55.5%*	47,872
	5.7%		25.7%		19.1%		5.8%		8.2%
HC in both FY 2016 and FY 2017	3,786	*15.9%*	4,272	*18.0%*	3,783	*15.9%*	11,956	*50.2%*	23,797
	8.8%		7.0%		23.2%		2.6%		4.1%
Not HC in either FY 2016 or FY 2017	27,345	*5.7%*	38,964	*8.2%*	6,701	*1.4%*	403,465	*84.7%*	476,475
	63.5%		63.6%		41.2%		87.7%		82.1%
Total	43,044	*7.4%*	61,254	*10.5%*	16,280	*2.8%*	460,102	*79.2%*	580,680

ACT = acute care transition; FY = fiscal year; HC = high-cost.
SOURCE: RTI analysis of Medicare claims.
NOTES: Row percentages are italicized in the cells to the right of their respective Ns, and column percentages are in the cells beneath their respective Ns.

Figure M-1. Percentage of residents who had ACTs for the six conditions by their high-cost status
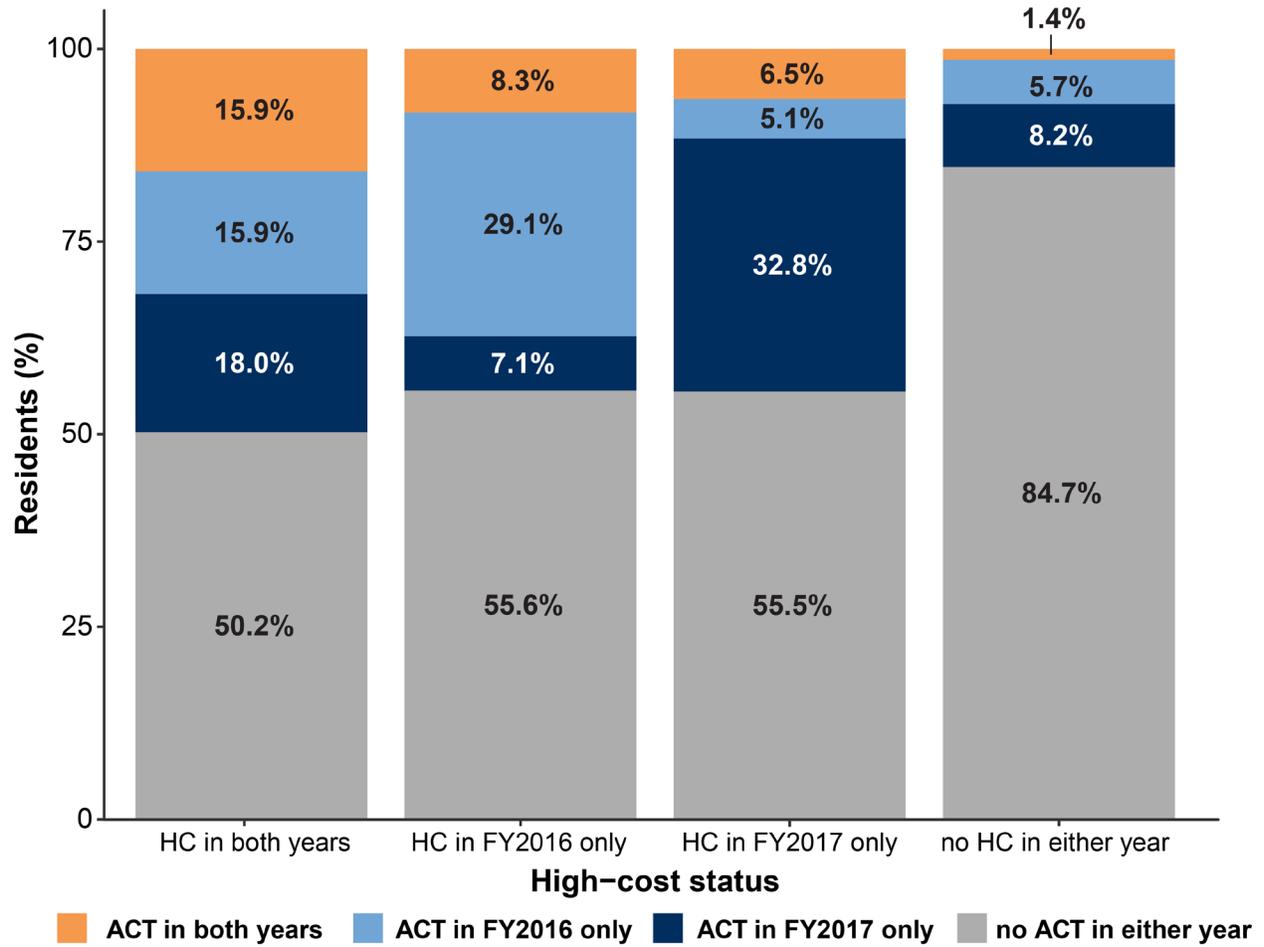
ACT = acute care transition.

SOURCE: RTI analysis of Medicare claims.

Figure M-2. Percentage of residents who are high-cost by ACT for the six conditions status
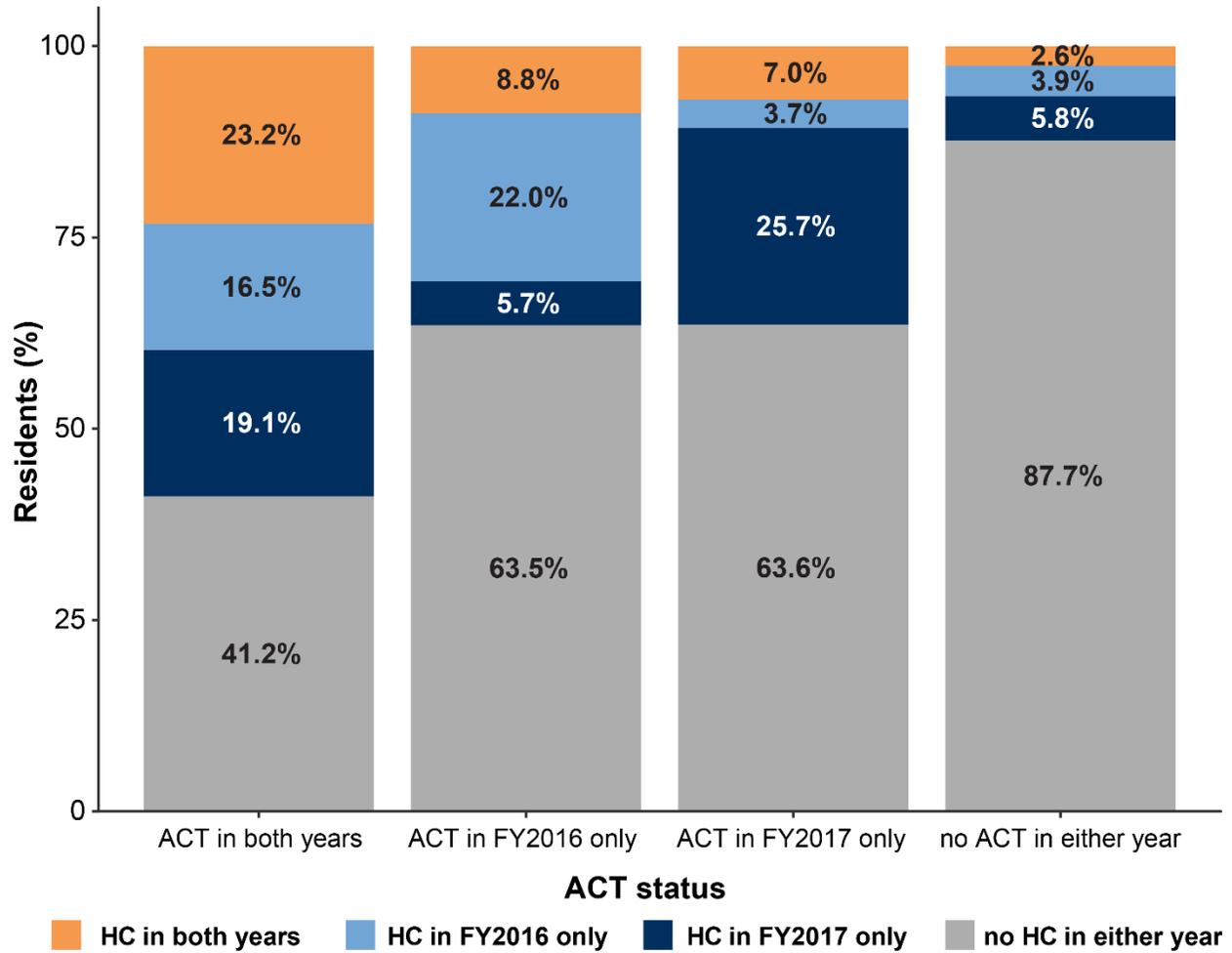
ACT = acute care transition.

SOURCE: RTI analysis of Medicare claims.

Figure M-3. Percentage of residents who are high-cost by all-cause ACT status
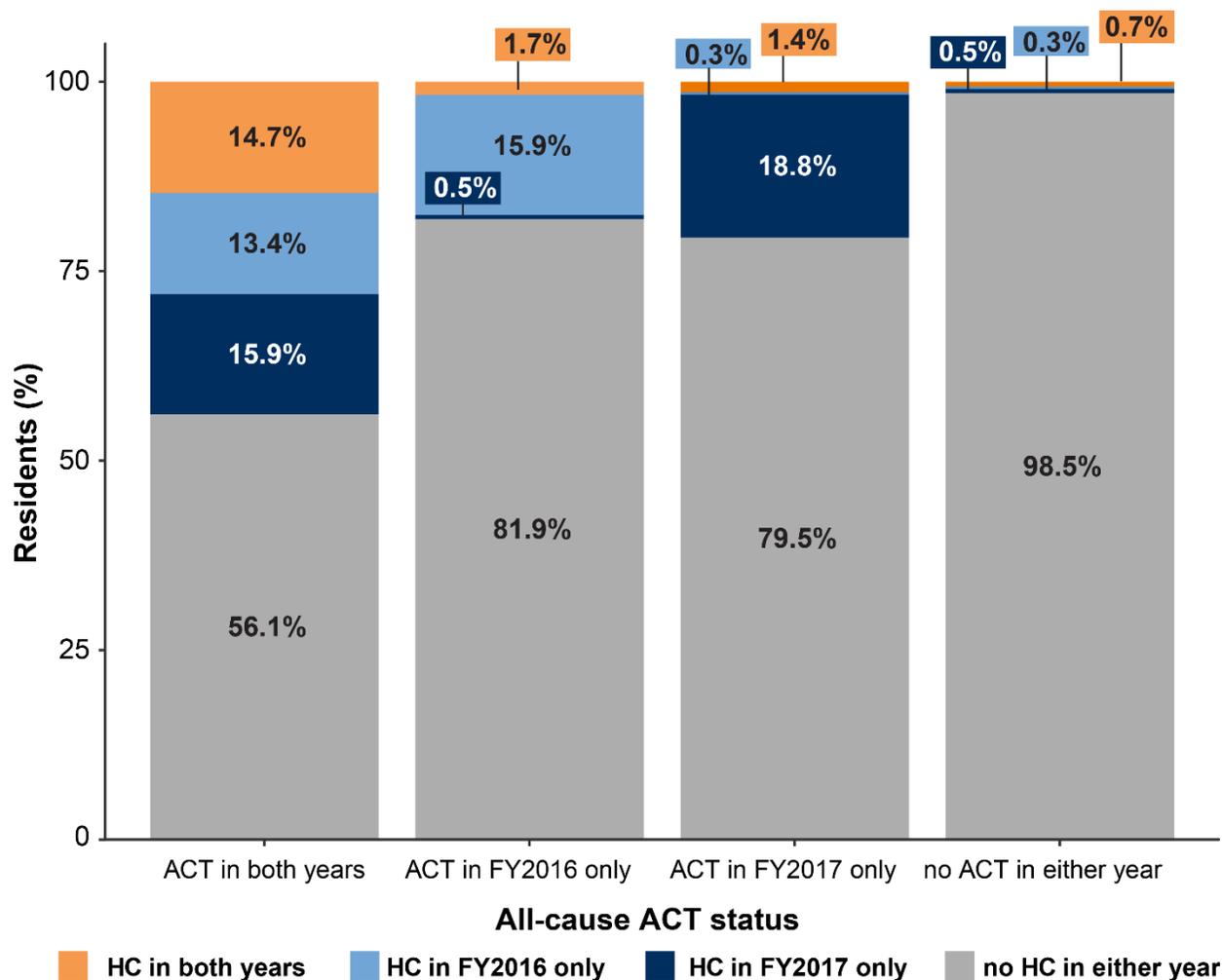
ACT = acute care transition; HC = high cost.
SOURCE: RTI analysis of Medicare claims.

Medicare spending tends to be concentrated among a relatively small group of beneficiaries, sometimes referred to as high-cost beneficiaries. Researchers and policymakers have paid attention to the health care delivered to high-cost beneficiaries, especially those who are persistently high-cost (high-cost for more than one year), because substantial Medicare savings might be generated from focusing on identifying and addressing their clinical needs (Hayes et al., 2016). The present study, which identified high-cost NF residents as those whose total Medicare expenditures fell in the top 10 percent across all residents, attempts to characterize the extent to which this concentration of Medicare spending exists in the specific analytic sample of NFI 2.

Given the focus of NFI 2 on hospitalizations for the six conditions, we conducted an analysis to explore the degree of overlap between high (Medicare) cost NF residents and residents with hospitalizations for the six qualifying conditions. We were especially interested in those who were persistently high-cost, which we defined as being high-cost for two consecutive years.

We began by restricting our sample to those beneficiaries who were Initiative-eligible in FY 2016 (N = 903,562). Beneficiaries in this sample were classified as high-cost in FY 2016 or FY 2017 if their adjusted total Medicare expenditures in that year were in the top 10 percent—that is, if their adjusted total Medicare expenditures were at or above the 90th percentile of expenditures across all beneficiaries in the sample in FY 2016. To account for geographic variability in Medicare spending, and for greater comparability across beneficiaries, we divided each beneficiary's gross Medicare expenditures in each year by their respective county's average geographic adjustment (AGA) in that year. AGA is a county-level index calculated from a weighted average of the prior five years' original Medicare claims data among beneficiaries in each county (Morgan, 2017).

We then restricted the sample to only those beneficiaries who were Initiative-eligible in both FY 2016 and FY 2017, generating a final analytic sample of 580,680 beneficiaries. Of these, 56,333 (9.7 percent) were high-cost in FY 2016, and 71,669 (12.3 percent) were high-cost in FY 2017.[22] There were 23,797 beneficiaries (4.1 percent of our final sample) who were high-cost in both FY 2016 and FY 2017, while 476,475 beneficiaries (82.1 percent) were not high-cost in either year (**Table M-1**).

Our analysis confirmed that high-cost beneficiaries accounted for a disproportionately large share of total Medicare expenditures for Initiative-eligible NF residents. In FY 2016, among all Initiative-eligible residents, the Medicare expenditures of high-cost residents (10 percent of the population) accounted for 43.2 percent of total Medicare payments. We also confirmed that both being high-cost and having hospitalizations for the six qualifying conditions were often persistent issues. Among those in our sample, 42.2 percent of those who were high-cost in FY 2016 were also high-cost in FY 2017. And, while 10.2 percent of all beneficiaries in our sample had ACTs for the six qualifying conditions in FY 2016, 27.4 percent of these residents also had these events in FY 2017 (results not shown).

To understand the relationship between high-cost status and hospitalization for the six qualifying conditions, we cross-tabulated beneficiaries' high-cost status (in FY 2016 only, FY 2017 only, both FY 2016 and FY 2017, or neither year) by whether they had an ACT in FY 2016 only, FY 2017 only, both FY 2016 and FY 2017, or neither year due to the six qualifying conditions (see **Table M-2**).

Our analyses showed that high-cost NF residents were more likely than other residents to have ACTs for the six qualifying conditions. Of residents who were not high-cost in FY 2016, fewer than 10 percent had an ACT for any of the six qualifying conditions in FY 2016; meanwhile, more than

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[22] We note a discrepant number of high-cost beneficiaries in 2016 versus those in 2017, likely due to selection bias from our criterion that beneficiaries should be eligible in both FY 2016 and FY 2017. The sample may include beneficiaries who were newly eligible in FY 2016 (and not previously eligible in FY 2015) but by design cannot include those newly eligible in FY 2017; that is, our FY 2017 sample contains only residents who were previously eligible in FY 2016. Given that newly eligible residents tend to be healthier (and thus have lower costs) than previously eligible residents, then, the presence of some newly eligible residents in FY 2016, combined with the total absence of newly eligible residents in FY 2017, explains the differential counts and percentages of high-cost beneficiaries in FY 2016 versus FY 2017.

30 percent of those who were high-cost in FY 2016 had an ACT for the six qualifying conditions in FY 2016. Moreover, among persistently high-cost residents, 49.8 percent had ACTs for the six conditions in at least one of the two years (**Table M-2** and **Figure M-1**).

Our results also showed that residents with ACTs for the six qualifying conditions were much more likely to be high-cost. Of residents that had no ACTs for the six qualifying conditions in FY 2016 or FY 2017, about 12.3 percent were high-cost in at least one of the two years (**Figure M-2**). However, of residents with ACTs for the six qualifying conditions in at least one of the years, 39 percent were high-cost in at least one of the years; and of those who persistently had ACTs for the six qualifying conditions (in both years), roughly 58.8 percent were high-cost in at least one of the years, with 23.2 percent having high costs in both years (**Table M-2** and **Figure M-2**).

Importantly, we found that having an ACT for one of the six qualifying conditions is a stronger predictor of having high costs than simply having an all-cause ACT. For example, while 58.8 percent of those with an ACT for the six conditions in both years was high-cost in at least one of the two years (**Figure M-2**), the corresponding percentage for residents with an all-cause ACT in both years was 43.9 percent (**Figure M-3**).

Our results show there is substantial overlap between high-cost residents and residents with ACTs for the six qualifying conditions. This overlap suggests the possibility for alignment between efforts that aim to reduce ACTs for the six qualifying conditions with efforts to address the needs of high-cost NF residents.

APPENDIX N
MEDICAID DATA CONSTRUCTION AND ANALYSIS, FY 2016–FY 2018

N.1   Overview

This Medicaid data analysis examines Medicaid expenditures from FY 2016 through FY 2018 among Initiative-eligible residents and the within-state reference group (WSRG). In this appendix, we present information on state policies, details of data quality, our complete methodology, and additional results. The appendix is organized as follows:

- *Appendix Section N.2* describes state-level bed hold policies in detail.

- *Appendix Section N.3* provides a detailed description of the Medicaid data and our assessment of data quality.

- *Appendix Section N.4* describes our process of selecting the relevant sample for analysis.

- *Appendix Section N.5* provides our methodology for calculating Medicaid expenditures.

- *Appendix Section N.6* presents additional results on expenditures for long-term care and potentially avoidable acute care transitions (ACTs).

- *Appendix Section N.7* presents complete data on Medicaid expenditures by spending category for each ECCP state.

N.2   State Bed Hold Policies

Table N-1 provides detailed descriptions of each ECCP state's policy regarding bed hold payments.

Table N-1.   State Medicaid per diem, bed-hold policies, and implications on Medicaid expenditures

State (ECCP)	Mean state Medicaid per diem[1]	Bed-hold policy for medical leave (hospital)[2,3]	Implications for Medicaid expenditures if there are changes in hospitalization rates
Alabama (AQAF)	Average of $213.21/day	4 days/visit.	Avoided hospital stays (of 4 days or less) would not change Medicaid expenditures. Medicaid continues to pay for bed if the resident remains in the nursing facility. With hospitalization, bed hold policy would continue to pay for bed.
Colorado (ATOP2)	$231.39/day	Medicaid does not pay bed hold for medical leave.	Avoided hospitalizations would increase Medicaid expenditures due to increase in nursing facility days. No offset without bed hold policy.
Nevada (ATOP2)	$274.27/day	Medicaid does not pay bed hold for medical leave.	Avoided hospitalizations would increase Medicaid expenditures due to increase in nursing facility days. No offset without bed hold policy.

(continued)

Table N-1.   State Medicaid per diem expenditures, bed-hold policies, and implications on Medicaid expenditures (continued)

State (ECCP)	Mean state Medicaid per diem[1]	Bed-hold policy for medical leave (hospital)[2,3]	Implications for Medicaid expenditures if there are changes in hospitalization rates
Missouri (MOQI)	Average of $163.03/day	3 days/visit; facilities must have had occupancy rate at or above 97% of Medicaid beds for the previous quarter.	Avoided hospital stays (of 3 days or less) would not change Medicaid expenditures. Medicaid continues to pay for bed if the resident remains in the nursing facility. With hospitalization, bed hold policy would continue to pay for bed.
New York (NY-RAH)	Average of $295.32/day	14 days/year; subject to per diem rate adjustment each year; no distinction is made between hospital days and non-medical days. Facilities must have a 95% or greater census upon resident hospitalization.[4]	Avoided hospital stays (up to 14 days a year) would not change Medicaid expenditures. Medicaid continues to pay for bed if the resident remains in the nursing facility. With hospitalization, bed hold policy would continue to pay for bed.
Indiana (OPTIMISTIC)	Average of $219.44/day	Medicaid does not pay bed hold for medical leave.	Avoided hospitalizations would increase Medicaid expenditures due to increase in nursing facility days. No offset without bed hold policy.
Pennsylvania (RAVEN)	Average of $204.51/day	15 days/visit; expenditure rate is 1/3 of current per diem nursing facility rate if current occupancy rate is 85% or greater.	Avoided hospital stays (of 15 days or less) would not change Medicaid expenditures. Medicaid continues to pay for bed if the resident remains in the nursing facility. With hospitalization, bed hold policy would continue to pay for bed.

[1] Per Diem Sources—AL: Personal communication, Alabama Medicaid Agency, 6/30/2020; CO: AHCA (2017); NV: AHCA (2017); MO: MO Dept. of Social Services (2019); NY: NY Dept. of Health (2019); IN: Myers and Stauffer, LC (2020); PA: PA Dept. of Human Services (2020).

[2] Bed Hold Policy Sources—All states except MO: The National Long-Term Care Ombudsman Resource Center (2019).

[3] Bed Hold Policy for MO – Medicaid and CHIP Payment and Access Commission (2019).

[4] We are aware of the possible implementation of legislation to remove the New York bed hold policy for nursing facility residents not receiving hospice care and over the age of 21. This legislation is not in effect as of August 2021.

N.3   Detailed Description of Data and Data Quality

We used the FY 2016–FY 2018 transformed Medicaid statistical information system (T-MSIS) analytic files (TAF) from CMS's Chronic Conditions Warehouse in February 2021.[23] Medicaid is a state-administered program, and each state submits T-MSIS data files to CMS, which include enrollment, service utilization, and payment data. CMS, through a contractor, examined the quality of the data from each state, and classified the data in terms of level of concern, with labels of low concern, medium concern, high concern, or unusable.

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[23] The CCW updates TAF data periodically, and thus replication using future data extracts may produce different results.

In some cases, quality was not assessed or reported and was listed as unclassified.[24] For the seven Initiative states, data quality varied for enrollment benchmarking, claim completeness, and expenditures.

As shown in *Table N-2*, data for FY 2016–FY 2018 mostly have low quality concerns. The quality of the data does not seem to differ significantly over the three years. Comparing across states, the data for Alabama, Indiana, Nevada, and Pennsylvania are of higher quality than those of Missouri, New York, and Colorado, with the latter group having about twice as many quality concerns. The data categories with the most quality concerns are the enrollment benchmarking of dual-eligible residents and fee-for-service (FFS) expenditures. For the data on dual-eligible residents, Nevada, Colorado, New York, and Pennsylvania all have two or more years for which there is high concern, while the other states have low concerns. The FFS expenditure data show mixed quality concerns across the states. Most states have a combination of low, medium, or high concerns, except for Indiana and Pennsylvania, both of which have low concerns. The other data categories mostly have low and some medium data quality concerns. The only exception is Missouri for outpatient service use, which have high concerns. Long-term claim completeness and three data categories within service use (inpatient diagnosis code, inpatient, and inpatient admission date) have consistently low concerns across all states.

Overall, these reported quality findings suggest that the data quality is adequate to perform some analysis of Medicaid expenditures for long-term care residents in the states participating in the Initiative. The medium concerns with enrollment benchmarking are addressed by using the Minimum Data Set (MDS) and Medicare enrollment and claims data to identify Medicare-enrolled nursing home residents. Consequently, we do not rely on the Medicaid data to identify Medicare enrollment, limiting this issue as a concern for the analysis. Other limitations on the analysis file are described below.

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[24] There are numerous reasons why data quality cannot be assessed for specific measures. See https://www.medicaid.gov/dq-atlas/landing/resources for additional information.

Table N-2.   Data quality concerns among the Initiative states, FY 2016–FY 2018

Topic	Alabama	Missouri	Indiana	Nevada	Colorado	New York	Pennsylvania
2016							
Enrollment Benchmarking							
Medicaid beneficiaries	Low	Low	Medium	Low	Low	Low	Low
Dual-eligible beneficiaries	Low	Low	Low	Medium	High	High	High
Claim Completeness							
LT	Low	Low	Low	Low	Low	Low	Low
IP	Low	Low	Low	Low	Medium	Medium	Low
OT	Medium	Low	Low	Low	Medium	Low	Low
Expenditures							
FFS exp	Low	Medium	Low	Low	High	Medium	Low
Service Use							
Diagnosis code IP	Low	Low	Low	Low	Low	Low	Low
Type of service LT	Low	Medium	Low	Low	Low	Low	Low
Type of service IP	Low	Low	Low	Low	Low	Low	Low
Type of service OT	Low	High	Low	Low	Low	Low	Low
Admission date LT	Low	Low	Low	Low	Low	Low	Low
Admission date IP	Low	Low	Low	Low	Low	Low	Low
2017							
Enrollment Benchmarking							
Medicaid beneficiaries	Low	Low	Medium	Low	Low	Low	Low
Dual-eligible beneficiaries	Low	Low	Low	High	High	High	Medium
Claim Completeness							
LT	Low	Low	Low	Low	Low	Low	Low
IP	Low	Low	Low	Low	Medium	Low	Low
OT	Medium	Low	Low	Low	Medium	Low	Low
Expenditures							
FFS exp	Low	Medium	Low	Low	High	High	Low
Service Use							
Diagnosis code IP	Low	Low	Low	Low	Low	Low	Low
Type of service LT	Low	Medium	Low	Low	Low	Low	Low
Type of service IP	Low	Low	Low	Low	Low	Low	Low
Type of service OT	Low	High	Low	Low	Low	Low	Low
Admission date LT	Low	Low	Low	Low	Low	Low	Low
Admission date IP	Low	Low	Low	Low	Low	Low	Low

(continued)

Table N-2.   Data quality concerns among the Initiative states, FY 2016–FY 2018 (continued)

Topic	Alabama	Missouri	Indiana	Nevada	Colorado	New York	Pennsylvania
2018							
Enrollment Benchmarking							
Medicaid beneficiaries	Low	Low	Medium	Low	Low	Low	Low
Dual-eligible beneficiaries	Low	Low	Low	High	High	Medium	High
Claim Completeness							
LT	Low	Low	Low	Low	Low	Low	Low
IP	Low	Low	Low	Low	Medium	Low	Low
OT	Medium	Low	Low	Low	Medium	Low	Low
Expenditures							
FFS exp	Medium	Medium	Low	Medium	Medium	Low	Low
Service Use							
Diagnosis code IP	Low	Low	Low	Low	Low	Low	Low
Type of service LT	Low	Medium	Low	Low	Low	Low	Low
Type of service IP	Low	Low	Low	Low	Low	Low	Low
Type of service OT	Low	High	Low	Low	Low	Low	Low
Admission date LT	Low	Low	Low	Low	Low	Medium	Low
Admission date IP	Low	Low	Low	Low	Low	Low	Low

LT = long-term care claims; IP = inpatient claims; OT = other claims; FFS = fee-for service
SOURCE: The information was derived from https://www.medicaid.gov/dq-atlas/landing/topics/info.
NOTE: Data quality was assessed for Release 2 of 2016 data and Release 1 of 2017 and 2018 data.

N.4   Sample Selection

We began by identifying the sample. As shown in **Table N-3**, we started with Initiative-eligible and WSRG residents identified in the Medicare analysis (see **Appendix Section I.4–I.6**) for a detailed description of the sample). Thus, the sample for the Medicaid analysis was limited to the seven states in the Initiative, including residents of nursing facilities in the Initiative and nursing facility residents in the WSRG. We did not attempt to use the national comparison group due to the inherent complexities of using and validating Medicaid data across so many state programs. Assessing and addressing data quality issues across all states in the national comparison group would far exceed available resources, making such analysis impractical. Limiting the sample to the ECCP states also limits the impact of state-level policy differences including payment rate differences.

We then identified residents with dual status at any time in the year using the dual status reported by Medicare. We attempted to find a match for each of the dual status residents in the Medicaid Beneficiary Summary File using combinations of social security number, health insurance claim number, gender, and date of birth. During the matching process, we found a small number of dual

Initiative-eligible residents that matched to more than one person in the Medicaid Beneficiary Summary File, and we selected the best match only (with quality of match based on identifier, gender, and date of birth) so that we had one match per resident. **Table N-3** shows that we identified most residents in all states, ranging from 97.1 percent for Pennsylvania to 99.8 percent for Alabama.

After identifying a match, we searched for a long-term care claim during their exposure period (see **Appendix I** for a detailed description of how exposure periods were determined), excluding beneficiary data that were not from the assigned nursing home's state. When we restricted the match to individuals with at least one Medicaid long-term care claim during their exposure period in the assigned state, we found that the match rate for combined FY 2016–FY 2018 data ranged from 74.7 percent in Indiana to 94.5 percent for Alabama.[25]

In the final step of selecting the sample, we identified and excluded residents with comprehensive or long-term Medicaid managed care for one or more months because Medicaid payment data may not be complete in managed care encounter data. Overall, 7.8 percent (37,082) of all residents had comprehensive or long-term Medicaid managed care. Most states had very few residents in Medicaid managed care programs; the exception was New York, where we found that 22 percent of beneficiaries had Medicaid managed care. These findings are consistent with NY-RAH interviewees' reports that both Medicare and Medicaid managed care have been prevalent throughout the state, even prior to NFI 2.

Overall, our matched Medicaid sample includes between 60.8 percent (New York) and 94.4 percent (Alabama) of the original sample of Initiative-eligible residents who are also dual-eligible beneficiaries. The sample sizes in each state include residents in ECCP nursing facilities, as well as facilities in the WSRG.

Match rates did not exhibit a clear pattern over the three years. Match rates were stable in Alabama (94.3 percent to 94.7 percent), while match rates for Indiana declined from 80.8 percent in FY 2016 to 66.6 percent in FY 2018. Several states (Missouri, New York, and Pennsylvania) had match rates that increased from FY 2016 to FY 2017 but declined from FY 2017 to FY 2018. Finally, the match rate in Nevada declined between FY 2016 and FY 2017 (93.8 percent to 89.9 percent) but rebounded in FY 2018 to 93.4 percent.

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[25] Most people excluded in this step had Medicaid long-term claims outside the exposure period. However, given that the focus of this report is on Medicaid expenditures during the exposure period, we decided to exclude these individuals.

Table N-3.   Developing the sample for Medicaid expenditure analysis, FY 2016–FY 2018

State (ECCP in State)	Identified as Initiative Eligible & Dual	Matched to Medicaid		Matched to Medicaid & has Long-Term Care Claim During Initiative-Eligible Period		Matched, LTC Claim and Not Medicaid Managed Care	
		N	%	N	%	N	%
2016							
Alabama (AQOF)	15,595	15,565	99.8	14,724	94.4	14,724	94.4
Colorado (ATOP2)	6,172	6,045	97.9	5,640	91.4	5,460	88.5
Indiana (OPTIMISTIC)	26,084	25,840	99.1	21,064	80.8	21,063	80.8
Missouri (MOQI)	22,187	21,157	95.4	19,634	88.5	19,634	88.5
Nevada (ATOP2)	1,760	1,745	99.1	1,651	93.8	1,651	93.8
New York (NY-RAH)	51,235	48,161	94.0	37,418	73.0	31,154	60.8
Pennsylvania (RAVEN)	40,814	38,243	93.7	32,506	79.6	32,503	79.6
2017							
Alabama (AQOF)	14,752	14,727	99.8	13,973	94.7	13,973	94.7
Colorado (ATOP2)	5,981	5,911	98.8	5,450	91.1	5,450	91.1
Indiana (OPTIMISTIC)	25,469	25,331	99.5	19,432	76.3	19,422	76.3
Missouri (MOQI)	21,880	21,822	99.7	21,057	96.2	21,057	96.2
Nevada (ATOP2)	1,789	1,778	99.4	1,610	90.0	1,608	89.9
New York (NY-RAH)	49,056	48,870	99.6	43,311	88.3	31,464	64.1
Pennsylvania (RAVEN)	38,638	38,257	99.0	34,362	88.9	34,359	88.9
2018							
Alabama (AQOF)	12,151	12,115	99.7	11,452	94.3	11,452	94.3
Colorado (ATOP2)	5,883	5,772	98.1	5,407	91.9	5,407	91.9
Indiana (OPTIMISTIC)	24,759	24,507	99.0	16,489	66.6	16,485	66.6
Missouri (MOQI)	21,595	21,447	99.3	19,469	90.2	19,469	90.2
Nevada (ATOP2)	1,749	1,731	99.0	1,633	93.4	1,633	93.4
New York (NY-RAH)	48,054	47,726	99.3	41,322	86.0	27,363	56.9
Pennsylvania (RAVEN)	37,028	36,568	98.8	34,107	92.1	29,118	78.6
2016–2018 Combined							
Alabama (AQOF)	42,498	42,407	99.8	40,149	94.45	40,149	94.5
Colorado (ATOP2)	18,036	17,728	98.3	16,497	91.5	16,497	91.5
Indiana (OPTIMISTIC)	76,312	75,678	99.2	56,985	74.7	56,970	74.7
Missouri (MOQI)	65,662	64,426	98.1	60,160	91.6	60,160	91.6
Nevada (ATOP2)	5,298	5,254	99.2	4,894	92.4	4,892	92.3
New York (NY-RAH)	148,345	144,757	97.6	122,051	82.3	89,981	60.7
Pennsylvania (RAVEN)	116,480	113,068	97.1	100,975	86.7	95,980	82.4
TOTAL	472,631	463,318	98.0	401,711	85.0	364,629	77.2

SOURCE: RTI analysis of Medicaid TAF for FY 2016–FY 2018.

NOTE: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

N.5   Detailed Methodology

Our analyses of Medicaid payments included all payments made for any claim during an exposure period for Initiative-eligible residents. We identified the types of services and summed the payments for all claims within each exposure period. We excluded 1,208 residents from the sample who had negative values as payments. We calculated mean annualized Medicaid payment per beneficiary for all states combined and for each individual state by C+P, P-O, and WSRG groups. To calculate the annualized Medicaid expenditures, we determined the total Initiative exposure for each beneficiary by year and adjusted expenditures to represent an annual amount by dividing by the fraction of the year of exposure. Three states (Missouri, New York, and Pennsylvania) did not have TAF data available for the first three months of FY 2016 (October 2015–December 2015). Consequently, the exposure period was adjusted to exclude these three months, and annualized expenditures for Missouri, New York, and Pennsylvania were computed based on 9 months of data in FY 2016. In addition, some residents had very short exposure periods, potentially leading to extreme values when annualized. Thus, exposure periods less than 30 days were set to 30 days when annualizing expenditures.

We calculated total annualized expenditures and annualized expenditures per category in each year. For expenditures related to ACTs (e.g., hospitalizations, observation stays, emergency department [ED] visits), we calculated overall hospital expenditures (i.e., all-cause), as well as expenditures for potentially avoidable events based on ICD codes reported in the claims. The total Medicaid expenditures included long-term care, hospital, ED, observation stays, prescription, and other claims from the inpatient and outpatient files. For most services, other than long-term care, the Medicaid spending is related to the beneficiary cost share for a Medicare service.

N.6   Subcategories of Expenditures

In addition to the total Medicaid expenditures that we present in the main report, we also looked at long-term care expenditures and potentially avoidable ACTs. *Figure N-1* presents Medicaid long-term care expenditures, and *Figure N-2* presents Medicaid expenditures for potentially avoidable ACTs. Each of these figures presents expenditures from FY 2016 to FY 2018 by group for each ECCP state.

Focusing on long-term care expenditures, *Figure N-1* shows that the expenditure patterns are very similar to those exhibited by total Medicaid expenditures in Section II, Chapter 6. Examining the potentially avoidable ACTs shows that the impact of these expenditures on total Medicaid expenditures is extremely small in each state. *Figure N-2* shows widely varying patterns across the three years, but only over a range of around zero to $300 per beneficiary per year (PBPY).

Figure N-1. Medicaid long-term care expenditures, All ECCP states and by state, FY 2016–FY 2018
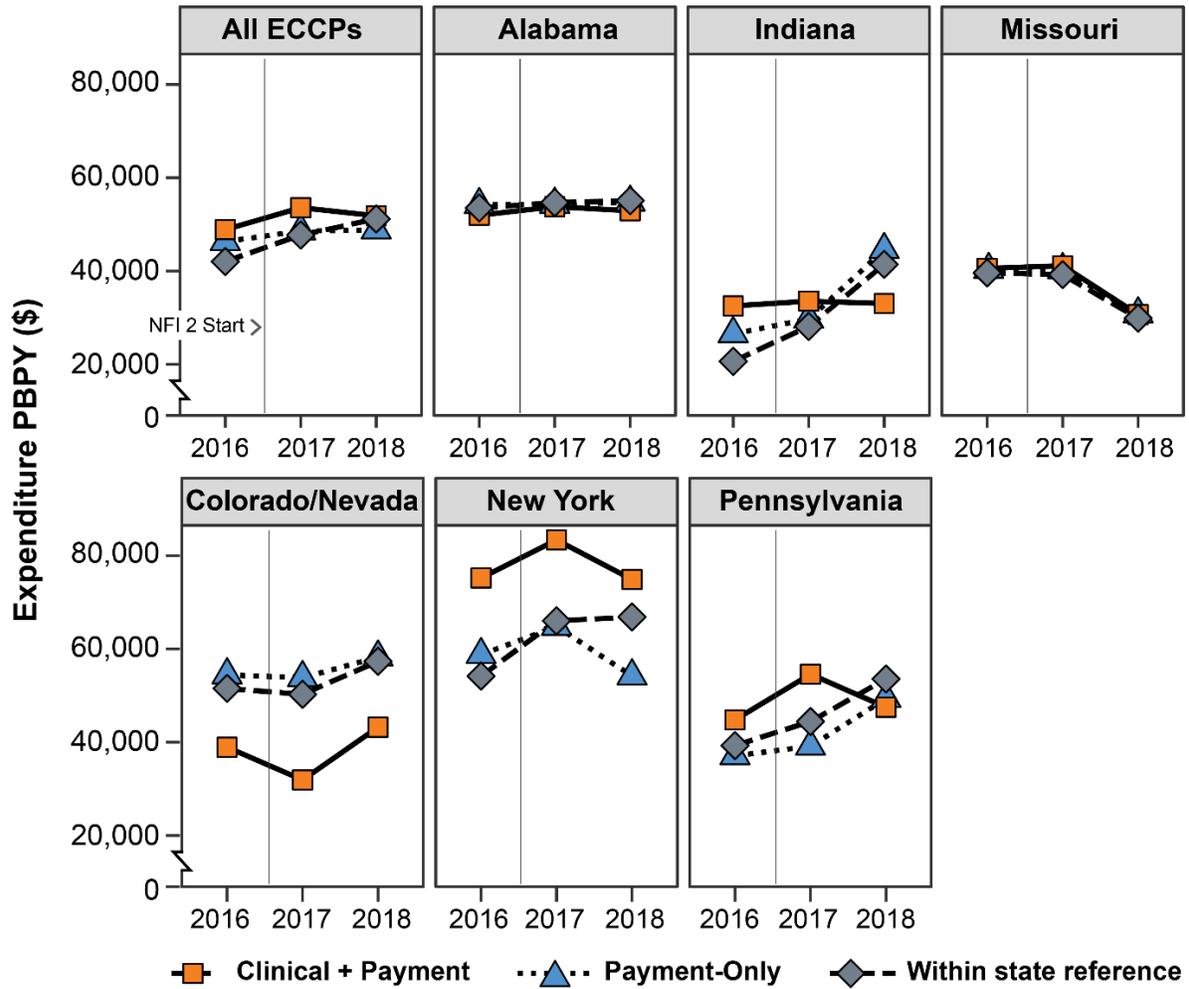
SOURCE: RTI analysis of Medicaid claims data.

Figure N-2   Medicaid expenditures for potentially avoidable ACTs, all ECCP states and by state, FY 2016–FY 2018
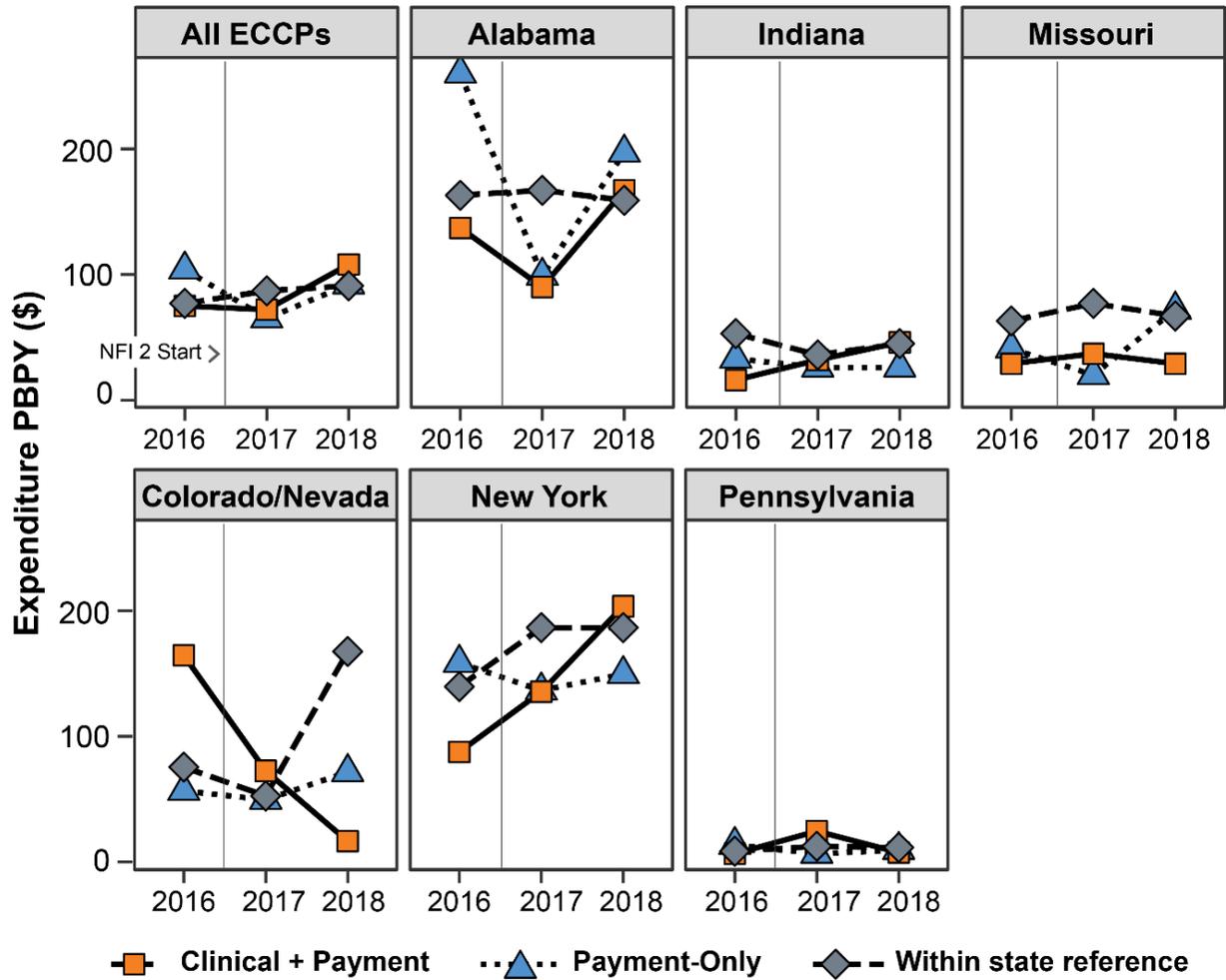
SOURCE: RTI analysis of Medicaid claims data.

N.7   Complete Expenditure Data by ECCP State

Tables N-4 through *N-9* present the complete data on average Medicaid expenditures PBPY by spending category for each of the ECCP states.

Table N-4. Medicaid expenditures by spending category for Alabama, FY 2016–FY 2018

Measure	Alabama								
	2016			**2017**			**2018**		
	Payment Only	**Clinical+ Payment**	**WSRG**	**Payment Only**	**Clinical+ Payment**	**WSRG**	**Payment Only**	**Clinical+ Payment**	**WSRG**
Number of Initiative-eligible residents	1,615	1,996	11,077	1,543	1,847	10,539	1,177	1,190	9,049
Exposure days, mean	282	281	282	281	274	279	270	250	274
Total Medicaid expenditures, dollars, mean (SD)	56,232 (13,167)	54,149 (13,928)	55,575 (13,321)	56,227 (13,582)	56,054 (13,946)	56,670 (13,819)	56,933 (13,554)	55,560 (14,466)	57,400 (14,145)
Medicaid expenditures excluding long-term care expenditures, mean (SD)	2,021 (7,047)	2,198 (5,651)	2,050 (5,161)	1,952 (5,833)	2,261 (5,812)	1,996 (6,004)	2,209 (5,575)	2,648 (6,638)	2,308 (6,000)
Long-term care Medicaid expenditures (only), mean (SD)	54,211 (12,738)	51,951 (13,955)	53,525 (13,390)	54,275 (13,561)	53,793 (13,831)	54,674 (13,750)	54,725 (13,935)	52,912 (14,698)	55,092 (14,184)
Acute care transition expenditures, dollars									
All-cause, mean (SD)	683 (5,197)	594 (3,104)	605 (2,555)	610 (3,413)	676 (3,389)	679 (4,417)	659 (2,241)	758 (2,848)	675 (2,728)
Potentially avoidable, mean (SD)	260 (4,797)	137 (1,070)	163 (1,219)	99 (610)	90 (535)	167 (1,238)	197 (1,535)	167 (1,104)	159 (1,079)

SOURCE: RTI analysis of Medicaid claims data.

Table N-5. Medicaid expenditures by spending category for Indiana, FY 2016–FY 2018

Measure	Indiana								
	2016			**2017**			**2018**		
	Payment Only	**Clinical+ Payment**	**WSRG**	**Payment Only**	**Clinical+ Payment**	**WSRG**	**Payment Only**	**Clinical+ Payment**	**WSRG**
Number of Initiative-eligible residents	1,498	1,397	17,944	1,453	1,269	16,401	1,126	574	14,517
Exposure days, mean	271	264	275	272	268	278	265	260	271
Total Medicaid expenditures, dollars, mean (SD)	28,751 (24,037)	34,821 (23,376)	22,881 (23,323)	31,345 (20,260)	35,469 (21,739)	29,979 (21,721)	47,047 (19,719)	35,527 (26,344)	43,799 (21,305)
Medicaid expenditures excluding long-term care expenditures, mean (SD)	2,196 (5,084)	2,310 (4,860)	2,265 (5,168)	1,707 (3,825)	1,937 (4,938)	1,881 (4,695)	2,472 (6,104)	2,492 (4,669)	2,383 (5,176)
Long-term care Medicaid expenditures (only), mean (SD)	26,555 (23,771)	32,511 (23,383)	20,616 (22,894)	29,639 (20,377)	33,532 (21,751)	28,098 (21,372)	44,575 (19,717)	33,035 (26,567)	41,416 (21,220)
Acute care transition expenditures, dollars									
All-cause, mean (SD)	88 (579)	51 (317)	128 (769)	46 (610)	58 (1,119)	89 (586)	73 (521)	104 (802)	124 (1,187)
Potentially avoidable, mean (SD)	33 (353)	16 (143)	53 (489)	26 (556)	32 (827)	36 (347)	26 (343)	46 (559)	45 (446)

SOURCE: RTI analysis of Medicaid claims data.

Table N-6.   Medicaid expenditures by spending category for Missouri, FY 2016–FY 2018

Measure	Missouri								
	2016			**2017**			**2018**		
	Payment Only	**Clinical+ Payment**	**WSRG**	**Payment Only**	**Clinical+ Payment**	**WSRG**	**Payment Only**	**Clinical+ Payment**	**WSRG**
Number of Initiative-eligible residents	1,468	1,149	16,955	1,506	1,194	18,277	1,295	1,086	16,790
Exposure days, mean	223	222	217	278	275	267	279	279	277
Total Medicaid expenditures, dollars, mean (SD)	42,839 (11,420)	43,030 (12,463)	42,495 (11,979)	42,795 (11,930)	43,981 (12,291)	42,429 (12,924)	33,820 (11,974)	34,275 (13,006)	33,283 (12,197)
Medicaid expenditures excluding long-term care expenditures, mean (SD)	2,526 (4,719)	2,467 (5,349)	2,898 (5,727)	2,527 (4,271)	2,854 (5,269)	3,211 (7,845)	3,056 (6,161)	3,606 (6,936)	3,415 (6,972)
Long-term care Medicaid expenditures (only), mean (SD)	40,312 (11,509)	40,563 (12,363)	39,597 (11,944)	40,268 (11,781)	41,126 (11,963)	39,217 (12,116)	30,765 (10,611)	30,669 (11,438)	29,868 (10,866)
Acute care transition expenditures, dollars									
All-cause, mean (SD)	145 (1,024)	95 (835)	172 (1,661)	88 (709)	106 (879)	259 (5,133)	239 (3,838)	87 (531)	226 (3,710)
Potentially avoidable, mean (SD)	41 (474)	29 (403)	63 (649)	20 (252)	37 (503)	77 (1,011)	72 (793)	29 (282)	67 (631)

SOURCE: RTI analysis of Medicaid claims data.

Table N-7. Medicaid expenditures by spending category for Colorado/Nevada, FY 2016–FY 2018

Measure	Colorado / Nevada								
	2016			2017			2018		
	Payment Only	Clinical+ Payment	WSRG	Payment Only	Clinical+ Payment	WSRG	Payment Only	Clinical+ Payment	WSRG
Number of Initiative-eligible residents	1,182	887	5,197	1,166	839	5,001	1,101	902	5,006
Exposure days, mean	266	273	259	261	281	260	265	270	261
Total Medicaid expenditures, dollars, mean (SD)	58,008 (17,008)	41,452 (37,107)	56,379 (23,523)	57,173 (16,961)	34,436 (31,255)	53,838 (22,656)	62,138 (16,304)	45,898 (39,338)	61,454 (25,428)
Medicaid expenditures excluding long-term care expenditures, mean (SD)	3,586 (5,630)	2,531 (6,000)	4,845 (10,391)	3,332 (5,587)	2,529 (5,794)	3,564 (7,874)	3,900 (6,875)	2,688 (10,454)	4,101 (7,562)
Long-term care Medicaid expenditures (only), mean (SD)	54,423 (16,924)	38,922 (36,647)	51,534 (22,808)	53,841 (16,952)	31,907 (30,468)	50,274 (22,000)	58,238 (16,170)	43,210 (37,708)	57,353 (24,888)
Acute care transition expenditures, dollars									
All-cause, mean (SD)	153 (1,005)	488 (3,799)	369 (6,005)	150 (922)	328 (3,220)	174 (1,232)	205 (857)	443 (9,504)	382 (2,996)
Potentially avoidable, mean (SD)	57 (555)	165 (2,636)	76 (672)	50 (505)	73 (1,126)	53 (495)	72 (559)	17 (267)	168 (2,383)

SOURCE: RTI analysis of Medicaid claims data.

NOTE: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado.

Table N-8.   Medicaid expenditures by spending category for New York, FY 2016–FY 2018

| Measure | New York | | | | | | | | |
| | 2016 | | | 2017 | | | 2018 | | |
	Payment Only	Clinical+ Payment	WSRG	Payment Only	Clinical+ Payment	WSRG	Payment Only	Clinical+ Payment	WSRG
Number of Initiative-eligible residents	2,213	1,521	27,044	2,312	1,905	26,937	1,827	1,817	23,445
Exposure days, mean	228	222	228	282	259	270	274	256	262
Total Medicaid expenditures, dollars, mean (SD)	60,367 (32,025)	77,014 (42,475)	56,072 (33,691)	66,674 (29,873)	85,651 (36,826)	68,198 (30,239)	56,441 (31,124)	77,655 (40,160)	69,339 (33,536)
Medicaid expenditures excluding long-term care expenditures, mean (SD)	1,603 (3,875)	1,795 (5,348)	1,893 (6,351)	1,856 (7,939)	2,266 (6,874)	2,163 (7,619)	2,235 (10,556)	2,741 (10,986)	2,475 (14,794)
Long-term care Medicaid expenditures (only), mean (SD)	58,764 (32,008)	75,218 (42,474)	54,180 (33,200)	64,818 (29,114)	83,385 (36,768)	66,035 (29,537)	54,206 (29,005)	74,914 (38,748)	66,864 (30,814)
Acute care transition expenditures, dollars									
All-cause, mean (SD)	429 (1,692)	397 (1,846)	531 (4,417)	617 (6,718)	699 (4,593)	677 (5,852)	842 (9,107)	889 (9,257)	740 (13,328)
Potentially avoidable, mean (SD)	159 (1,013)	88 (506)	140 (1,142)	137 (835)	136 (782)	187 (1,773)	150 (975)	204 (3,661)	187 (3,885)

SOURCE: RTI analysis of Medicaid claims data.

Table N-9. Medicaid expenditures by spending category for Pennsylvania, FY 2016–FY 2018

Measure	Pennsylvania								
	2016			2017			2018		
	Payment Only	Clinical+ Payment	WSRG	Payment Only	Clinical+ Payment	WSRG	Payment Only	Clinical+ Payment	WSRG
Number of Initiative-eligible residents	1,256	1,231	29,655	1,323	1,317	31,286	1,320	382	27,135
Exposure days, mean	230	237	232	286	290	288	275	237	274
Total Medicaid expenditures, dollars, mean (SD)	38,097 (14,710)	45,477 (16,193)	40,090 (18,885)	40,074 (15,369)	55,333 (21,806)	45,216 (20,158)	50,395 (16,509)	48,628 (19,086)	54,487 (21,706)
Medicaid expenditures excluding long-term care expenditures, mean (SD)	1,017 (5,428)	679 (2,228)	810 (5,379)	949 (4,753)	750 (3,208)	779 (4,666)	1,047 (6,972)	1,137 (5,990)	924 (6,113)
Long-term care Medicaid expenditures (only), mean (SD)	37,080 (13,810)	44,798 (16,053)	39,280 (18,073)	39,125 (14,537)	54,583 (21,773)	44,437 (19,707)	49,348 (15,729)	47,491 (19,058)	53,563 (21,246)
Acute care transition expenditures, dollars									
All-cause, mean (SD)	51 (589)	43 (531)	33 (551)	46 (509)	64 (689)	56 (1,847)	32 (332)	39 (374)	47 (866)
Potentially avoidable, mean (SD)	14 (223)	7 (93)	9 (203)	7 (87)	25 (420)	13 (557)	10 (147)	8 (91)	12 (332)

SOURCE: RTI analysis of Medicaid claims data.

APPENDIX O
DESCRIPTIVE ANALYSIS OF UTILIZATION (PERCENTAGE)

In this appendix, we present summary results from a descriptive analysis of utilization measures, reporting the annual percentage of residents who were hospitalized, visited the emergency department, or experienced any of these acute care transitions, for all-cause, potentially avoidable, and the six qualifying conditions aggregated and separately. ***Table O-1*** presents the results from the national comparison group. ***Tables O-2*** through ***O-16*** present the results by intervention group (Clinical + Payment and Payment-Only), combined across all ECCPs, and then separately for each ECCP.

Table O-1.   National comparison group: Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	National comparison group				
	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	772,196	769,878	728,716	683,120	666,154
Mean exposure (days)	249.0	244.9	246.9	241.8	245.6
Any hospitalization (all-cause)	30.8	30.2	29.4	30.2	29.4
Any potentially avoidable hospitalization	16.9	16.2	15.0	15.0	14.3
Any potentially avoidable hospitalization (all six qualifying conditions)	11.3	10.7	9.6	9.5	9.0
Any hospitalization (pneumonia)	5.3	5.1	4.4	4.3	3.8
Any hospitalization (CHF)	1.9	1.8	1.8	1.8	1.7
Any hospitalization (COPD/asthma)	1.2	1.1	0.9	0.9	0.8
Any hospitalization (skin infection)	0.8	0.8	0.7	0.7	0.6
Any hospitalization (dehydration)	0.4	0.3	0.3	0.3	0.4
Any hospitalization (UTI)	2.9	2.6	2.4	2.4	2.3
Any ED visit (all-cause)	25.8	25.3	25.4	26.3	26.5
Any potentially avoidable ED visit	14.8	14.5	14.4	15.1	15.1
Any potentially avoidable ED visit (all six qualifying conditions)	5.1	5.1	4.9	5.3	5.2
Any ED visit (pneumonia)	1.1	1.1	1.0	1.1	1.0
Any ED visit (CHF)	0.5	0.5	0.5	0.5	0.5
Any ED visit (COPD/asthma)	0.6	0.6	0.6	0.6	0.6
Any ED visit (skin infection)	0.5	0.5	0.5	0.5	0.4
Any ED visit (dehydration)	0.5	0.5	0.5	0.5	0.5
Any ED visit (UTI)	2.3	2.2	2.2	2.5	2.5
Any acute care transition (all-cause)	44.2	43.5	42.8	43.9	43.4
Any potentially avoidable acute care transition	27.0	26.2	25.2	25.6	25.2
Any potentially avoidable acute care transition (all six qualifying conditions)	14.7	14.1	13.0	13.2	12.6
Any acute care transition (pneumonia)	5.9	5.7	4.9	5.0	4.4
Any acute care transition (CHF)	2.2	2.1	2.1	2.1	2.1
Any acute care transition (COPD/asthma)	1.7	1.6	1.4	1.4	1.3
Any acute care transition (skin infection)	1.3	1.2	1.1	1.1	0.9
Any acute care transition (dehydration)	0.9	0.8	0.8	0.7	1.0
Any acute care transition (UTI)	4.9	4.5	4.4	4.5	4.6

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-2.   National comparison group: Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	National comparison group			
	2017	2018	2019	2020
Number of residents meeting eligibility criteria	646,925	625,193	592,937	575,273
Mean exposure (days)	242.9	242.5	244.2	243.0
Any hospitalization (all-cause)	30.0	30.4	30.1	32.1
Any potentially avoidable hospitalization	14.4	14.4	14.1	13.0
Any potentially avoidable hospitalization (all six qualifying conditions)	9.0	8.9	8.6	7.6
Any hospitalization (pneumonia)	3.2	3.6	3.4	3.0
Any hospitalization (CHF)	1.9	2.0	2.0	1.7
Any hospitalization (COPD/asthma)	1.3	0.9	0.8	0.6
Any hospitalization (skin infection)	0.6	0.6	0.5	0.5
Any hospitalization (dehydration)	0.4	0.4	0.4	0.5
Any hospitalization (UTI)	2.2	2.2	2.2	1.9
Any ED visit (all-cause)	26.7	27.4	27.5	26.0
Any potentially avoidable ED visit	15.2	15.4	15.5	13.9
Any potentially avoidable ED visit (all six qualifying conditions)	5.4	5.5	5.5	4.8
Any ED visit (pneumonia)	1.0	1.1	1.0	0.9
Any ED visit (CHF)	0.6	0.6	0.6	0.5
Any ED visit (COPD/asthma)	0.6	0.6	0.6	0.5
Any ED visit (skin infection)	0.4	0.4	0.4	0.3
Any ED visit (dehydration)	0.6	0.5	0.5	0.5
Any ED visit (UTI)	2.6	2.7	2.7	2.4
Any acute care transition (all-cause)	43.9	44.5	44.4	45.0
Any potentially avoidable acute care transition	25.2	25.4	25.3	23.2
Any potentially avoidable acute care transition (all six qualifying conditions)	12.8	12.8	12.5	11.1
Any acute care transition (pneumonia)	3.9	4.3	4.0	3.6
Any acute care transition (CHF)	2.3	2.3	2.4	2.1
Any acute care transition (COPD/asthma)	1.8	1.4	1.3	1.0
Any acute care transition (skin infection)	0.9	0.9	0.9	0.8
Any acute care transition (dehydration)	1.0	1.0	0.9	0.9
Any acute care transition (UTI)	4.6	4.5	4.6	4.0

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-3. All ECCPs (all states): Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	13,403	13,090	12,581	12,346	11,787	15,123	14,706	14,504	14,187	13,695
Mean exposure (days)	250.7	245.5	248.9	245.6	248.0	251.6	250.9	248.0	245.7	251.4
Any hospitalization (all-cause)	32.1	29.5	27.9	27.8	26.7	28.4	28.2	26.4	27.5	26.0
Any potentially avoidable hospitalization	16.6	14.2	12.6	12.1	11.1	14.8	14.1	13.0	13.0	11.8
Any potentially avoidable hospitalization (all six qualifying conditions)	10.4	8.8	7.2	6.7	6.1	9.8	9.0	7.9	8.1	7.0
Any hospitalization (pneumonia)	4.6	4.0	3.2	3.0	2.3	4.6	4.5	3.5	3.9	2.9
Any hospitalization (CHF)	1.7	1.6	1.4	1.3	1.2	1.8	1.6	1.8	1.7	1.6
Any hospitalization (COPD/asthma)	1.1	0.8	0.6	0.5	0.4	1.0	0.9	0.8	0.6	0.6
Any hospitalization (skin infection)	0.9	0.8	0.5	0.5	0.4	0.6	0.5	0.5	0.6	0.4
Any hospitalization (dehydration)	0.3	0.2	0.2	0.2	0.4	0.3	0.3	0.2	0.2	0.4
Any hospitalization (UTI)	2.7	2.1	1.8	1.7	1.6	2.3	1.9	1.7	1.7	1.5
Any ED visit (all-cause)	20.0	19.5	18.6	18.6	17.8	22.8	22.3	21.5	22.4	21.5
Any potentially avoidable ED visit	10.8	10.7	9.4	9.6	9.5	12.8	12.3	11.5	12.6	12.1
Any potentially avoidable ED visit (all six qualifying conditions)	2.6	2.8	2.3	2.3	2.4	3.8	3.7	3.5	3.8	3.6
Any ED visit (pneumonia)	0.3	0.4	0.4	0.3	0.3	0.7	0.6	0.6	0.7	0.6
Any ED visit (CHF)	0.2	0.3	0.2	0.3	0.2	0.4	0.4	0.3	0.3	0.4
Any ED visit (COPD/asthma)	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.4	0.4
Any ED visit (skin infection)	0.2	0.3	0.3	0.2	0.2	0.4	0.3	0.4	0.3	0.3
Any ED visit (dehydration)	0.3	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.4	0.3
Any ED visit (UTI)	1.4	1.5	1.2	1.2	1.3	1.7	1.8	1.6	1.7	1.8
Any acute care transition (all-cause)	42.5	40.1	37.9	38.0	36.5	40.9	40.2	38.1	39.9	38.2
Any potentially avoidable acute care transition	24.4	22.2	19.7	19.5	18.6	24.0	23.1	21.6	22.4	21.0
Any potentially avoidable acute care transition (all six qualifying conditions)	12.4	11.0	8.9	8.5	8.0	12.4	11.7	10.6	10.8	9.7

Table O-3. All ECCPs (all states): Utilization by service type, FY 2012–FY 2016 (continued)

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Any acute care transition (pneumonia)	4.8	4.3	3.5	3.2	2.5	5.1	4.9	3.9	4.3	3.4
Any acute care transition (CHF)	1.8	1.7	1.5	1.5	1.3	2.1	1.9	2.0	1.8	1.9
Any acute care transition (COPD/asthma)	1.4	1.0	0.7	0.7	0.7	1.3	1.3	1.2	1.0	1.0
Any acute care transition (skin infection)	1.1	1.0	0.8	0.7	0.6	0.9	0.8	0.8	0.9	0.7
Any acute care transition (dehydration)	0.6	0.5	0.3	0.4	0.6	0.7	0.6	0.6	0.6	0.7
Any acute care transition (UTI)	4.0	3.4	2.9	2.8	2.8	3.8	3.5	3.2	3.3	3.2

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-4. All ECCPs (all states): Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	11,494	10,622	10,151	10,086	13,100	11,986	11,078	10,807
Mean exposure (days)	244.1	238.3	240.0	233.9	247.3	244.9	246.8	237.4
Any hospitalization (all-cause)	26.7	27.0	26.1	29.5	24.7	26.2	26.1	26.2
Any potentially avoidable hospitalization	11.4	11.1	11.7	10.4	10.9	12.0	11.7	10.5
Any potentially avoidable hospitalization (all six qualifying conditions)	6.2	6.1	6.2	4.9	6.3	6.7	6.6	5.5
Any hospitalization (pneumonia)	2.1	2.3	2.4	1.8	2.1	2.7	2.6	2.1
Any hospitalization (CHF)	1.5	1.4	1.8	1.3	1.6	1.8	1.8	1.7
Any hospitalization (COPD/asthma)	0.8	0.5	0.5	0.3	0.9	0.6	0.5	0.3
Any hospitalization (skin infection)	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3
Any hospitalization (dehydration)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Any hospitalization (UTI)	1.5	1.5	1.4	1.1	1.4	1.4	1.5	1.1
Any ED visit (all-cause)	18.2	18.4	19.0	17.6	20.9	21.8	22.0	20.5
Any potentially avoidable ED visit	9.5	9.5	9.9	8.6	11.2	12.0	11.8	10.3
Any potentially avoidable ED visit (all six qualifying conditions)	2.2	2.1	2.4	2.2	3.2	3.5	3.7	3.1
Any ED visit (pneumonia)	0.4	0.4	0.3	0.2	0.5	0.5	0.5	0.5
Any ED visit (CHF)	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.3
Any ED visit (COPD/asthma)	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.3
Any ED visit (skin infection)	0.2	0.1	0.2	0.2	0.2	0.2	0.4	0.2
Any ED visit (dehydration)	0.2	0.1	0.1	0.2	0.3	0.4	0.3	0.3
Any ED visit (UTI)	1.2	1.1	1.4	1.2	1.5	1.8	1.9	1.7
Any acute care transition (all-cause)	36.9	36.9	36.5	38.4	36.9	38.3	38.2	37.2
Any potentially avoidable acute care transition	18.7	18.5	18.8	17.1	19.6	21.0	20.5	18.3
Any potentially avoidable acute care transition (all six qualifying conditions)	7.9	7.7	8.1	6.7	8.9	9.3	9.4	8.0
Any acute care transition (pneumonia)	2.4	2.6	2.6	2.0	2.4	3.1	3.0	2.4
Any acute care transition (CHF)	1.6	1.6	1.9	1.5	1.9	2.1	2.0	1.9
Any acute care transition (COPD/asthma)	1.0	0.7	0.7	0.4	1.2	0.8	0.9	0.6

(continued)

Table O-4.   All ECCPs (all states): Utilization by service type, FY 2014–FY 2019 (continued)

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	**2018**	**2019**	**2020**	**2017**	**2018**	**2019**	**2020**
Any acute care transition (skin infection)	0.5	0.5	0.5	0.5	0.5	0.6	0.8	0.5
Any acute care transition (dehydration)	0.5	0.5	0.4	0.4	0.6	0.7	0.6	0.5
Any acute care transition (UTI)	2.6	2.6	2.7	2.2	2.9	3.0	3.3	2.8

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-5.   AQAF (AL): Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	2,503	2,434	2,391	2,425	2,411	2,111	2,030	2,072	2,001	1,950
Mean exposure (days)	260.3	256.6	265.4	259.1	261.7	256.8	259.3	252.9	258.7	259.1
Any hospitalization (all-cause)	33.3	30.4	28.1	30.4	30.2	32.4	34.6	33.3	32.5	29.4
Any potentially avoidable hospitalization	18.4	16.6	14.3	15.3	13.5	17.7	18.7	18.4	16.6	13.6
Any potentially avoidable hospitalization (all six qualifying conditions)	11.8	10.4	8.7	8.8	7.3	12.6	12.7	12.1	10.9	8.6
Any hospitalization (pneumonia)	5.2	5.0	4.1	4.1	2.6	6.1	6.7	5.8	5.4	3.1
Any hospitalization (CHF)	1.8	2.0	1.7	2.0	1.3	2.1	1.7	2.6	1.8	1.8
Any hospitalization (COPD/asthma)	1.4	1.1	0.8	0.9	0.7	1.5	1.5	1.2	0.9	0.9
Any hospitalization (skin infection)	0.5	0.9	0.5	0.3	0.3	0.4	0.7	0.8	0.6	0.4
Any hospitalization (dehydration)	0.6	0.2	0.2	0.4	0.5	0.5	0.3	0.6	0.3	0.4
Any hospitalization (UTI)	3.2	2.0	2.1	1.7	2.3	3.2	2.8	2.6	2.6	2.3
Any ED visit (all-cause)	27.7	25.7	23.1	23.3	22.4	26.6	28.9	25.5	26.1	24.7
Any potentially avoidable ED visit	15.5	15.0	11.8	13.4	12.8	15.5	15.1	13.7	13.9	14.0
Any potentially avoidable ED visit (all six qualifying conditions)	4.6	4.0	3.2	3.9	4.0	4.7	3.7	3.9	3.9	4.3
Any ED visit (pneumonia)	0.6	0.6	0.4	0.4	0.5	0.7	0.3	0.2	0.5	0.5
Any ED visit (CHF)	0.6	0.5	0.4	0.7	0.4	0.6	0.3	0.5	0.4	0.6
Any ED visit (COPD/asthma)	0.6	0.2	0.2	0.4	0.4	0.5	0.5	0.8	0.3	0.7
Any ED visit (skin infection)	0.4	0.2	0.2	0.5	0.2	0.4	0.3	0.4	0.3	0.4
Any ED visit (dehydration)	0.4	0.2	0.1	0.4	0.5	0.5	0.3	0.5	0.3	0.2
Any ED visit (UTI)	2.4	2.3	1.9	1.8	2.1	2.6	2.1	1.5	2.1	2.3
Any acute care transition (all-cause)	47.5	44.0	40.9	42.4	41.6	46.5	49.4	45.9	47.0	43.0
Any potentially avoidable acute care transition	29.2	27.3	23.2	24.9	23.2	28.5	29.6	27.8	26.5	24.4
Any potentially avoidable acute care transition (all six qualifying conditions)	15.2	13.6	11.1	11.8	10.7	15.8	15.6	15.0	14.0	11.7

(continued)

Table O-5. AQAF (AL): Utilization by service type, FY 2012–FY 2016 (continued)

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Any acute care transition (pneumonia)	5.7	5.5	4.3	4.4	3.0	6.5	7.0	5.9	5.7	3.5
Any acute care transition (CHF)	2.1	2.3	1.9	2.7	1.6	2.7	1.9	2.9	2.0	2.3
Any acute care transition (COPD/asthma)	1.9	1.4	1.0	1.2	1.1	1.8	1.9	1.9	1.2	1.4
Any acute care transition (skin infection)	0.9	1.2	0.7	0.8	0.5	0.8	1.0	1.2	0.9	0.7
Any acute care transition (dehydration)	1.0	0.5	0.3	0.8	1.0	0.9	0.6	1.1	0.6	0.6
Any acute care transition (UTI)	5.4	4.1	3.8	3.3	4.1	5.5	4.7	4.0	4.6	4.4

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-6.   AQAF (AL): Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	2,218	1,532	1,355	1,255	1,814	1,403	1,070	984
Mean exposure (days)	253.3	225.5	237.4	237.0	257.5	251.1	245.5	256.0
Any hospitalization (all-cause)	29.4	29.5	31.3	34.9	28.4	28.7	29.0	32.9
Any potentially avoidable hospitalization	13.6	13.4	15.2	13.4	13.3	14.6	15.2	15.1
Any potentially avoidable hospitalization (all six qualifying conditions)	7.1	7.3	8.3	7.2	7.7	8.3	9.4	9.2
Any hospitalization (pneumonia)	2.4	2.9	3.5	2.7	2.8	3.1	3.9	3.2
Any hospitalization (CHF)	1.8	1.6	2.0	1.5	1.4	2.0	2.7	2.4
Any hospitalization (COPD/asthma)	1.0	0.5	0.9	0.4	1.4	1.0	0.9	0.8
Any hospitalization (skin infection)	0.3	0.2	0.2	0.2	0.4	0.4	0.4	0.4
Any hospitalization (dehydration)	0.5	0.5	0.3	0.6	0.2	0.4	0.4	0.7
Any hospitalization (UTI)	1.9	2.0	1.8	1.9	2.0	2.1	2.0	2.0
Any ED visit (all-cause)	21.6	22.0	22.8	24.2	23.5	24.7	27.2	26.7
Any potentially avoidable ED visit	11.8	13.2	13.3	11.8	12.2	13.3	15.9	16.5
Any potentially avoidable ED visit (all six qualifying conditions)	2.8	3.5	3.2	2.6	3.1	4.3	4.9	5.9
Any ED visit (pneumonia)	0.4	0.7	0.1	0.3	0.4	0.4	0.6	0.5
Any ED visit (CHF)	0.3	0.4	0.2	0.4	0.4	0.8	0.5	0.9
Any ED visit (COPD/asthma)	0.5	0.2	0.7	0.5	0.5	0.6	0.5	0.7
Any ED visit (skin infection)	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3
Any ED visit (dehydration)	0.3	0.3	0.4	0.4	0.2	0.6	0.4	0.6
Any ED visit (UTI)	1.4	1.9	1.7	1.1	1.5	2.1	3.1	3.0
Any acute care transition (all-cause)	40.3	40.9	42.7	46.2	41.6	40.7	43.6	45.7
Any potentially avoidable acute care transition	22.0	23.2	24.3	22.4	22.4	23.5	26.9	26.8
Any potentially avoidable acute care transition (all six qualifying conditions)	9.4	10.1	11.0	9.2	10.4	11.1	13.3	13.7
Any acute care transition (pneumonia)	2.8	3.5	3.6	3.0	3.1	3.4	4.5	3.6
Any acute care transition (CHF)	2.0	2.0	2.1	1.8	1.7	2.6	3.0	3.0
Any acute care transition (COPD/asthma)	1.4	0.6	1.5	0.9	1.9	1.4	1.3	1.3

(continued)

Table O-6.   AQAF (AL): Utilization by service type, FY 2017–FY 2020 (continued)

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Any acute care transition (skin infection)	0.4	0.3	0.4	0.2	0.5	0.6	0.7	0.6
Any acute care transition (dehydration)	0.8	0.8	0.7	1.0	0.3	1.0	0.7	1.3
Any acute care transition (UTI)	3.1	3.9	3.5	2.9	3.5	4.1	4.9	5.0

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-7.   ATOP2 (NV/CO): Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	Clinical + Payment (Nevada)					Payment-Only (Colorado)				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,150	1,170	1,142	1,118	1,058	1,872	1,805	1,786	1,722	1,645
Mean exposure (days)	229.3	226.5	228.2	238.5	248.1	238.0	242.8	245.0	230.8	240.8
Any hospitalization (all-cause)	28.7	27.9	28.0	29.7	29.8	20.6	18.9	17.8	18.4	18.4
Any potentially avoidable hospitalization	13.4	12.0	12.8	12.1	10.5	10.1	9.0	8.1	7.8	7.7
Any potentially avoidable hospitalization (all six qualifying conditions)	7.6	6.9	6.8	5.9	4.9	5.7	5.5	4.9	4.5	4.6
Any hospitalization (pneumonia)	3.6	2.8	3.4	3.2	1.9	2.6	2.6	2.2	2.2	2.2
Any hospitalization (CHF)	0.8	1.4	0.4	0.3	0.6	0.9	0.8	1.1	0.8	0.7
Any hospitalization (COPD/asthma)	1.1	0.6	0.4	0.2	0.4	0.4	0.6	0.6	0.5	0.1
Any hospitalization (skin infection)	0.7	0.7	0.6	0.3	0.7	0.4	0.4	0.4	0.4	0.3
Any hospitalization (dehydration)	0.2	0.4	—	0.2	0.1	0.1	0.1	0.1	0.1	0.6
Any hospitalization (UTI)	1.7	1.6	2.0	2.1	1.4	1.7	1.2	0.7	0.8	0.7
Any ED visit (all-cause)	15.8	17.2	17.1	20.5	16.9	18.2	21.2	19.9	20.7	21.5
Any potentially avoidable ED visit	8.3	8.3	9.5	10.8	8.7	10.6	11.9	10.9	12.1	12.0
Any potentially avoidable ED visit (all six qualifying conditions)	1.2	2.3	2.0	2.3	2.3	4.1	4.0	4.0	4.2	5.1
Any ED visit (pneumonia)	0.2	0.2	0.7	0.2	0.2	1.0	1.1	1.0	1.1	0.9
Any ED visit (CHF)	—	0.2	0.1	0.3	.	0.3	0.4	0.4	0.3	0.4
Any ED visit (COPD/asthma)	0.3	0.4	0.1	0.4	0.2	0.4	0.3	0.4	0.5	0.5
Any ED visit (skin infection)	0.2	0.3	0.2	0.2	0.3	0.6	0.5	0.7	0.7	0.5
Any ED visit (dehydration)	—	0.2	0.1	0.2	0.2	0.4	0.2	0.1	0.2	0.7
Any ED visit (UTI)	0.7	1.1	0.9	1.2	1.4	1.6	1.8	1.6	1.7	2.5
Any acute care transition (all-cause)	37.9	38.2	37.7	41.5	39.6	31.7	32.5	30.9	32.5	32.5
Any potentially avoidable acute care transition	19.8	18.6	19.5	21.1	17.7	17.7	18.3	17.0	17.9	17.7
Any potentially avoidable acute care transition (all six qualifying conditions)	8.4	8.5	8.4	7.7	6.9	8.4	8.5	8.2	7.9	8.8

(continued)

Table O-7.   ATOP2 (NV/CO): Utilization by service type, FY 2012–FY 2016 (continued)

(percentage of residents per year)

Event	Clinical + Payment (Nevada)					Payment-Only (Colorado)				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Any acute care transition (pneumonia)	3.7	3.0	3.9	3.4	2.0	3.2	3.4	2.9	2.9	2.9
Any acute care transition (CHF)	0.8	1.5	0.5	0.5	0.6	0.9	1.2	1.5	0.9	1.0
Any acute care transition (COPD/asthma)	1.3	0.9	0.5	0.6	0.6	0.8	0.8	0.9	0.9	0.7
Any acute care transition (skin infection)	0.9	0.9	0.8	0.4	0.9	0.9	0.8	1.1	1.0	0.9
Any acute care transition (dehydration)	0.2	0.6	0.1	0.4	0.3	0.4	0.2	0.2	0.3	1.2
Any acute care transition (UTI)	2.3	2.6	2.8	3.2	2.8	3.2	2.8	2.2	2.6	3.2

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-8. ATOP 2 (NV/CO): Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	Clinical + Payment (Nevada)				Payment-Only (Colorado)			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,082	1,093	1,049	1,057	1,601	1,506	1,379	1,292
Mean exposure (days)	243.5	246.9	250.8	260.7	235.5	237.9	246.8	241.5
Any hospitalization (all-cause)	26.8	29.4	27.6	32.1	18.4	19.0	20.4	19.0
Any potentially avoidable hospitalization	10.4	11.6	11.6	10.1	7.8	7.5	7.8	7.2
Any potentially avoidable hospitalization (all six qualifying conditions)	5.4	5.9	6.1	5.3	4.2	3.4	4.4	3.7
Any hospitalization (pneumonia)	2.1	2.8	2.7	2.9	1.8	1.3	1.7	1.9
Any hospitalization (CHF)	1.0	1.2	1.4	0.8	1.2	0.9	1.5	1.2
Any hospitalization (COPD/asthma)	0.6	0.5	0.7	0.1	0.6	0.3	0.1	0.1
Any hospitalization (skin infection)	0.3	0.5	0.3	0.8	0.1	0.3	0.3	0.2
Any hospitalization (dehydration)	0.3	0.3	0.5	0.3	0.2	0.1	0.1	0.1
Any hospitalization (UTI)	1.7	1.1	1.0	0.9	0.6	0.7	1.2	0.6
Any ED visit (all-cause)	20.9	19.9	20.9	19.4	20.5	21.2	22.1	22.1
Any potentially avoidable ED visit	10.9	9.8	10.3	9.0	10.6	11.5	12.3	11.1
Any potentially avoidable ED visit (all six qualifying conditions)	2.9	2.3	2.4	2.7	3.8	3.5	5.0	3.6
Any ED visit (pneumonia)	0.4	0.3	0.2	—	1.2	1.0	1.2	0.8
Any ED visit (CHF)	0.3	0.5	0.3	0.6	0.6	0.2	0.3	0.4
Any ED visit (COPD/asthma)	—	0.3	0.4	0.4	0.3	0.5	0.5	0.5
Any ED visit (skin infection)	0.3	0.3	0.1	0.3	0.3	0.3	0.9	0.5
Any ED visit (dehydration)	0.2	—	—	0.2	0.2	0.1	0.2	0.2
Any ED visit (UTI)	1.8	1.0	1.6	1.3	1.4	1.5	2.2	1.5
Any acute care transition (all-cause)	39.6	39.1	39.4	41.8	31.9	32.2	34.4	32.9
Any potentially avoidable acute care transition	19.0	19.3	18.8	16.9	16.3	17.0	17.6	16.0
Any potentially avoidable acute care transition (all six qualifying conditions)	7.5	7.7	8.1	7.1	7.3	6.4	8.2	6.7
Any acute care transition (pneumonia)	2.3	2.9	2.9	2.9	2.6	2.1	2.5	2.4
Any acute care transition (CHF)	1.3	1.6	1.7	1.1	1.7	1.1	1.5	1.4
Any acute care transition (COPD/asthma)	0.6	0.8	1.0	0.4	0.9	0.8	0.6	0.5

(continued)

Table O-8.   ATOP 2 (NV/CO): Utilization by service type, FY 2017–FY 2020 (continued)

(percentage of residents per year)

Event	Clinical + Payment (Nevada)				Payment-Only (Colorado)			
	2017	2018	2019	2020	2017	2018	2019	2020
Any acute care transition (skin infection)	0.6	0.7	0.4	0.9	0.3	0.6	1.0	0.6
Any acute care transition (dehydration)	0.5	0.3	0.5	0.5	0.4	0.3	0.4	0.3
Any acute care transition (UTI)	3.2	2.1	2.6	2.2	2.0	2.2	3.2	2.1

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-9.   MOQI (MO): Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,478	1,539	1,548	1,604	1,513	2,181	2,167	2,187	2,179	2,056
Mean exposure (days)	251.4	250.9	260.3	248.0	257.8	251.3	255.7	252.5	248.0	261.8
Any hospitalization (all-cause)	36.3	30.3	29.2	27.9	24.2	31.7	29.1	29.0	31.2	28.9
Any potentially avoidable hospitalization	20.8	15.1	13.2	13.6	10.8	17.7	17.0	15.1	16.2	14.6
Any potentially avoidable hospitalization (all six qualifying conditions)	15.0	9.7	7.4	7.7	6.6	12.1	11.1	9.0	10.2	9.0
Any hospitalization (pneumonia)	8.1	4.3	2.9	3.6	2.8	5.9	5.9	4.5	5.7	4.1
Any hospitalization (CHF)	1.8	1.9	1.7	2.1	1.9	2.5	2.2	1.8	1.9	2.0
Any hospitalization (COPD/asthma)	1.1	0.5	0.5	0.3	0.4	1.2	0.8	0.5	0.7	0.9
Any hospitalization (skin infection)	1.8	0.9	0.6	0.8	0.6	1.0	0.8	0.3	0.9	0.6
Any hospitalization (dehydration)	0.5	0.3	0.3	0.1	0.1	0.4	0.4	0.3	0.3	0.4
Any hospitalization (UTI)	3.4	2.5	1.7	1.3	1.3	2.4	1.8	2.1	1.5	2.0
Any ED visit (all-cause)	24.4	23.3	20.9	16.3	16.9	26.8	24.9	27.6	26.6	26.5
Any potentially avoidable ED visit	13.1	12.9	10.7	7.7	8.9	16.4	15.4	16.4	16.5	16.1
Any potentially avoidable ED visit (all six qualifying conditions)	4.1	3.2	2.0	1.7	1.9	5.2	5.2	5.5	5.3	4.7
Any ED visit (pneumonia)	0.3	0.5	0.3	0.4	0.3	1.3	0.8	1.1	1.1	1.0
Any ED visit (CHF)	0.3	0.2	0.1	—	—	0.6	0.9	0.5	0.5	0.6
Any ED visit (COPD/asthma)	0.4	0.2	0.3	0.2	0.2	0.6	0.7	1.0	0.8	0.5
Any ED visit (skin infection)	0.1	0.6	0.3	0.2	0.3	0.5	0.5	0.3	0.3	0.6
Any ED visit (dehydration)	0.5	0.4	0.1	0.2	0.3	0.6	0.5	0.5	0.6	0.4
Any ED visit (UTI)	2.4	1.3	1.2	0.8	0.9	1.8	2.3	2.6	2.4	2.1
Any acute care transition (all-cause)	47.4	43.1	40.6	36.8	34.0	45.1	42.5	44.1	45.3	42.9
Any potentially avoidable acute care transition	29.5	24.8	21.3	19.7	17.8	28.7	27.1	27.1	28.1	25.8
Any potentially avoidable acute care transition (all six qualifying conditions)	17.7	12.2	8.8	9.0	7.9	14.9	14.5	13.2	14.0	12.3

Table O-9.   MOQI (MO): Utilization by service type, FY 2012–FY 2016 (continued)

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Any acute care transition (pneumonia)	8.3	4.7	3.1	3.8	3.0	6.5	6.3	5.2	6.5	4.9
Any acute care transition (CHF)	2.1	2.1	1.8	2.1	1.9	2.8	3.0	2.1	2.1	2.4
Any acute care transition (COPD/asthma)	1.4	0.7	0.8	0.6	0.6	1.7	1.4	1.4	1.3	1.2
Any acute care transition (skin infection)	1.9	1.5	0.9	1.0	0.8	1.4	1.1	0.6	1.2	1.0
Any acute care transition (dehydration)	0.9	0.6	0.3	0.3	0.4	0.9	0.9	0.7	0.9	0.8
Any acute care transition (UTI)	5.4	3.7	2.7	2.1	2.2	3.9	3.8	4.4	3.7	3.8

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-10.   MOQI (MO): Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,442	1,357	1,308	1,183	1,928	1,790	1,628	1,481
Mean exposure (days)	254.6	249.3	253.7	254.3	259.2	250.3	250.3	253.0
Any hospitalization (all-cause)	25.9	27.2	24.3	28.8	29.2	30.1	30.8	31.1
Any potentially avoidable hospitalization	11.5	10.6	10.7	10.0	14.8	14.9	14.7	14.2
Any potentially avoidable hospitalization (all six qualifying conditions)	6.7	5.9	6.7	5.1	9.2	9.3	7.9	7.2
Any hospitalization (pneumonia)	2.1	1.9	2.3	1.8	3.0	4.0	2.5	2.4
Any hospitalization (CHF)	2.0	1.6	2.2	1.4	2.6	2.5	2.1	2.2
Any hospitalization (COPD/asthma)	0.5	0.7	0.3	0.3	1.0	0.6	1.0	0.3
Any hospitalization (skin infection)	0.6	0.3	0.6	0.7	0.5	0.7	0.5	0.7
Any hospitalization (dehydration)	0.3	0.4	0.2	0.3	0.3	0.3	0.4	0.7
Any hospitalization (UTI)	1.5	1.5	1.8	0.9	2.3	2.2	2.0	1.5
Any ED visit (all-cause)	17.4	17.7	17.4	17.8	27.3	28.2	27.4	28.0
Any potentially avoidable ED visit	9.0	8.5	9.5	8.6	17.0	16.4	15.2	15.5
Any potentially avoidable ED visit (all six qualifying conditions)	1.9	1.9	3.1	2.3	6.3	6.1	5.3	5.8
Any ED visit (pneumonia)	0.4	0.4	0.5	0.3	1.3	1.2	1.0	1.1
Any ED visit (CHF)	0.1	0.2	0.2	0.3	0.6	0.7	0.6	0.5
Any ED visit (COPD/asthma)	0.1	0.1	0.2	—	0.8	0.6	1.0	0.7
Any ED visit (skin infection)	0.2	0.1	0.2	0.3	0.2	0.4	0.4	0.2
Any ED visit (dehydration)	0.2	0.1	0.1	0.2	0.9	0.6	0.7	0.6
Any ED visit (UTI)	1.0	0.9	1.8	1.3	2.8	2.9	2.3	3.2
Any acute care transition (all-cause)	36.1	36.8	34.9	39.0	44.6	45.3	45.1	45.3
Any potentially avoidable acute care transition	18.3	17.5	17.8	17.2	27.6	26.6	25.6	25.3
Any potentially avoidable acute care transition (all six qualifying conditions)	8.0	7.4	9.4	7.0	14.1	13.0	11.6	11.6
Any acute care transition (pneumonia)	2.4	2.3	2.8	2.1	3.7	4.6	3.4	3.0
Any acute care transition (CHF)	2.1	1.7	2.4	1.5	3.1	3.0	2.6	2.4
Any acute care transition (COPD/asthma)	0.6	0.7	0.5	0.3	1.8	0.9	1.7	0.9

(continued)

Table O-10.   MOQI (MO): Utilization by service type, FY 2017–FY 2020 (continued)

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Any acute care transition (skin infection)	0.8	0.4	0.8	0.9	0.7	1.1	0.8	0.8
Any acute care transition (dehydration)	0.6	0.6	0.2	0.5	1.2	0.9	1.0	1.2
Any acute care transition (UTI)	2.4	2.4	3.7	2.2	4.7	4.6	4.1	4.6

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-11. NY-RAH (NY): Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	4,708	4,363	3,906	3,598	3,328	4,600	4,574	4,424	4,284	4,101
Mean exposure (days)	256.2	246.9	243.4	239.6	231.7	258.5	252.7	248.1	246.8	251.0
Any hospitalization (all-cause)	33.3	30.2	30.6	29.5	28.2	28.7	29.4	26.2	27.6	26.0
Any potentially avoidable hospitalization	16.1	13.7	12.9	11.1	10.9	13.2	12.7	11.6	11.8	10.1
Any potentially avoidable hospitalization (all six qualifying conditions)	9.1	7.9	7.4	6.3	6.5	8.5	8.0	7.1	7.2	6.1
Any hospitalization (pneumonia)	3.3	3.2	2.8	2.5	2.4	3.7	3.8	2.7	3.0	2.4
Any hospitalization (CHF)	1.6	1.4	1.6	1.0	1.3	1.7	1.4	1.9	1.6	1.5
Any hospitalization (COPD/asthma)	1.1	0.7	0.6	0.7	0.4	0.8	0.8	0.7	0.6	0.4
Any hospitalization (skin infection)	0.9	0.8	0.7	0.7	0.5	0.7	0.4	0.5	0.6	0.4
Any hospitalization (dehydration)	0.3	0.3	0.2	0.1	0.5	0.3	0.3	0.2	0.3	0.4
Any hospitalization (UTI)	2.6	2.1	1.9	1.7	1.7	2.0	1.8	1.5	1.7	1.3
Any ED visit (all-cause)	15.9	16.0	15.6	16.6	14.8	20.2	18.6	18.2	20.5	17.8
Any potentially avoidable ED visit	8.0	7.9	7.1	7.8	7.1	10.6	9.6	8.9	11.3	9.8
Any potentially avoidable ED visit (all six qualifying conditions)	1.5	1.5	1.5	1.2	1.4	2.0	2.5	2.1	2.6	2.1
Any ED visit (pneumonia)	0.1	0.1	0.1	0.2	0.1	0.2	0.4	0.2	0.5	0.2
Any ED visit (CHF)	0.0	0.1	0.0	0.1	0.0	0.1	0.3	0.2	0.1	0.1
Any ED visit (COPD/asthma)	0.1	0.1	0.2	0.1	0.1	0.2	0.3	0.2	0.2	0.2
Any ED visit (skin infection)	0.2	0.2	0.3	0.1	0.1	0.2	0.3	0.2	0.2	0.1
Any ED visit (dehydration)	0.3	0.2	0.2	0.1	0.2	0.3	0.2	0.2	0.4	0.2
Any ED visit (UTI)	0.7	0.8	0.7	0.7	0.9	1.2	1.2	1.1	1.1	1.2
Any acute care transition (all-cause)	41.1	38.7	38.4	38.8	36.0	40.1	39.0	36.3	39.0	36.2
Any potentially avoidable acute care transition	21.9	19.6	18.5	17.6	16.7	21.7	20.2	18.6	20.5	17.9
Any potentially avoidable acute care transition (all six qualifying conditions)	10.2	9.1	8.5	7.3	7.6	10.1	9.9	8.8	9.2	7.8

Table O-11.   NY-RAH (NY): Utilization by service type, FY 2012–FY 2016 (continued)

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Any acute care transition (pneumonia)	3.4	3.3	2.9	2.7	2.4	3.8	4.2	2.9	3.4	2.6
Any acute care transition (CHF)	1.6	1.4	1.6	1.1	1.3	1.8	1.6	2.1	1.6	1.6
Any acute care transition (COPD/asthma)	1.3	0.8	0.8	0.8	0.5	0.9	1.1	0.9	0.7	0.6
Any acute care transition (skin infection)	1.1	0.9	1.0	0.8	0.6	0.8	0.7	0.6	0.7	0.5
Any acute care transition (dehydration)	0.6	0.5	0.4	0.2	0.7	0.6	0.5	0.4	0.6	0.7
Any acute care transition (UTI)	3.3	2.8	2.5	2.3	2.6	3.1	2.9	2.6	2.6	2.4

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-12. NY-RAH (NY): Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	3,403	3,499	3,510	4,045	3,912	3,696	3,640	3,870
Mean exposure (days)	226.7	227.5	221.9	209.8	246.8	242.3	243.7	218.5
Any hospitalization (all-cause)	27.8	28.2	26.6	30.1	23.8	26.3	25.1	25.1
Any potentially avoidable hospitalization	10.7	10.9	10.4	9.5	9.2	11.0	10.0	8.6
Any potentially avoidable hospitalization (all six qualifying conditions)	6.1	5.9	5.4	4.4	5.1	5.6	5.8	4.3
Any hospitalization (pneumonia)	1.9	2.1	1.9	1.4	1.5	2.3	2.3	1.6
Any hospitalization (CHF)	1.4	1.4	1.4	1.3	1.5	1.5	1.4	1.6
Any hospitalization (COPD/asthma)	0.8	0.5	0.4	0.3	0.6	0.3	0.4	0.3
Any hospitalization (skin infection)	0.3	0.4	0.3	0.3	0.3	0.4	0.5	0.3
Any hospitalization (dehydration)	0.5	0.2	0.3	0.2	0.3	0.3	0.2	0.2
Any hospitalization (UTI)	1.5	1.6	1.5	1.0	1.1	1.1	1.4	0.6
Any ED visit (all-cause)	16.2	16.8	17.0	14.4	17.1	17.9	18.7	16.1
Any potentially avoidable ED visit	8.0	7.9	8.2	6.8	8.8	9.7	9.2	7.3
Any potentially avoidable ED visit (all six qualifying conditions)	1.4	1.0	1.7	1.2	1.9	2.3	2.3	1.6
Any ED visit (pneumonia)	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2
Any ED visit (CHF)	.	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Any ED visit (COPD/asthma)	0.1	0.1	0.1	0.0	0.1	0.1	0.4	0.1
Any ED visit (skin infection)	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.1
Any ED visit (dehydration)	0.1	0.1	0.1	0.0	0.2	0.4	0.1	0.1
Any ED visit (UTI)	0.9	0.5	1.1	0.7	1.1	1.1	1.2	1.0
Any acute care transition (all-cause)	37.1	37.2	35.7	36.9	34.1	36.6	35.4	33.9
Any potentially avoidable acute care transition	17.2	17.1	16.6	14.8	16.7	18.8	17.0	14.6
Any potentially avoidable acute care transition (all six qualifying conditions)	7.2	6.7	6.6	5.4	6.7	7.5	7.6	5.8
Any acute care transition (pneumonia)	2.1	2.3	2.1	1.5	1.6	2.5	2.4	1.8
Any acute care transition (CHF)	1.4	1.5	1.5	1.4	1.6	1.7	1.5	1.7
Any acute care transition (COPD/asthma)	0.9	0.5	0.4	0.3	0.7	0.4	0.7	0.4

Table O-12.   NY-RAH (NY): Utilization by service type, FY 2017–FY 2020 (continued)

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Any acute care transition (skin infection)	0.4	0.4	0.4	0.4	0.5	0.6	0.7	0.4
Any acute care transition (dehydration)	0.6	0.3	0.3	0.3	0.5	0.7	0.4	0.3
Any acute care transition (UTI)	2.3	2.1	2.3	1.7	2.2	2.2	2.5	1.6

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-13. OPTIMISTIC (IN): Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,926	2,007	1,987	1,979	1,877	2,414	2,301	2,264	2,242	2,154
Mean exposure (days)	219.4	222.4	233.6	225.5	229.3	247.6	244.0	239.0	236.4	244.1
Any hospitalization (all-cause)	26.5	27.7	24.3	23.9	23.0	26.4	26.2	24.5	26.1	25.0
Any potentially avoidable hospitalization	13.8	12.5	10.2	10.4	10.5	14.5	13.7	12.6	13.2	12.4
Any potentially avoidable hospitalization (all six qualifying conditions)	8.8	8.4	5.0	5.1	5.1	9.5	8.8	6.7	7.5	7.0
Any hospitalization (pneumonia)	4.2	3.9	2.5	2.0	1.9	4.8	3.8	3.1	3.7	2.8
Any hospitalization (CHF)	1.7	1.0	0.8	1.0	1.1	1.7	1.9	1.5	1.7	1.7
Any hospitalization (COPD/asthma)	0.7	1.0	0.4	0.3	0.2	0.9	0.7	0.6	0.6	1.1
Any hospitalization (skin infection)	0.3	0.8	0.3	0.4	0.3	0.7	0.7	0.3	0.5	0.2
Any hospitalization (dehydration)	0.2	—	0.1	0.3	0.3	0.2	0.3	0.1	0.1	0.1
Any hospitalization (UTI)	2.2	1.9	1.3	1.7	1.3	2.2	2.1	1.4	1.5	1.5
Any ED visit (all-cause)	17.8	18.7	18.5	17.8	19.5	26.9	25.0	22.8	21.9	23.0
Any potentially avoidable ED visit	10.6	10.8	10.5	9.9	10.4	15.1	14.6	12.5	12.5	13.7
Any potentially avoidable ED visit (all six qualifying conditions)	2.4	3.1	2.9	2.4	2.3	5.0	5.2	4.5	4.3	4.1
Any ED visit (pneumonia)	0.5	0.5	0.4	0.4	0.3	1.1	1.1	0.9	0.9	0.8
Any ED visit (CHF)	0.1	0.2	0.1	0.2	0.3	0.6	0.3	0.4	0.6	0.7
Any ED visit (COPD/asthma)	0.2	0.2	0.4	0.1	0.3	0.2	0.6	0.5	0.6	0.6
Any ED visit (skin infection)	0.1	0.2	0.4	0.2	0.1	0.6	0.3	0.5	0.4	0.4
Any ED visit (dehydration)	0.1	0.1	0.1	0.1	0.2	0.5	0.3	0.5	0.4	0.3
Any ED visit (UTI)	1.5	2.0	1.6	1.6	1.3	2.2	2.8	1.9	1.7	1.7
Any acute care transition (all-cause)	37.2	38.7	34.8	34.3	35.5	41.1	40.1	36.6	37.5	37.7
Any potentially avoidable acute care transition	22.1	21.1	18.5	18.0	19.1	24.6	24.2	21.6	21.9	22.4
Any potentially avoidable acute care transition (all six qualifying conditions)	11.0	10.9	7.2	7.0	7.3	12.6	12.3	10.0	10.1	9.9

(continued)

Table O-13.   OPTIMISTIC (IN): Utilization by service type, FY 2012–FY 2016 (continued)

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Any acute care transition (pneumonia)	4.7	4.2	2.7	2.3	2.2	5.3	4.5	3.7	4.1	3.3
Any acute care transition (CHF)	1.7	1.2	0.9	1.2	1.3	2.1	2.0	1.7	2.1	2.1
Any acute care transition (COPD/asthma)	0.8	1.1	0.6	0.3	0.5	1.0	1.1	1.1	1.0	1.5
Any acute care transition (skin infection)	0.4	1.0	0.6	0.5	0.4	1.1	1.0	0.8	0.8	0.6
Any acute care transition (dehydration)	0.3	0.1	0.2	0.3	0.5	0.6	0.6	0.6	0.5	0.4
Any acute care transition (UTI)	3.7	3.9	2.7	3.0	2.6	4.2	4.4	3.2	3.1	3.1

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-14. OPTIMISTIC (IN): Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,813	1,656	1,527	1,291	2,149	1,966	1,800	1,714
Mean exposure (days)	234.0	230.8	235.1	231.8	236.4	237.8	242.9	241.4
Any hospitalization (all-cause)	25.1	25.5	25.3	26.5	23.2	26.2	25.9	24.3
Any potentially avoidable hospitalization	11.7	11.0	13.0	12.1	10.8	12.5	13.1	10.4
Any potentially avoidable hospitalization (all six qualifying conditions)	6.1	5.8	6.4	4.4	6.0	7.0	6.9	5.7
Any hospitalization (pneumonia)	2.1	1.9	2.5	1.2	1.8	2.8	2.9	2.1
Any hospitalization (CHF)	1.3	1.3	2.6	1.5	1.7	2.0	1.8	1.8
Any hospitalization (COPD/asthma)	1.0	0.5	0.3	0.2	1.0	0.9	0.4	0.4
Any hospitalization (skin infection)	0.4	0.3	0.2	0.1	0.3	0.3	0.6	0.3
Any hospitalization (dehydration)	0.2	0.6	0.4	0.2	0.3	0.2	0.3	0.1
Any hospitalization (UTI)	1.4	1.3	1.0	1.1	1.3	1.3	1.3	1.2
Any ED visit (all-cause)	16.2	18.8	20.8	19.6	22.0	24.3	24.1	21.2
Any potentially avoidable ED visit	8.5	10.1	11.5	10.1	11.7	14.2	14.1	10.9
Any potentially avoidable ED visit (all six qualifying conditions)	2.2	2.4	2.8	2.7	2.8	3.6	4.5	3.0
Any ED visit (pneumonia)	0.4	0.2	0.2	0.3	0.3	0.4	0.3	0.6
Any ED visit (CHF)	0.1	0.1	0.3	0.6	0.3	0.4	0.6	0.4
Any ED visit (COPD/asthma)	0.3	0.3	0.3	0.2	0.1	0.4	0.8	0.1
Any ED visit (skin infection)	0.1	0.2	0.3	0.2	0.2	0.3	0.3	0.2
Any ED visit (dehydration)	0.2	0.2	0.1	.	0.3	0.4	0.4	0.3
Any ED visit (UTI)	1.1	1.4	1.7	1.5	1.5	1.8	2.3	1.5
Any acute care transition (all-cause)	34.5	36.7	37.1	37.3	35.8	39.9	38.4	36.2
Any potentially avoidable acute care transition	18.8	19.1	21.8	19.8	19.3	23.1	23.1	18.7
Any potentially avoidable acute care transition (all six qualifying conditions)	7.8	7.9	8.6	6.7	8.2	9.6	9.9	7.9
Any acute care transition (pneumonia)	2.4	2.2	2.6	1.5	2.0	3.0	3.1	2.6
Any acute care transition (CHF)	1.4	1.4	2.8	2.0	1.9	2.3	2.0	1.9
Any acute care transition (COPD/asthma)	1.2	0.8	0.7	0.4	1.1	1.2	1.2	0.4

(continued)

Table O-14. OPTIMISTIC (IN): Utilization by service type, FY 2017–FY 2020 (continued)

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Any acute care transition (skin infection)	0.5	0.5	0.5	0.2	0.5	0.5	0.8	0.5
Any acute care transition (dehydration)	0.4	0.8	0.5	0.2	0.6	0.6	0.7	0.4
Any acute care transition (UTI)	2.4	2.7	2.6	2.5	2.8	3.1	3.5	2.7

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-15. RAVEN (PA): Utilization by service type, FY 2012–FY 2016

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,638	1,577	1,607	1,622	1,600	1,945	1,829	1,771	1,759	1,789
Mean exposure (days)	271.6	262.4	260.7	265.6	273.7	248.0	248.3	250.9	252.0	250.2
Any hospitalization (all-cause)	32.0	28.7	24.0	23.4	22.7	29.6	28.2	27.1	27.4	27.4
Any potentially avoidable hospitalization	16.9	15.2	11.3	10.1	9.3	17.0	14.3	13.5	12.6	13.8
Any potentially avoidable hospitalization (all six qualifying conditions)	11.8	10.0	7.3	5.8	4.7	11.7	9.1	8.1	8.4	7.4
Any hospitalization (pneumonia)	5.2	4.9	4.2	2.6	1.8	5.8	4.8	3.6	3.8	3.2
Any hospitalization (CHF)	2.4	1.9	1.1	1.2	0.5	2.3	1.8	1.8	2.4	1.8
Any hospitalization (COPD/asthma)	1.2	1.3	0.4	0.4	0.5	1.6	1.2	1.0	0.6	0.5
Any hospitalization (skin infection)	1.1	0.4	0.1	0.2	0.4	0.5	0.2	0.6	0.5	0.4
Any hospitalization (dehydration)	0.2	0.1	0.1	0.1	0.5	0.2	0.2	0.2	0.2	0.5
Any hospitalization (UTI)	3.2	2.2	1.9	1.9	1.2	2.4	2.1	2.0	1.6	1.6
Any ED visit (all-cause)	22.0	19.0	18.4	17.6	16.7	19.5	18.7	17.3	20.0	18.6
Any potentially avoidable ED visit	11.3	11.1	8.9	8.7	9.3	10.6	9.6	8.8	10.2	9.1
Any potentially avoidable ED visit (all six qualifying conditions)	3.0	4.3	2.7	2.8	2.5	3.7	2.6	2.3	3.5	2.7
Any ED visit (pneumonia)	0.4	0.8	0.7	0.7	0.5	0.8	0.4	0.1	0.4	0.4
Any ED visit (CHF)	0.2	0.4	0.4	0.2	0.3	0.5	0.2	0.1	0.1	0.2
Any ED visit (COPD/asthma)	0.3	0.6	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2
Any ED visit (skin infection)	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.1
Any ED visit (dehydration)	0.2	0.6	0.3	0.1	0.3	0.5	0.4	0.3	0.5	0.1
Any ED visit (UTI)	1.5	2.0	0.9	1.3	1.1	1.5	1.3	1.4	2.2	1.7
Any acute care transition (all-cause)	44.0	38.3	33.2	33.2	31.6	40.2	38.4	35.7	37.8	37.8
Any potentially avoidable acute care transition	25.7	22.9	17.7	16.5	16.4	24.4	21.5	19.5	20.5	20.5
Any potentially avoidable acute care transition (all six qualifying conditions)	13.9	12.9	9.1	7.9	6.7	14.7	11.2	9.8	11.1	9.7

Table O-15. RAVEN (PA): Utilization by service type, FY 2012–FY 2016 (continued)

(percentage of residents per year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Any acute care transition (pneumonia)	5.3	5.6	4.7	3.1	2.1	6.2	5.1	3.6	4.0	3.6
Any acute care transition (CHF)	2.6	2.1	1.4	1.4	0.8	2.6	1.9	1.9	2.4	1.9
Any acute care transition (COPD/asthma)	1.5	1.6	0.7	0.7	0.8	1.9	1.4	1.1	0.9	0.7
Any acute care transition (skin infection)	1.5	0.6	0.4	0.4	0.6	0.8	0.4	0.8	0.7	0.5
Any acute care transition (dehydration)	0.4	0.6	0.4	0.1	0.6	0.6	0.5	0.6	0.6	0.6
Any acute care transition (UTI)	4.4	3.9	2.6	3.1	2.3	3.9	3.3	3.2	3.7	3.2

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table O-16. RAVEN (PA): Utilization by service type, FY 2017–FY 2020

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,536	1,485	1,402	1,255	1,696	1,625	1,561	1,466
Mean exposure (days)	271.5	268.8	272.6	268.4	248.8	254.2	255.8	250.5
Any hospitalization (all-cause)	22.9	21.0	21.3	23.4	25.4	26.5	26.7	28.0
Any potentially avoidable hospitalization	9.8	9.6	11.1	9.5	11.1	12.5	11.7	11.3
Any potentially avoidable hospitalization (all six qualifying conditions)	5.1	5.8	5.5	4.4	6.6	7.4	6.7	5.9
Any hospitalization (pneumonia)	2.1	2.6	2.6	1.4	2.1	3.2	2.9	2.3
Any hospitalization (CHF)	1.1	1.3	1.3	1.3	1.6	2.1	2.2	1.6
Any hospitalization (COPD/asthma)	0.7	0.5	0.4	0.2	1.0	0.6	0.3	0.2
Any hospitalization (skin infection)	0.3	0.4	0.2	0.4	0.2	0.4	0.4	0.3
Any hospitalization (dehydration)	0.1	0.1	0.3	0.2	0.4	0.2	0.3	0.2
Any hospitalization (UTI)	1.1	1.3	0.9	1.0	1.4	1.2	1.2	1.6
Any ED visit (all-cause)	19.3	17.6	18.1	17.7	18.5	18.2	17.9	18.3
Any potentially avoidable ED visit	10.1	9.2	9.1	9.2	8.6	9.1	8.6	7.9
Any potentially avoidable ED visit (all six qualifying conditions)	3.3	2.8	2.6	3.4	2.5	3.0	2.8	2.5
Any ED visit (pneumonia)	0.7	0.7	0.8	0.6	0.4	0.3	0.4	0.3
Any ED visit (CHF)	0.7	0.3	0.3	0.2	0.3	0.2	0.1	0.2
Any ED visit (COPD/asthma)	0.1	0.3	0.1	0.2	0.4	0.2	0.1	0.1
Any ED visit (skin infection)	0.3	0.1	0.4	0.2	0.1	0.1	0.4	0.3
Any ED visit (dehydration)	0.1	.	0.1	0.5	0.2	0.1	0.1	0.1
Any ED visit (UTI)	1.5	1.6	1.1	1.9	1.3	2.1	1.8	1.7
Any acute care transition (all-cause)	33.5	30.8	31.5	33.1	35.7	36.3	37.0	37.4
Any potentially avoidable acute care transition	17.3	16.8	17.1	16.3	17.6	18.6	18.6	17.3
Any potentially avoidable acute care transition (all six qualifying conditions)	7.3	7.9	7.2	7.3	8.5	9.7	9.4	7.8
Any acute care transition (pneumonia)	2.4	2.9	3.0	1.8	2.4	3.4	3.2	2.5
Any acute care transition (CHF)	1.6	1.4	1.4	1.4	1.8	2.3	2.3	1.7
Any acute care transition (COPD/asthma)	0.8	0.8	0.4	0.5	1.4	0.7	0.4	0.3

(continued)

Table O-16.   RAVEN (PA): Utilization by service type, FY 2017–FY 2020 (continued)

(percentage of residents per year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Any acute care transition (skin infection)	0.7	0.5	0.5	0.6	0.3	0.5	0.8	0.6
Any acute care transition (dehydration)	0.2	0.1	0.4	0.6	0.6	0.4	0.3	0.3
Any acute care transition (UTI)	2.4	2.8	2.1	2.7	2.6	3.1	2.9	3.3

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Percentages are based on counting each individual once without regard to the length of their exposure period. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

APPENDIX P
DESCRIPTIVE ANALYSIS OF UTILIZATION (RATE)

In this appendix, we present summary results from a descriptive analysis of utilization rates, reporting the number of events per 1,000 Initiative-eligible resident-days, including hospitalizations, emergency department visits, and acute care transitions, for all-cause, potentially avoidable, and the six qualifying conditions aggregated and separately. ***Table P-1*** presents the results from the national comparison group. ***Tables P-2*** through ***P-16*** present the results by intervention group (Clinical + Payment and Payment-Only), combined across all ECCPs, and then separately for each ECCP.

Table P-1.   National comparison group: Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	National comparison group				
	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	772,196	769,878	728,716	683,120	666,154
Mean exposure (days)	249.011	244.944	246.892	241.756	245.624
Hospitalizations (all-cause)	1.992	1.954	1.878	1.971	1.890
Potentially avoidable hospitalizations	0.890	0.851	0.777	0.786	0.734
Potentially avoidable hospitalizations (all six qualifying conditions)	0.574	0.543	0.479	0.481	0.443
Hospitalizations (pneumonia)	0.245	0.240	0.201	0.202	0.173
Hospitalizations (CHF)	0.090	0.087	0.084	0.087	0.083
Hospitalizations (COPD/asthma)	0.057	0.053	0.044	0.044	0.038
Hospitalizations (skin infection)	0.038	0.034	0.032	0.031	0.027
Hospitalizations (dehydration)	0.017	0.014	0.012	0.011	0.019
Hospitalizations (UTI)	0.128	0.116	0.107	0.107	0.103
ED visits (all-cause)	1.616	1.606	1.600	1.719	1.722
Potentially avoidable ED visits	0.770	0.762	0.753	0.812	0.805
Potentially avoidable ED visits (all six qualifying conditions)	0.238	0.239	0.232	0.256	0.249
ED visits (pneumonia)	0.046	0.048	0.044	0.051	0.045
ED visits (CHF)	0.021	0.022	0.021	0.023	0.023
ED visits (COPD/asthma)	0.027	0.027	0.025	0.028	0.028
ED visits (skin infection)	0.021	0.020	0.020	0.021	0.016
ED visits (dehydration)	0.022	0.022	0.020	0.022	0.023
ED visits (UTI)	0.100	0.098	0.101	0.111	0.114
Acute care transitions (all-cause)	3.631	3.584	3.502	3.711	3.634
Potentially avoidable acute care transitions	1.667	1.620	1.538	1.605	1.545
Potentially avoidable acute care transitions (all six qualifying conditions)	0.814	0.783	0.713	0.739	0.694
Acute care transitions (pneumonia)	0.291	0.289	0.246	0.253	0.219
Acute care transitions (CHF)	0.111	0.109	0.105	0.111	0.107
Acute care transitions (COPD/asthma)	0.085	0.080	0.069	0.072	0.066
Acute care transitions (skin infection)	0.059	0.055	0.052	0.052	0.043
Acute care transitions (dehydration)	0.040	0.037	0.033	0.033	0.042
Acute care transitions (UTI)	0.228	0.214	0.208	0.219	0.218

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-2.   National comparison group: Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	National comparison group			
	2017	**2018**	**2019**	**2020**
Number of residents meeting eligibility criteria	646,925	625,193	592,937	575,273
Mean exposure (days)	242.917	242.483	244.191	242.979
Hospitalizations (all-cause)	1.957	1.987	1.965	2.068
Potentially avoidable hospitalizations	0.745	0.746	0.723	0.655
Potentially avoidable hospitalizations (all six qualifying conditions)	0.447	0.442	0.423	0.369
Hospitalizations (pneumonia)	0.147	0.166	0.153	0.137
Hospitalizations (CHF)	0.094	0.095	0.097	0.083
Hospitalizations (COPD/asthma)	0.061	0.040	0.035	0.025
Hospitalizations (skin infection)	0.026	0.025	0.024	0.020
Hospitalizations (dehydration)	0.019	0.019	0.018	0.021
Hospitalizations (UTI)	0.100	0.097	0.095	0.082
ED visits (all-cause)	1.762	1.826	1.831	1.682
Potentially avoidable ED visits	0.815	0.837	0.834	0.732
Potentially avoidable ED visits (all six qualifying conditions)	0.258	0.266	0.261	0.225
ED visits (pneumonia)	0.045	0.047	0.044	0.041
ED visits (CHF)	0.025	0.027	0.026	0.022
ED visits (COPD/asthma)	0.028	0.030	0.029	0.022
ED visits (skin infection)	0.017	0.018	0.018	0.015
ED visits (dehydration)	0.023	0.023	0.021	0.019
ED visits (UTI)	0.119	0.121	0.122	0.105
Acute care transitions (all-cause)	3.742	3.836	3.817	3.768
Potentially avoidable acute care transitions	1.566	1.590	1.563	1.392
Potentially avoidable acute care transitions (all six qualifying conditions)	0.707	0.711	0.686	0.595
Acute care transitions (pneumonia)	0.192	0.214	0.197	0.178
Acute care transitions (CHF)	0.120	0.123	0.123	0.105
Acute care transitions (COPD/asthma)	0.090	0.070	0.064	0.047
Acute care transitions (skin infection)	0.043	0.043	0.043	0.036
Acute care transitions (dehydration)	0.043	0.042	0.040	0.040
Acute care transitions (UTI)	0.219	0.219	0.218	0.188

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stay. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-3.   All ECCPs (all states): Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	13,403	13,090	12,581	12,346	11,787	15,123	14,706	14,504	14,187	13,695
Mean exposure (days)	250.716	245.458	248.949	245.556	247.988	251.594	250.947	247.989	245.714	251.385
Hospitalizations (all-cause)	2.082	1.870	1.744	1.707	1.623	1.743	1.701	1.621	1.688	1.528
Potentially avoidable hospitalizations	0.858	0.722	0.629	0.593	0.539	0.744	0.701	0.648	0.651	0.565
Potentially avoidable hospitalizations (all six qualifying conditions)	0.515	0.423	0.338	0.318	0.279	0.478	0.433	0.377	0.390	0.320
Hospitalizations (pneumonia)	0.211	0.177	0.144	0.135	0.103	0.208	0.201	0.158	0.175	0.125
Hospitalizations (CHF)	0.085	0.075	0.062	0.060	0.055	0.087	0.074	0.083	0.080	0.070
Hospitalizations (COPD/asthma)	0.053	0.040	0.026	0.024	0.020	0.048	0.042	0.033	0.030	0.027
Hospitalizations (skin infection)	0.038	0.033	0.022	0.020	0.018	0.027	0.023	0.021	0.025	0.017
Hospitalizations (dehydration)	0.013	0.009	0.006	0.008	0.016	0.011	0.011	0.010	0.009	0.016
Hospitalizations (UTI)	0.115	0.088	0.079	0.072	0.068	0.098	0.083	0.072	0.071	0.064
ED visits (all-cause)	1.159	1.134	1.039	1.039	1.026	1.319	1.298	1.256	1.349	1.246
Potentially avoidable ED visits	0.526	0.524	0.457	0.468	0.449	0.631	0.602	0.573	0.635	0.594
Potentially avoidable ED visits (all six qualifying conditions)	0.116	0.124	0.101	0.100	0.103	0.168	0.166	0.157	0.171	0.160
ED visits (pneumonia)	0.012	0.017	0.015	0.014	0.012	0.031	0.027	0.024	0.032	0.024
ED visits (CHF)	0.008	0.011	0.008	0.011	0.008	0.018	0.016	0.014	0.012	0.017
ED visits (COPD/asthma)	0.012	0.010	0.010	0.009	0.011	0.015	0.020	0.021	0.021	0.018
ED visits (skin infection)	0.010	0.012	0.011	0.009	0.007	0.016	0.014	0.016	0.014	0.013
ED visits (dehydration)	0.011	0.010	0.007	0.007	0.012	0.017	0.011	0.014	0.017	0.012
ED visits (UTI)	0.062	0.065	0.050	0.051	0.054	0.072	0.078	0.069	0.075	0.076
Acute care transitions (all-cause)	3.252	3.017	2.799	2.764	2.667	3.077	3.016	2.891	3.050	2.787
Potentially avoidable acute care transitions	1.387	1.250	1.090	1.070	0.996	1.380	1.309	1.225	1.290	1.160
Potentially avoidable acute care transitions (all six qualifying conditions)	0.631	0.547	0.439	0.419	0.382	0.648	0.601	0.534	0.562	0.480
Acute care transitions (pneumonia)	0.223	0.195	0.160	0.148	0.115	0.239	0.228	0.182	0.207	0.149

Table P-3.   All ECCPs (all states): Utilization by service type, FY 2012–FY 2016 (continued)
(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (CHF)	0.093	0.086	0.069	0.071	0.062	0.105	0.090	0.097	0.092	0.088
Acute care transitions (COPD/asthma)	0.065	0.050	0.035	0.033	0.030	0.063	0.062	0.054	0.051	0.045
Acute care transitions (skin infection)	0.048	0.045	0.033	0.029	0.025	0.043	0.037	0.037	0.040	0.030
Acute care transitions (dehydration)	0.024	0.019	0.013	0.015	0.027	0.028	0.022	0.024	0.026	0.028
Acute care transitions (UTI)	0.177	0.153	0.129	0.122	0.122	0.170	0.162	0.141	0.147	0.141

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-4.   All ECCPs (all states): Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	11,494	10,622	10,151	10,086	13,100	11,986	11,078	10,807
Mean exposure (days)	244.058	238.306	240.049	233.863	247.254	244.856	246.811	237.374
Hospitalizations (all-cause)	1.658	1.765	1.707	1.870	1.488	1.599	1.584	1.615
Potentially avoidable hospitalizations	0.547	0.570	0.590	0.517	0.538	0.584	0.572	0.524
Potentially avoidable hospitalizations (all six qualifying conditions)	0.285	0.296	0.303	0.232	0.291	0.318	0.313	0.268
Hospitalizations (pneumonia)	0.091	0.107	0.110	0.081	0.090	0.118	0.114	0.095
Hospitalizations (CHF)	0.065	0.068	0.085	0.061	0.074	0.086	0.084	0.083
Hospitalizations (COPD/asthma)	0.036	0.026	0.021	0.013	0.042	0.026	0.023	0.015
Hospitalizations (skin infection)	0.015	0.015	0.013	0.015	0.014	0.017	0.018	0.015
Hospitalizations (dehydration)	0.014	0.014	0.012	0.013	0.012	0.011	0.012	0.011
Hospitalizations (UTI)	0.065	0.065	0.061	0.048	0.060	0.060	0.062	0.048
ED visits (all-cause)	1.056	1.105	1.146	1.096	1.236	1.314	1.341	1.272
Potentially avoidable ED visits	0.461	0.482	0.495	0.455	0.553	0.604	0.600	0.537
Potentially avoidable ED visits (all six qualifying conditions)	0.101	0.094	0.105	0.097	0.140	0.159	0.172	0.149
ED visits (pneumonia)	0.016	0.016	0.013	0.009	0.023	0.023	0.025	0.023
ED visits (CHF)	0.009	0.010	0.009	0.013	0.015	0.016	0.013	0.015
ED visits (COPD/asthma)	0.009	0.008	0.011	0.008	0.015	0.015	0.023	0.012
ED visits (skin infection)	0.007	0.007	0.008	0.008	0.008	0.010	0.015	0.010
ED visits (dehydration)	0.007	0.006	0.005	0.007	0.013	0.016	0.011	0.011
ED visits (UTI)	0.052	0.048	0.060	0.052	0.067	0.078	0.084	0.078
Acute care transitions (all-cause)	2.724	2.878	2.862	2.974	2.736	2.925	2.941	2.899
Potentially avoidable acute care transitions	1.009	1.053	1.087	0.974	1.094	1.191	1.174	1.065
Potentially avoidable acute care transitions (all six qualifying conditions)	0.385	0.390	0.409	0.329	0.432	0.477	0.485	0.417
Acute care transitions (pneumonia)	0.107	0.123	0.124	0.091	0.113	0.141	0.139	0.118
Acute care transitions (CHF)	0.073	0.078	0.094	0.075	0.089	0.102	0.097	0.099
Acute care transitions (COPD/asthma)	0.045	0.033	0.032	0.020	0.056	0.041	0.047	0.028

(continued)

Table P-4. **All ECCPs (all states): Utilization by service type, FY 2017–FY 2020 (continued)**

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (skin infection)	0.022	0.022	0.021	0.023	0.022	0.028	0.034	0.025
Acute care transitions (dehydration)	0.022	0.020	0.017	0.020	0.025	0.027	0.023	0.022
Acute care transitions (UTI)	0.117	0.113	0.121	0.100	0.128	0.138	0.146	0.126

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-5. AQAF (AL): Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	2,503	2,434	2,391	2,425	2,411	2,111	2,030	2,072	2,001	1,950
Mean exposure (days)	260.266	256.593	265.386	259.086	261.713	256.766	259.348	252.883	258.712	259.134
Hospitalizations (all-cause)	2.121	1.840	1.625	1.709	1.712	1.963	2.006	2.038	1.864	1.666
Potentially avoidable hospitalizations	0.913	0.797	0.689	0.723	0.648	0.906	0.912	0.928	0.807	0.613
Potentially avoidable hospitalizations (all six qualifying conditions)	0.565	0.477	0.386	0.401	0.314	0.616	0.604	0.588	0.510	0.366
Hospitalizations (pneumonia)	0.236	0.211	0.164	0.180	0.111	0.277	0.300	0.263	0.238	0.139
Hospitalizations (CHF)	0.089	0.085	0.080	0.083	0.054	0.105	0.082	0.113	0.083	0.069
Hospitalizations (COPD/asthma)	0.068	0.048	0.035	0.038	0.029	0.065	0.072	0.048	0.042	0.038
Hospitalizations (skin infection)	0.020	0.040	0.019	0.013	0.011	0.015	0.027	0.036	0.025	0.016
Hospitalizations (dehydration)	0.023	0.010	0.008	0.018	0.019	0.020	0.013	0.023	0.012	0.016
Hospitalizations (UTI)	0.129	0.083	0.080	0.070	0.090	0.135	0.110	0.105	0.110	0.089
ED visits (all-cause)	1.621	1.478	1.201	1.240	1.233	1.520	1.635	1.498	1.518	1.334
Potentially avoidable ED visits	0.769	0.717	0.548	0.614	0.588	0.764	0.707	0.670	0.664	0.645
Potentially avoidable ED visits (all six qualifying conditions)	0.200	0.170	0.132	0.159	0.162	0.216	0.156	0.166	0.166	0.182
ED visits (pneumonia)	0.023	0.024	0.016	0.014	0.019	0.026	0.011	0.008	0.021	0.018
ED visits (CHF)	0.025	0.021	0.016	0.029	0.017	0.026	0.013	0.021	0.015	0.022
ED visits (COPD/asthma)	0.023	0.010	0.011	0.014	0.016	0.026	0.021	0.032	0.017	0.028
ED visits (skin infection)	0.014	0.010	0.008	0.018	0.006	0.017	0.011	0.017	0.012	0.016
ED visits (dehydration)	0.017	0.010	0.005	0.014	0.021	0.018	0.011	0.019	0.014	0.008
ED visits (UTI)	0.098	0.096	0.077	0.070	0.082	0.103	0.087	0.069	0.087	0.091
Acute care transitions (all-cause)	3.764	3.354	2.871	2.997	2.994	3.524	3.692	3.563	3.400	3.018
Potentially avoidable acute care transitions	1.690	1.532	1.258	1.367	1.263	1.683	1.641	1.605	1.476	1.261
Potentially avoidable acute care transitions (all six qualifying conditions)	0.768	0.648	0.520	0.563	0.475	0.836	0.771	0.756	0.678	0.550
Acute care transitions (pneumonia)	0.259	0.235	0.181	0.194	0.130	0.303	0.313	0.271	0.259	0.156

(continued)

Table P-5.   AQAF (AL): Utilization by service type, FY 2012–FY 2016 (continued)
(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (CHF)	0.114	0.106	0.096	0.113	0.071	0.135	0.095	0.136	0.099	0.093
Acute care transitions (COPD/asthma)	0.091	0.058	0.046	0.054	0.044	0.090	0.097	0.080	0.060	0.065
Acute care transitions (skin infection)	0.035	0.051	0.027	0.030	0.017	0.031	0.038	0.053	0.037	0.032
Acute care transitions (dehydration)	0.040	0.019	0.013	0.032	0.040	0.039	0.025	0.042	0.027	0.024
Acute care transitions (UTI)	0.229	0.179	0.158	0.140	0.173	0.238	0.203	0.174	0.197	0.180

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-6.   AQAF (AL): Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	2,218	1,532	1,355	1,255	1,814	1,403	1,070	984
Mean exposure (days)	253.282	225.539	237.379	236.984	257.493	251.148	245.502	255.964
Hospitalizations (all-cause)	1.809	2.046	1.971	2.189	1.666	1.711	1.938	1.882
Potentially avoidable hospitalizations	0.650	0.758	0.765	0.652	0.638	0.701	0.777	0.746
Potentially avoidable hospitalizations (all six qualifying conditions)	0.333	0.394	0.395	0.323	0.343	0.400	0.457	0.417
Hospitalizations (pneumonia)	0.098	0.148	0.165	0.121	0.116	0.125	0.175	0.131
Hospitalizations (CHF)	0.077	0.101	0.090	0.067	0.058	0.094	0.122	0.127
Hospitalizations (COPD/asthma)	0.050	0.023	0.037	0.020	0.062	0.051	0.046	0.032
Hospitalizations (skin infection)	0.011	0.009	0.009	0.007	0.017	0.017	0.019	0.016
Hospitalizations (dehydration)	0.018	0.023	0.012	0.027	0.006	0.017	0.015	0.028
Hospitalizations (UTI)	0.080	0.090	0.081	0.081	0.083	0.096	0.080	0.083
ED visits (all-cause)	1.175	1.464	1.458	1.600	1.295	1.388	1.633	1.624
Potentially avoidable ED visits	0.536	0.773	0.703	0.639	0.576	0.650	0.807	0.842
Potentially avoidable ED visits (all six qualifying conditions)	0.126	0.168	0.143	0.121	0.126	0.187	0.225	0.250
ED visits (pneumonia)	0.016	0.035	0.006	0.013	0.017	0.017	0.023	0.020
ED visits (CHF)	0.014	0.017	0.009	0.017	0.017	0.031	0.019	0.036
ED visits (COPD/asthma)	0.020	0.009	0.028	0.020	0.019	0.023	0.019	0.032
ED visits (skin infection)	0.005	0.009	0.006	0.003	0.004	0.006	0.011	0.012
ED visits (dehydration)	0.014	0.014	0.019	0.017	0.006	0.023	0.015	0.024
ED visits (UTI)	0.057	0.084	0.075	0.050	0.062	0.088	0.137	0.127
Acute care transitions (all-cause)	2.992	3.528	3.445	3.793	2.974	3.119	3.586	3.522
Potentially avoidable acute care transitions	1.186	1.537	1.467	1.291	1.218	1.359	1.584	1.600
Potentially avoidable acute care transitions (all six qualifying conditions)	0.459	0.561	0.538	0.444	0.471	0.587	0.681	0.671
Acute care transitions (pneumonia)	0.114	0.182	0.171	0.134	0.133	0.142	0.198	0.151
Acute care transitions (CHF)	0.091	0.119	0.099	0.084	0.075	0.125	0.141	0.167
Acute care transitions (COPD/asthma)	0.069	0.032	0.065	0.040	0.081	0.074	0.065	0.064

(continued)

Table P-6.   AQAF (AL): Utilization by service type, FY 2017–FY 2020 (continued)

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (skin infection)	0.016	0.017	0.016	0.010	0.021	0.023	0.030	0.028
Acute care transitions (dehydration)	0.032	0.038	0.031	0.044	0.013	0.040	0.030	0.052
Acute care transitions (UTI)	0.137	0.174	0.155	0.131	0.148	0.184	0.217	0.210

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-7.   ATOP 2 (NV/CO): Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment (Nevada)					Payment-Only (Colorado)				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,150	1,170	1,142	1,118	1,058	1,872	1,805	1,786	1,722	1,645
Mean exposure (days)	229.332	226.496	228.233	238.470	248.086	238.002	242.798	244.968	230.811	240.812
Hospitalizations (all-cause)	2.078	1.875	1.888	1.984	1.852	1.230	1.068	1.019	1.069	1.030
Potentially avoidable hospitalizations	0.732	0.660	0.633	0.604	0.488	0.489	0.422	0.384	0.395	0.374
Potentially avoidable hospitalizations (all six qualifying conditions)	0.398	0.381	0.315	0.281	0.210	0.269	0.244	0.224	0.229	0.204
Hospitalizations (pneumonia)	0.197	0.151	0.153	0.150	0.080	0.121	0.114	0.096	0.106	0.098
Hospitalizations (CHF)	0.038	0.072	0.019	0.011	0.023	0.040	0.034	0.050	0.038	0.030
Hospitalizations (COPD/asthma)	0.049	0.034	0.023	0.008	0.015	0.018	0.025	0.025	0.025	0.005
Hospitalizations (skin infection)	0.034	0.034	0.031	0.011	0.030	0.016	0.018	0.021	0.018	0.015
Hospitalizations (dehydration)	0.008	0.019	0.000	0.008	0.004	0.002	0.002	0.002	0.005	0.025
Hospitalizations (UTI)	0.072	0.072	0.088	0.094	0.057	0.072	0.050	0.030	0.038	0.030
ED visits (all-cause)	0.963	1.057	1.078	1.328	1.059	1.066	1.221	1.150	1.223	1.328
Potentially avoidable ED visits	0.451	0.442	0.541	0.589	0.450	0.557	0.582	0.530	0.609	0.654
Potentially avoidable ED visits (all six qualifying conditions)	0.061	0.106	0.096	0.109	0.099	0.193	0.185	0.185	0.199	0.245
ED visits (pneumonia)	0.008	0.008	0.031	0.008	0.008	0.043	0.050	0.050	0.048	0.038
ED visits (CHF)	0.000	0.008	0.004	0.011	0.000	0.016	0.016	0.016	0.013	0.023
ED visits (COPD/asthma)	0.011	0.019	0.008	0.019	0.011	0.018	0.014	0.016	0.020	0.025
ED visits (skin infection)	0.008	0.015	0.012	0.008	0.011	0.027	0.025	0.032	0.033	0.023
ED visits (dehydration)	0.000	0.008	0.004	0.008	0.011	0.018	0.007	0.005	0.010	0.030
ED visits (UTI)	0.034	0.049	0.038	0.056	0.057	0.072	0.073	0.066	0.075	0.106
Acute care transitions (all-cause)	3.060	2.951	2.981	3.334	2.937	2.301	2.302	2.192	2.310	2.380
Potentially avoidable acute care transitions	1.183	1.102	1.174	1.197	0.949	1.046	1.006	0.917	1.014	1.027
Potentially avoidable acute care transitions (all six qualifying conditions)	0.459	0.487	0.411	0.390	0.309	0.462	0.429	0.409	0.430	0.449
Acute care transitions (pneumonia)	0.205	0.158	0.184	0.158	0.088	0.164	0.164	0.146	0.153	0.136

(continued)

Table P-7.   ATOP 2 (NV/CO): Utilization by service type, FY 2012–FY 2016 (continued)

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment (Nevada)					Payment-Only (Colorado)				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (CHF)	0.038	0.079	0.023	0.023	0.023	0.056	0.050	0.066	0.050	0.053
Acute care transitions (COPD/asthma)	0.061	0.053	0.031	0.026	0.027	0.036	0.039	0.041	0.045	0.030
Acute care transitions (skin infection)	0.042	0.049	0.042	0.019	0.042	0.043	0.043	0.053	0.050	0.038
Acute care transitions (dehydration)	0.008	0.026	0.004	0.015	0.015	0.020	0.009	0.007	0.015	0.056
Acute care transitions (UTI)	0.106	0.121	0.127	0.150	0.114	0.144	0.123	0.096	0.116	0.136

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-8.   ATOP 2 (NV/CO): Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment (Nevada)				Payment-Only (Colorado)			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,082	1,093	1,049	1,057	1,601	1,506	1,379	1,292
Mean exposure (days)	243.494	246.919	250.825	260.700	235.470	237.856	246.782	241.488
Hospitalizations (all-cause)	1.780	1.964	1.878	1.956	1.157	1.061	1.161	1.083
Potentially avoidable hospitalizations	0.501	0.593	0.566	0.468	0.393	0.371	0.373	0.365
Potentially avoidable hospitalizations (all six qualifying conditions)	0.243	0.267	0.285	0.232	0.210	0.173	0.206	0.189
Hospitalizations (pneumonia)	0.087	0.119	0.110	0.116	0.085	0.056	0.076	0.087
Hospitalizations (CHF)	0.042	0.052	0.076	0.033	0.061	0.053	0.059	0.061
Hospitalizations (COPD/asthma)	0.023	0.022	0.027	0.007	0.029	0.014	0.003	0.006
Hospitalizations (skin infection)	0.011	0.019	0.011	0.029	0.003	0.014	0.012	0.006
Hospitalizations (dehydration)	0.011	0.011	0.019	0.011	0.008	0.006	0.006	0.003
Hospitalizations (UTI)	0.068	0.044	0.042	0.036	0.024	0.031	0.050	0.026
ED visits (all-cause)	1.207	1.223	1.190	1.081	1.321	1.270	1.372	1.279
Potentially avoidable ED visits	0.528	0.500	0.502	0.465	0.552	0.595	0.644	0.548
Potentially avoidable ED visits (all six qualifying conditions)	0.129	0.096	0.110	0.109	0.180	0.162	0.232	0.170
ED visits (pneumonia)	0.019	0.011	0.008	0.000	0.050	0.042	0.062	0.035
ED visits (CHF)	0.011	0.022	0.011	0.022	0.027	0.008	0.012	0.016
ED visits (COPD/asthma)	0.000	0.011	0.019	0.018	0.013	0.022	0.024	0.022
ED visits (skin infection)	0.011	0.011	0.004	0.011	0.013	0.020	0.038	0.022
ED visits (dehydration)	0.008	0.000	0.000	0.007	0.011	0.006	0.009	0.010
ED visits (UTI)	0.080	0.041	0.068	0.051	0.066	0.064	0.088	0.064
Acute care transitions (all-cause)	2.999	3.198	3.071	3.056	2.504	2.353	2.545	2.378
Potentially avoidable acute care transitions	1.029	1.093	1.068	0.933	0.950	0.971	1.023	0.917
Potentially avoidable acute care transitions (all six qualifying conditions)	0.372	0.363	0.395	0.341	0.390	0.335	0.441	0.359
Acute care transitions (pneumonia)	0.106	0.130	0.118	0.116	0.135	0.098	0.138	0.122
Acute care transitions (CHF)	0.053	0.074	0.087	0.054	0.088	0.061	0.071	0.077
Acute care transitions (COPD/asthma)	0.023	0.033	0.046	0.025	0.042	0.036	0.029	0.029

(continued)

Table P-8.   ATOP 2 (NV/CO): Utilization by service type, FY 2017–FY 2020 (continued)

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment (Nevada)				Payment-Only (Colorado)			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (skin infection)	0.023	0.030	0.015	0.040	0.016	0.033	0.050	0.029
Acute care transitions (dehydration)	0.019	0.011	0.019	0.018	0.019	0.011	0.015	0.013
Acute care transitions (UTI)	0.148	0.085	0.110	0.087	0.090	0.095	0.138	0.090

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-9.   MOQI (MO): Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,478	1,539	1,548	1,604	1,513	2,181	2,167	2,187	2,179	2,056
Mean exposure (days)	251.394	250.884	260.287	248.001	257.777	251.305	255.682	252.511	247.970	261.814
Hospitalizations (all-cause)	2.374	1.883	1.737	1.677	1.438	1.972	1.724	1.722	1.899	1.622
Potentially avoidable hospitalizations	1.098	0.759	0.658	0.661	0.533	0.927	0.848	0.750	0.787	0.676
Potentially avoidable hospitalizations (all six qualifying conditions)	0.748	0.453	0.333	0.370	0.310	0.626	0.523	0.416	0.481	0.414
Hospitalizations (pneumonia)	0.366	0.179	0.132	0.156	0.121	0.283	0.264	0.206	0.252	0.169
Hospitalizations (CHF)	0.092	0.096	0.074	0.106	0.092	0.126	0.101	0.081	0.089	0.084
Hospitalizations (COPD/asthma)	0.043	0.023	0.025	0.015	0.015	0.062	0.032	0.024	0.028	0.039
Hospitalizations (skin infection)	0.086	0.041	0.025	0.035	0.023	0.044	0.034	0.011	0.039	0.024
Hospitalizations (dehydration)	0.019	0.010	0.010	0.005	0.005	0.015	0.014	0.011	0.011	0.015
Hospitalizations (UTI)	0.143	0.104	0.067	0.053	0.054	0.097	0.078	0.083	0.063	0.084
ED visits (all-cause)	1.429	1.277	1.072	0.825	0.936	1.657	1.520	1.709	1.675	1.577
Potentially avoidable ED visits	0.649	0.598	0.474	0.357	0.385	0.845	0.792	0.875	0.872	0.825
Potentially avoidable ED visits (all six qualifying conditions)	0.170	0.135	0.087	0.075	0.074	0.230	0.231	0.254	0.255	0.217
ED visits (pneumonia)	0.011	0.021	0.012	0.015	0.010	0.057	0.031	0.047	0.046	0.041
ED visits (CHF)	0.013	0.010	0.005	0.000	0.000	0.027	0.038	0.022	0.019	0.024
ED visits (COPD/asthma)	0.016	0.008	0.010	0.010	0.008	0.026	0.029	0.043	0.046	0.019
ED visits (skin infection)	0.003	0.028	0.010	0.008	0.010	0.018	0.018	0.013	0.013	0.024
ED visits (dehydration)	0.022	0.016	0.002	0.008	0.010	0.024	0.018	0.018	0.028	0.015
ED visits (UTI)	0.105	0.052	0.047	0.035	0.036	0.078	0.097	0.110	0.104	0.095
Acute care transitions (all-cause)	3.819	3.167	2.829	2.511	2.387	3.660	3.258	3.451	3.583	3.218
Potentially avoidable acute care transitions	1.749	1.360	1.134	1.021	0.920	1.784	1.644	1.633	1.660	1.503
Potentially avoidable acute care transitions (all six qualifying conditions)	0.918	0.588	0.419	0.447	0.385	0.856	0.756	0.670	0.738	0.632
Acute care transitions (pneumonia)	0.377	0.199	0.144	0.171	0.131	0.339	0.294	0.254	0.298	0.210

(continued)

Table P-9.   MOQI (MO): Utilization by service type, FY 2012–FY 2016 (continued)
(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (CHF)	0.105	0.106	0.079	0.106	0.092	0.153	0.139	0.103	0.107	0.108
Acute care transitions (COPD/asthma)	0.059	0.031	0.035	0.028	0.023	0.088	0.061	0.067	0.074	0.058
Acute care transitions (skin infection)	0.089	0.070	0.035	0.043	0.033	0.062	0.052	0.024	0.054	0.048
Acute care transitions (dehydration)	0.040	0.026	0.012	0.013	0.015	0.038	0.034	0.029	0.039	0.030
Acute care transitions (UTI)	0.248	0.155	0.114	0.088	0.090	0.175	0.175	0.194	0.167	0.178

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-10. MOQI (MO): Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,442	1,357	1,308	1,183	1,928	1,790	1,628	1,481
Mean exposure (days)	254.617	249.341	253.667	254.289	259.213	250.317	250.273	252.997
Hospitalizations (all-cause)	1.465	1.637	1.462	1.662	1.713	1.752	1.885	1.874
Potentially avoidable hospitalizations	0.517	0.505	0.524	0.462	0.714	0.714	0.753	0.665
Potentially avoidable hospitalizations (all six qualifying conditions)	0.283	0.281	0.326	0.239	0.408	0.437	0.388	0.334
Hospitalizations (pneumonia)	0.084	0.077	0.096	0.083	0.128	0.163	0.118	0.107
Hospitalizations (CHF)	0.084	0.074	0.099	0.063	0.112	0.116	0.096	0.091
Hospitalizations (COPD/asthma)	0.019	0.038	0.015	0.010	0.042	0.025	0.047	0.019
Hospitalizations (skin infection)	0.022	0.012	0.027	0.030	0.022	0.029	0.020	0.029
Hospitalizations (dehydration)	0.014	0.018	0.006	0.013	0.012	0.016	0.017	0.027
Hospitalizations (UTI)	0.060	0.062	0.081	0.040	0.092	0.089	0.091	0.061
ED visits (all-cause)	0.921	0.966	0.934	0.858	1.751	1.743	1.794	1.793
Potentially avoidable ED visits	0.400	0.366	0.422	0.376	0.878	0.839	0.815	0.793
Potentially avoidable ED visits (all six qualifying conditions)	0.079	0.080	0.124	0.096	0.282	0.283	0.258	0.278
ED visits (pneumonia)	0.016	0.015	0.021	0.013	0.058	0.056	0.044	0.053
ED visits (CHF)	0.003	0.012	0.009	0.010	0.024	0.029	0.025	0.021
ED visits (COPD/asthma)	0.003	0.006	0.009	0.000	0.036	0.027	0.047	0.032
ED visits (skin infection)	0.008	0.006	0.009	0.010	0.008	0.018	0.015	0.011
ED visits (dehydration)	0.008	0.006	0.003	0.007	0.036	0.025	0.027	0.024
ED visits (UTI)	0.041	0.035	0.072	0.057	0.120	0.129	0.101	0.136
Acute care transitions (all-cause)	2.421	2.619	2.426	2.553	3.490	3.513	3.723	3.694
Potentially avoidable acute care transitions	0.923	0.875	0.952	0.848	1.601	1.560	1.576	1.460
Potentially avoidable acute care transitions (all six qualifying conditions)	0.362	0.361	0.449	0.336	0.694	0.721	0.648	0.614
Acute care transitions (pneumonia)	0.101	0.092	0.118	0.096	0.186	0.219	0.162	0.160
Acute care transitions (CHF)	0.087	0.086	0.109	0.073	0.138	0.145	0.123	0.112
Acute care transitions (COPD/asthma)	0.022	0.044	0.024	0.010	0.078	0.051	0.093	0.053

(continued)

Table P-10. MOQI (MO): Utilization by service type, FY 2017–FY 2020 (continued)

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (skin infection)	0.030	0.018	0.036	0.040	0.030	0.047	0.034	0.040
Acute care transitions (dehydration)	0.022	0.024	0.009	0.020	0.048	0.040	0.044	0.051
Acute care transitions (UTI)	0.101	0.098	0.154	0.096	0.214	0.219	0.191	0.197

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-11.   NY-RAH (NY): Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	4,708	4,363	3,906	3,598	3,328	4,600	4,574	4,424	4,284	4,101
Mean exposure (days)	256.184	246.925	243.418	239.558	231.711	258.507	252.711	248.091	246.792	251.027
Hospitalizations (all-cause)	2.136	2.005	2.040	1.915	1.914	1.726	1.809	1.675	1.736	1.544
Potentially avoidable hospitalizations	0.822	0.692	0.661	0.559	0.564	0.622	0.618	0.574	0.584	0.488
Potentially avoidable hospitalizations (all six qualifying conditions)	0.442	0.372	0.361	0.305	0.329	0.378	0.369	0.337	0.341	0.272
Hospitalizations (pneumonia)	0.148	0.140	0.128	0.116	0.117	0.152	0.164	0.119	0.132	0.103
Hospitalizations (CHF)	0.079	0.068	0.075	0.050	0.069	0.069	0.064	0.091	0.076	0.066
Hospitalizations (COPD/asthma)	0.055	0.033	0.026	0.032	0.022	0.035	0.037	0.030	0.027	0.017
Hospitalizations (skin infection)	0.040	0.031	0.033	0.030	0.021	0.027	0.019	0.021	0.024	0.017
Hospitalizations (dehydration)	0.010	0.013	0.009	0.005	0.022	0.012	0.012	0.011	0.010	0.017
Hospitalizations (UTI)	0.111	0.087	0.089	0.072	0.079	0.083	0.073	0.065	0.072	0.051
ED visits (all-cause)	0.879	0.939	0.878	0.934	0.901	1.121	1.060	1.019	1.207	1.034
Potentially avoidable ED visits	0.364	0.380	0.342	0.384	0.354	0.494	0.457	0.424	0.566	0.458
Potentially avoidable ED visits (all six qualifying conditions)	0.065	0.063	0.062	0.051	0.066	0.083	0.112	0.091	0.109	0.088
ED visits (pneumonia)	0.004	0.006	0.005	0.007	0.004	0.007	0.019	0.010	0.022	0.009
ED visits (CHF)	0.001	0.003	0.001	0.005	0.001	0.005	0.010	0.008	0.005	0.006
ED visits (COPD/asthma)	0.007	0.005	0.007	0.002	0.006	0.007	0.012	0.009	0.009	0.009
ED visits (skin infection)	0.010	0.007	0.012	0.003	0.005	0.008	0.013	0.009	0.009	0.004
ED visits (dehydration)	0.012	0.006	0.008	0.005	0.009	0.011	0.009	0.008	0.015	0.010
ED visits (UTI)	0.032	0.036	0.028	0.029	0.040	0.045	0.049	0.046	0.048	0.051
Acute care transitions (all-cause)	3.015	2.944	2.919	2.849	2.818	2.850	2.873	2.697	2.944	2.579
Potentially avoidable acute care transitions	1.186	1.072	1.002	0.943	0.918	1.117	1.076	1.000	1.151	0.946
Potentially avoidable acute care transitions (all six qualifying conditions)	0.507	0.435	0.423	0.356	0.396	0.463	0.481	0.428	0.450	0.360
Acute care transitions (pneumonia)	0.152	0.146	0.134	0.123	0.121	0.159	0.183	0.129	0.154	0.112

(continued)

Table P-11.   NY-RAH (NY): Utilization by service type, FY 2012–FY 2016 (continued)
(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (CHF)	0.080	0.071	0.076	0.055	0.070	0.074	0.074	0.099	0.080	0.072
Acute care transitions (COPD/asthma)	0.061	0.038	0.034	0.035	0.029	0.042	0.049	0.039	0.037	0.026
Acute care transitions (skin infection)	0.050	0.038	0.044	0.034	0.026	0.035	0.032	0.030	0.033	0.021
Acute care transitions (dehydration)	0.022	0.019	0.018	0.009	0.031	0.024	0.021	0.019	0.026	0.026
Acute care transitions (UTI)	0.143	0.123	0.118	0.101	0.119	0.129	0.122	0.111	0.120	0.103

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-12. NY-RAH (NY): Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	3,403	3,499	3,510	4,045	3,912	3,696	3,640	3,870
Mean exposure (days)	226.703	227.544	221.910	209.841	246.760	242.311	243.724	218.545
Hospitalizations (all-cause)	1.880	1.953	1.873	2.131	1.448	1.697	1.528	1.695
Potentially avoidable hospitalizations	0.552	0.575	0.544	0.525	0.444	0.535	0.479	0.460
Potentially avoidable hospitalizations (all six qualifying conditions)	0.297	0.296	0.272	0.234	0.233	0.262	0.272	0.228
Hospitalizations (pneumonia)	0.091	0.103	0.087	0.077	0.063	0.105	0.098	0.080
Hospitalizations (CHF)	0.066	0.068	0.074	0.068	0.066	0.068	0.065	0.084
Hospitalizations (COPD/asthma)	0.039	0.024	0.017	0.015	0.029	0.012	0.019	0.014
Hospitalizations (skin infection)	0.012	0.019	0.012	0.013	0.015	0.018	0.019	0.013
Hospitalizations (dehydration)	0.022	0.009	0.012	0.012	0.012	0.011	0.011	0.007
Hospitalizations (UTI)	0.067	0.074	0.071	0.049	0.048	0.048	0.059	0.030
ED visits (all-cause)	1.038	1.089	1.123	1.034	0.956	1.163	1.100	1.089
Potentially avoidable ED visits	0.438	0.435	0.463	0.415	0.421	0.488	0.442	0.395
Potentially avoidable ED visits (all six qualifying conditions)	0.069	0.044	0.077	0.060	0.078	0.096	0.098	0.078
ED visits (pneumonia)	0.010	0.009	0.009	0.004	0.005	0.010	0.010	0.009
ED visits (CHF)	0.000	0.004	0.005	0.007	0.005	0.009	0.005	0.006
ED visits (COPD/asthma)	0.005	0.003	0.004	0.002	0.005	0.006	0.016	0.004
ED visits (skin infection)	0.005	0.001	0.005	0.008	0.008	0.007	0.009	0.004
ED visits (dehydration)	0.004	0.005	0.004	0.002	0.006	0.018	0.005	0.005
ED visits (UTI)	0.044	0.023	0.050	0.037	0.048	0.047	0.054	0.051
Acute care transitions (all-cause)	2.919	3.042	2.997	3.166	2.406	2.862	2.633	2.787
Potentially avoidable acute care transitions	0.990	1.010	1.008	0.940	0.866	1.023	0.921	0.855
Potentially avoidable acute care transitions (all six qualifying conditions)	0.366	0.340	0.349	0.295	0.311	0.358	0.370	0.306
Acute care transitions (pneumonia)	0.101	0.112	0.096	0.080	0.068	0.115	0.108	0.090
Acute care transitions (CHF)	0.066	0.072	0.080	0.075	0.071	0.077	0.070	0.090
Acute care transitions (COPD/asthma)	0.044	0.026	0.021	0.018	0.034	0.018	0.035	0.018

(continued)

Table P-12.   NY-RAH (NY): Utilization by service type, FY 2017–FY 2020 (continued)

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (skin infection)	0.017	0.020	0.017	0.021	0.023	0.025	0.028	0.017
Acute care transitions (dehydration)	0.026	0.014	0.015	0.014	0.019	0.029	0.016	0.012
Acute care transitions (UTI)	0.111	0.097	0.121	0.086	0.095	0.095	0.113	0.080

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-13. OPTIMISTIC (IN): Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,926	2,007	1,987	1,979	1,877	2,414	2,301	2,264	2,242	2,154
Mean exposure (days)	219.402	222.372	233.643	225.474	229.336	247.623	244.029	239.027	236.370	244.128
Hospitalizations (all-cause)	1.794	1.757	1.465	1.477	1.364	1.634	1.599	1.500	1.668	1.485
Potentially avoidable hospitalizations	0.781	0.663	0.534	0.536	0.511	0.728	0.695	0.626	0.696	0.609
Potentially avoidable hospitalizations (all six qualifying conditions)	0.476	0.423	0.252	0.262	0.246	0.465	0.420	0.325	0.392	0.333
Hospitalizations (pneumonia)	0.218	0.193	0.123	0.103	0.095	0.214	0.171	0.142	0.185	0.120
Hospitalizations (CHF)	0.097	0.052	0.037	0.045	0.051	0.075	0.082	0.068	0.083	0.086
Hospitalizations (COPD/asthma)	0.035	0.049	0.022	0.011	0.012	0.040	0.032	0.030	0.032	0.046
Hospitalizations (skin infection)	0.014	0.038	0.013	0.016	0.014	0.030	0.030	0.013	0.021	0.010
Hospitalizations (dehydration)	0.009	0.000	0.002	0.011	0.014	0.007	0.012	0.004	0.006	0.004
Hospitalizations (UTI)	0.102	0.092	0.056	0.076	0.060	0.099	0.093	0.068	0.066	0.068
ED visits (all-cause)	1.179	1.158	1.167	1.100	1.185	1.557	1.480	1.356	1.396	1.335
Potentially avoidable ED visits	0.592	0.571	0.549	0.527	0.530	0.729	0.746	0.626	0.657	0.685
Potentially avoidable ED visits (all six qualifying conditions)	0.118	0.150	0.136	0.114	0.107	0.222	0.242	0.209	0.206	0.196
ED visits (pneumonia)	0.021	0.022	0.017	0.016	0.014	0.049	0.046	0.041	0.045	0.036
ED visits (CHF)	0.002	0.011	0.004	0.011	0.012	0.023	0.014	0.017	0.025	0.032
ED visits (COPD/asthma)	0.009	0.009	0.015	0.004	0.012	0.010	0.032	0.024	0.028	0.029
ED visits (skin infection)	0.005	0.009	0.015	0.007	0.005	0.027	0.011	0.022	0.017	0.015
ED visits (dehydration)	0.005	0.004	0.004	0.002	0.007	0.018	0.011	0.022	0.015	0.011
ED visits (UTI)	0.076	0.094	0.080	0.074	0.058	0.095	0.128	0.083	0.075	0.072
Acute care transitions (all-cause)	2.982	2.933	2.639	2.600	2.562	3.210	3.099	2.873	3.098	2.841
Potentially avoidable acute care transitions	1.375	1.237	1.083	1.069	1.041	1.465	1.443	1.257	1.361	1.293
Potentially avoidable acute care transitions (all six qualifying conditions)	0.594	0.576	0.388	0.377	0.353	0.689	0.662	0.534	0.600	0.529
Acute care transitions (pneumonia)	0.239	0.215	0.140	0.119	0.109	0.263	0.217	0.183	0.230	0.156

Table P-13.   OPTIMISTIC (IN): Utilization by service type, FY 2012–FY 2016 (continued)
(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (CHF)	0.099	0.065	0.041	0.056	0.063	0.099	0.096	0.085	0.108	0.118
Acute care transitions (COPD/asthma)	0.045	0.058	0.037	0.016	0.023	0.050	0.064	0.054	0.060	0.074
Acute care transitions (skin infection)	0.019	0.047	0.028	0.022	0.019	0.057	0.041	0.035	0.040	0.025
Acute care transitions (dehydration)	0.014	0.004	0.006	0.013	0.021	0.025	0.023	0.026	0.021	0.015
Acute care transitions (UTI)	0.177	0.186	0.136	0.150	0.118	0.196	0.221	0.152	0.142	0.141

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-14. OPTIMISTIC (IN): Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,813	1,656	1,527	1,291	2,149	1,966	1,800	1,714
Mean exposure (days)	234.001	230.766	235.135	231.791	236.368	237.810	242.908	241.433
Hospitalizations (all-cause)	1.501	1.599	1.601	1.624	1.410	1.651	1.523	1.445
Potentially avoidable hospitalizations	0.573	0.573	0.668	0.591	0.567	0.650	0.636	0.515
Potentially avoidable hospitalizations (all six qualifying conditions)	0.292	0.288	0.329	0.194	0.297	0.357	0.327	0.263
Hospitalizations (pneumonia)	0.092	0.097	0.120	0.053	0.085	0.133	0.130	0.099
Hospitalizations (CHF)	0.061	0.065	0.125	0.070	0.077	0.103	0.085	0.080
Hospitalizations (COPD/asthma)	0.047	0.026	0.014	0.010	0.053	0.043	0.021	0.014
Hospitalizations (skin infection)	0.021	0.013	0.008	0.003	0.012	0.011	0.023	0.012
Hospitalizations (dehydration)	0.007	0.026	0.017	0.010	0.012	0.009	0.014	0.005
Hospitalizations (UTI)	0.064	0.060	0.045	0.047	0.059	0.060	0.055	0.053
ED visits (all-cause)	1.006	1.065	1.278	1.260	1.305	1.491	1.569	1.208
Potentially avoidable ED visits	0.453	0.510	0.557	0.528	0.587	0.764	0.762	0.546
Potentially avoidable ED visits (all six qualifying conditions)	0.104	0.118	0.120	0.124	0.124	0.165	0.210	0.133
ED visits (pneumonia)	0.016	0.010	0.008	0.013	0.014	0.017	0.018	0.024
ED visits (CHF)	0.005	0.005	0.011	0.027	0.014	0.017	0.023	0.019
ED visits (COPD/asthma)	0.016	0.013	0.014	0.007	0.006	0.017	0.037	0.002
ED visits (skin infection)	0.005	0.016	0.011	0.007	0.012	0.011	0.011	0.010
ED visits (dehydration)	0.009	0.008	0.003	0.000	0.014	0.017	0.016	0.012
ED visits (UTI)	0.052	0.065	0.072	0.070	0.065	0.086	0.105	0.065
Acute care transitions (all-cause)	2.520	2.677	2.894	2.887	2.725	3.161	3.120	2.673
Potentially avoidable acute care transitions	1.030	1.083	1.225	1.119	1.154	1.416	1.402	1.068
Potentially avoidable acute care transitions (all six qualifying conditions)	0.396	0.406	0.448	0.317	0.421	0.522	0.537	0.396
Acute care transitions (pneumonia)	0.108	0.107	0.128	0.067	0.098	0.150	0.149	0.123
Acute care transitions (CHF)	0.066	0.071	0.136	0.097	0.091	0.120	0.107	0.099
Acute care transitions (COPD/asthma)	0.064	0.039	0.028	0.017	0.059	0.060	0.057	0.017

(continued)

Table P-14.   OPTIMISTIC (IN): Utilization by service type, FY 2017–FY 2020 (continued)

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (skin infection)	0.026	0.029	0.019	0.010	0.024	0.021	0.034	0.022
Acute care transitions (dehydration)	0.016	0.034	0.019	0.010	0.026	0.026	0.030	0.017
Acute care transitions (UTI)	0.115	0.126	0.117	0.117	0.124	0.145	0.160	0.118

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-15.   RAVEN (PA): Utilization by service type, FY 2012–FY 2016

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,638	1,577	1,607	1,622	1,600	1,945	1,829	1,771	1,759	1,789
Mean exposure (days)	271.626	262.370	260.659	265.601	273.723	247.966	248.344	250.924	252.012	250.235
Hospitalizations (all-cause)	1.913	1.672	1.480	1.381	1.265	1.885	1.781	1.607	1.692	1.716
Potentially avoidable hospitalizations	0.823	0.754	0.540	0.462	0.402	0.910	0.768	0.659	0.638	0.670
Potentially avoidable hospitalizations (all six qualifying conditions)	0.551	0.469	0.332	0.258	0.187	0.612	0.489	0.389	0.395	0.351
Hospitalizations (pneumonia)	0.216	0.222	0.181	0.109	0.073	0.257	0.222	0.146	0.160	0.141
Hospitalizations (CHF)	0.106	0.085	0.045	0.049	0.021	0.126	0.084	0.079	0.111	0.083
Hospitalizations (COPD/asthma)	0.056	0.053	0.017	0.016	0.018	0.083	0.059	0.047	0.025	0.020
Hospitalizations (skin infection)	0.045	0.017	0.005	0.009	0.014	0.025	0.009	0.025	0.023	0.018
Hospitalizations (dehydration)	0.007	0.002	0.002	0.002	0.018	0.006	0.007	0.009	0.009	0.022
Hospitalizations (UTI)	0.121	0.089	0.081	0.072	0.043	0.114	0.108	0.083	0.068	0.067
ED visits (all-cause)	1.110	1.010	0.957	0.910	0.849	1.132	1.094	0.979	1.148	1.061
Potentially avoidable ED visits	0.488	0.541	0.406	0.392	0.395	0.520	0.462	0.428	0.474	0.411
Potentially avoidable ED visits (all six qualifying conditions)	0.115	0.186	0.117	0.111	0.105	0.164	0.121	0.097	0.158	0.114
ED visits (pneumonia)	0.016	0.034	0.029	0.028	0.018	0.035	0.015	0.005	0.018	0.018
ED visits (CHF)	0.009	0.017	0.019	0.009	0.011	0.023	0.009	0.005	0.005	0.007
ED visits (COPD/asthma)	0.011	0.022	0.010	0.009	0.011	0.012	0.018	0.007	0.014	0.007
ED visits (skin infection)	0.016	0.010	0.010	0.009	0.009	0.010	0.007	0.011	0.009	0.004
ED visits (dehydration)	0.007	0.022	0.014	0.002	0.009	0.019	0.015	0.014	0.020	0.004
ED visits (UTI)	0.056	0.082	0.036	0.053	0.046	0.064	0.057	0.056	0.092	0.074
Acute care transitions (all-cause)	3.041	2.692	2.449	2.300	2.121	3.025	2.888	2.595	2.847	2.781
Potentially avoidable acute care transitions	1.315	1.295	0.945	0.857	0.799	1.431	1.231	1.089	1.114	1.083
Potentially avoidable acute care transitions (all six qualifying conditions)	0.668	0.655	0.449	0.369	0.292	0.775	0.610	0.486	0.553	0.467
Acute care transitions (pneumonia)	0.232	0.256	0.210	0.137	0.091	0.292	0.238	0.151	0.178	0.159

(continued)

Table P-15.   RAVEN (PA): Utilization by service type, FY 2012–FY 2016 (continued)
(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (CHF)	0.117	0.102	0.064	0.058	0.032	0.149	0.092	0.083	0.115	0.089
Acute care transitions (COPD/asthma)	0.067	0.075	0.026	0.026	0.030	0.095	0.077	0.054	0.038	0.027
Acute care transitions (skin infection)	0.061	0.027	0.014	0.019	0.023	0.035	0.015	0.036	0.032	0.022
Acute care transitions (dehydration)	0.013	0.024	0.017	0.005	0.027	0.025	0.022	0.023	0.029	0.027
Acute care transitions (UTI)	0.178	0.172	0.117	0.125	0.089	0.178	0.165	0.140	0.160	0.143

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table P-16. RAVEN (PA): Utilization by service type, FY 2017–FY 2020

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,536	1,485	1,402	1,255	1,696	1,625	1,561	1,466
Mean exposure (days)	271.544	268.822	272.625	268.444	248.762	254.209	255.825	250.451
Hospitalizations (all-cause)	1.297	1.280	1.342	1.264	1.510	1.530	1.595	1.629
Potentially avoidable hospitalizations	0.429	0.431	0.536	0.401	0.529	0.557	0.556	0.523
Potentially avoidable hospitalizations (all six qualifying conditions)	0.218	0.251	0.256	0.172	0.292	0.320	0.311	0.264
Hospitalizations (pneumonia)	0.089	0.108	0.115	0.053	0.088	0.128	0.120	0.095
Hospitalizations (CHF)	0.046	0.050	0.060	0.053	0.071	0.092	0.108	0.068
Hospitalizations (COPD/asthma)	0.024	0.023	0.026	0.009	0.047	0.027	0.013	0.011
Hospitalizations (skin infection)	0.014	0.018	0.010	0.015	0.009	0.015	0.015	0.016
Hospitalizations (dehydration)	0.005	0.005	0.010	0.006	0.019	0.010	0.010	0.008
Hospitalizations (UTI)	0.041	0.048	0.034	0.036	0.057	0.048	0.045	0.065
ED visits (all-cause)	1.000	0.904	0.958	0.888	1.043	0.949	0.947	0.986
Potentially avoidable ED visits	0.420	0.383	0.385	0.395	0.405	0.392	0.381	0.376
Potentially avoidable ED visits (all six qualifying conditions)	0.122	0.115	0.099	0.137	0.111	0.126	0.118	0.109
ED visits (pneumonia)	0.024	0.025	0.029	0.021	0.014	0.012	0.015	0.011
ED visits (CHF)	0.024	0.010	0.010	0.009	0.012	0.010	0.005	0.008
ED visits (COPD/asthma)	0.005	0.010	0.003	0.009	0.017	0.010	0.005	0.003
ED visits (skin infection)	0.012	0.005	0.013	0.009	0.002	0.005	0.018	0.011
ED visits (dehydration)	0.002	0.000	0.003	0.018	0.009	0.005	0.003	0.003
ED visits (UTI)	0.055	0.065	0.042	0.071	0.057	0.085	0.073	0.074
Acute care transitions (all-cause)	2.302	2.187	2.305	2.158	2.553	2.489	2.544	2.617
Potentially avoidable acute care transitions	0.849	0.814	0.926	0.795	0.934	0.949	0.937	0.899
Potentially avoidable acute care transitions (all six qualifying conditions)	0.340	0.366	0.358	0.309	0.403	0.445	0.428	0.373
Acute care transitions (pneumonia)	0.113	0.133	0.144	0.074	0.102	0.140	0.135	0.106
Acute care transitions (CHF)	0.070	0.060	0.071	0.062	0.083	0.102	0.113	0.076
Acute care transitions (COPD/asthma)	0.029	0.033	0.029	0.018	0.064	0.036	0.018	0.014

Table P-16.   RAVEN (PA): Utilization by service type, FY 2017–FY 2020 (continued)

(rate per 1,000 Initiative-eligible resident-days)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (skin infection)	0.026	0.023	0.024	0.024	0.012	0.019	0.033	0.027
Acute care transitions (dehydration)	0.007	0.005	0.013	0.024	0.028	0.015	0.013	0.011
Acute care transitions (UTI)	0.096	0.113	0.078	0.107	0.114	0.133	0.118	0.139

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

APPENDIX Q
DESCRIPTIVE ANALYSIS OF EXPENDITURES

In this appendix, we present summary results from a descriptive analysis of Medicare expenditures per resident-year, reporting on total Medicare expenditures and expenditures associated with hospitalizations, emergency department visits, and any of these acute care transitions, for all-cause, potentially avoidable, and the six qualifying conditions aggregated and separately. Total expenditures cover all categories of Medicare spending: hospital, physician, skilled nursing facility (SNF), home health, durable medical equipment (DME), lab and other providers and suppliers, hospice, and Part D drugs. **Table Q-1** presents the results from the national comparison group. **Tables Q-2** through **Q-16** present the results by intervention group (Clinical + Payment and Payment-Only), combined across all ECCPs, and then separately for each ECCP.

Table Q-1. National comparison group: Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Measure	National comparison group				
	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	770,124	767,699	726,789	681,501	664,499
Mean exposure (days)	250	245	247	242	246
Total Medicare expenditures	26,118	26,074	26,561	28,145	28,247
Hospitalizations (all-cause)	7,510	7,669	7,485	7,873	7,808
Potentially avoidable hospitalizations	2,764	2,722	2,523	2,544	2,427
Potentially avoidable hospitalizations (all six qualifying conditions)	1,712	1,666	1,471	1,469	1,370
Hospitalizations (pneumonia)	870	866	722	706	627
Hospitalizations (CHF)	269	266	258	272	267
Hospitalizations (COPD/asthma)	144	141	117	118	106
Hospitalizations (skin infection)	121	111	103	107	89
Hospitalizations (dehydration)	31	26	26	22	44
Hospitalizations (UTI)	276	256	245	244	237
ED visits (all-cause)	302	316	341	374	387
Potentially avoidable ED visits	141	146	154	168	171
Potentially avoidable ED visits (all six qualifying conditions)	51	54	55	61	63
ED visits (pneumonia)	12	13	12	15	13
ED visits (CHF)	6	6	6	7	7
ED visits (COPD/asthma)	6	6	6	7	7
ED visits (skin infection)	3	3	3	3	3
ED visits (dehydration)	5	5	5	6	6
ED visits (UTI)	20	20	22	24	27
Acute care transitions (all-cause)	7,828	8,003	7,847	8,267	8,216
Potentially avoidable acute care transitions	2,909	2,873	2,682	2,717	2,603
Potentially avoidable acute care transitions (all six qualifying conditions)	1,764	1,721	1,528	1,532	1,435
Acute care transitions (pneumonia)	882	879	735	720	641
Acute care transitions (CHF)	276	272	265	280	275
Acute care transitions (COPD/asthma)	150	147	123	125	113
Acute care transitions (skin infection)	123	114	106	110	92
Acute care transitions (dehydration)	37	32	32	28	50
Acute care transitions (UTI)	296	277	267	268	264

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their expenditure to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-2.   National comparison group: Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Measure	National comparison group			
	2017	2018	2019	2020
Number of residents meeting eligibility criteria	645,452	623,897	591,699	574,318
Mean exposure (days)	243	243	245	243
Total Medicare expenditures	29,597	31,161	32,572	41,819
Hospitalizations (all-cause)	8,083	8,530	8,806	10,813
Potentially avoidable hospitalizations	2,463	2,562	2,578	2,544
Potentially avoidable hospitalizations (all six qualifying conditions)	1,375	1,422	1,401	1,332
Hospitalizations (pneumonia)	529	615	587	579
Hospitalizations (CHF)	319	334	338	312
Hospitalizations (COPD/asthma)	175	115	106	83
Hospitalizations (skin infection)	82	79	78	71
Hospitalizations (dehydration)	45	49	49	61
Hospitalizations (UTI)	225	230	242	227
ED visits (all-cause)	416	457	481	466
Potentially avoidable ED visits	181	199	208	192
Potentially avoidable ED visits (all six qualifying conditions)	68	75	77	70
ED visits (pneumonia)	14	16	15	15
ED visits (CHF)	8	9	9	8
ED visits (COPD/asthma)	7	8	8	7
ED visits (skin infection)	3	4	4	4
ED visits (dehydration)	7	7	6	6
ED visits (UTI)	29	31	34	30
Acute care transitions (all-cause)	8,520	9,009	9,311	11,298
Potentially avoidable acute care transitions	2,648	2,765	2,789	2,739
Potentially avoidable acute care transitions (all six qualifying conditions)	1,444	1,499	1,479	1,404
Acute care transitions (pneumonia)	543	631	603	594
Acute care transitions (CHF)	327	344	348	321
Acute care transitions (COPD/asthma)	183	124	115	90
Acute care transitions (skin infection)	85	83	82	75
Acute care transitions (dehydration)	52	56	55	67
Acute care transitions (UTI)	254	262	276	258

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their expenditure to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-3.   All ECCPs (all states): Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	13,345	13,034	12,525	12,298	11,734	15,078	14,664	14,470	14,151	13,662
Mean exposure (days)	252	246	250	246	249	252	252	248	246	252
Total Medicare expenditures	27,923	26,865	27,679	28,885	28,883	23,542	23,672	24,376	26,249	25,480
Hospitalizations (all-cause)	9,513	8,742	8,664	8,380	8,199	6,744	6,829	6,819	7,120	6,576
Potentially avoidable hospitalizations	2,974	2,595	2,393	2,207	2,061	2,241	2,218	2,094	2,153	1,895
Potentially avoidable hospitalizations (all six qualifying conditions)	1,669	1,468	1,234	1,111	999	1,344	1,303	1,133	1,217	977
Hospitalizations (pneumonia)	817	724	583	550	452	681	686	523	644	442
Hospitalizations (CHF)	291	255	223	208	193	249	246	272	249	235
Hospitalizations (COPD/asthma)	164	124	89	82	59	111	97	84	80	73
Hospitalizations (skin infection)	115	106	96	72	68	74	64	61	69	50
Hospitalizations (dehydration)	26	20	24	19	47	23	23	24	17	39
Hospitalizations (UTI)	256	239	219	181	179	205	187	169	158	138
ED visits (all-cause)	191	202	210	224	218	219	229	250	266	265
Potentially avoidable ED visits	85	94	90	92	91	104	106	112	120	118
Potentially avoidable ED visits (all six qualifying conditions)	20	24	22	21	22	31	34	33	35	38
ED visits (pneumonia)	2	3	4	3	3	7	7	6	8	6
ED visits (CHF)	2	3	2	3	2	5	4	4	3	5
ED visits (COPD/asthma)	2	2	3	2	2	3	4	5	4	4
ED visits (skin infection)	1	2	2	2	1	2	2	2	2	3
ED visits (dehydration)	2	2	1	1	3	3	2	3	4	3
ED visits (UTI)	10	12	10	10	11	11	15	14	14	16
Acute care transitions (all-cause)	9,711	8,959	8,886	8,621	8,436	6,976	7,071	7,091	7,404	6,854
Potentially avoidable acute care transitions	3,060	2,690	2,484	2,303	2,154	2,349	2,326	2,214	2,277	2,013
Potentially avoidable acute care transitions (all six qualifying conditions)	1,689	1,493	1,256	1,132	1,021	1,376	1,337	1,169	1,252	1,014

(continued)

Table Q-3. All ECCPs (all states): Medicare expenditures, FY 2012–FY 2016 (continued)

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (pneumonia)	819	727	587	553	455	688	693	529	652	448
Acute care transitions (CHF)	292	258	225	211	195	255	249	278	252	241
Acute care transitions (COPD/asthma)	166	126	91	84	61	114	101	89	84	77
Acute care transitions (skin infection)	117	108	98	74	69	76	66	63	72	53
Acute care transitions (dehydration)	28	22	25	20	50	26	26	27	21	42
Acute care transitions (UTI)	266	251	229	191	191	217	202	183	172	154

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-4.   All ECCPs (all states): Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	11,450	10,587	10,110	10,048	13,065	11,959	11,055	10,783
Mean exposure (days)	245	239	241	235	248	245	247	238
Total Medicare expenditures	30,743	33,648	34,265	46,140	26,633	28,614	29,966	37,635
Hospitalizations (all-cause)	8,465	9,564	9,680	13,121	6,365	7,179	7,551	8,854
Potentially avoidable hospitalizations	2,109	2,375	2,542	2,481	1,834	2,010	2,111	2,074
Potentially avoidable hospitalizations (all six qualifying conditions)	1,057	1,182	1,220	1,041	924	996	1,057	927
Hospitalizations (pneumonia)	446	544	540	449	312	423	432	366
Hospitalizations (CHF)	233	286	351	279	298	297	324	328
Hospitalizations (COPD/asthma)	123	87	78	49	118	60	61	43
Hospitalizations (skin infection)	50	51	45	71	37	56	52	42
Hospitalizations (dehydration)	40	39	37	47	32	32	34	34
Hospitalizations (UTI)	165	175	170	145	128	129	155	114
ED visits (all-cause)	234	257	272	270	273	314	335	323
Potentially avoidable ED visits	92	105	116	108	115	139	141	129
Potentially avoidable ED visits (all six qualifying conditions)	22	23	29	26	33	44	47	40
ED visits (pneumonia)	4	4	4	3	6	7	7	7
ED visits (CHF)	2	2	3	4	4	5	4	4
ED visits (COPD/asthma)	2	2	3	2	4	4	6	3
ED visits (skin infection)	1	2	1	2	1	2	4	3
ED visits (dehydration)	2	1	1	2	4	5	3	3
ED visits (UTI)	11	11	16	13	15	21	22	21
Acute care transitions (all-cause)	8,707	9,830	9,972	13,407	6,649	7,509	7,908	9,193
Potentially avoidable acute care transitions	2,201	2,481	2,661	2,593	1,950	2,151	2,256	2,206
Potentially avoidable acute care transitions (all six qualifying conditions)	1,079	1,205	1,249	1,067	958	1,040	1,104	968
Acute care transitions (pneumonia)	450	548	545	452	318	430	439	373
Acute care transitions (CHF)	235	288	354	283	301	301	329	332

(continued)

Table Q-4.   All ECCPs (all states): Medicare expenditures, FY 2017–FY 2020 (continued)

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (COPD/asthma)	125	90	80	51	121	65	67	47
Acute care transitions (skin infection)	52	53	46	73	39	58	56	45
Acute care transitions (dehydration)	41	40	39	48	35	36	37	37
Acute care transitions (UTI)	176	186	186	159	143	151	177	135

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-5. AQAF (AL): Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	2,502	2,430	2,387	2,423	2,408	2,109	2,026	2,069	1,999	1,948
Mean exposure (days)	260	257	266	259	262	257	260	253	259	259
Total Medicare expenditures	23,882	22,494	21,483	23,597	24,406	23,196	23,423	23,672	24,225	23,541
Hospitalizations (all-cause)	6,889	5,815	5,150	5,677	5,778	6,000	6,150	6,386	6,057	5,559
Potentially avoidable hospitalizations	2,352	2,018	1,769	1,869	1,767	2,293	2,398	2,379	2,090	1,553
Potentially avoidable hospitalizations (all six qualifying conditions)	1,363	1,191	834	932	714	1,439	1,480	1,403	1,173	807
Hospitalizations (pneumonia)	724	610	389	469	289	757	841	701	598	356
Hospitalizations (CHF)	230	214	194	212	135	260	217	299	237	187
Hospitalizations (COPD/asthma)	128	94	63	87	56	115	132	98	83	74
Hospitalizations (skin infection)	37	92	39	21	22	25	77	92	51	29
Hospitalizations (dehydration)	31	15	12	38	58	45	16	36	16	24
Hospitalizations (UTI)	213	167	137	105	153	237	197	177	186	138
ED visits (all-cause)	254	245	210	214	217	219	252	232	249	223
Potentially avoidable ED visits	117	117	94	98	93	104	107	98	98	96
Potentially avoidable ED visits (all six qualifying conditions)	35	31	24	28	25	33	28	28	26	34
ED visits (pneumonia)	5	5	2	2	3	5	3	1	4	2
ED visits (CHF)	5	4	6	9	4	6	3	4	2	7
ED visits (COPD/asthma)	3	2	2	2	2	4	6	6	3	5
ED visits (skin infection)	1	2	1	2	1	1	1	2	2	3
ED visits (dehydration)	4	2	1	2	3	3	2	3	2	2
ED visits (UTI)	16	17	12	11	12	15	14	11	13	15
Acute care transitions (all-cause)	7,153	6,078	5,391	5,914	6,019	6,274	6,425	6,646	6,313	5,787
Potentially avoidable acute care transitions	2,470	2,138	1,869	1,978	1,867	2,412	2,516	2,499	2,189	1,650
Potentially avoidable acute care transitions (all six qualifying conditions)	1,398	1,223	858	961	739	1,477	1,515	1,450	1,200	842

(continued)

Table Q-5.   AQAF (AL): Medicare expenditures, FY 2012–FY 2016 (continued)

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (pneumonia)	729	615	392	472	292	762	845	703	603	358
Acute care transitions (CHF)	235	218	200	221	139	270	220	323	240	195
Acute care transitions (COPD/asthma)	131	96	66	90	59	119	140	104	86	78
Acute care transitions (skin infection)	38	93	40	23	23	27	78	94	53	33
Acute care transitions (dehydration)	35	16	13	40	61	48	18	39	19	25
Acute care transitions (UTI)	230	184	149	116	165	252	214	188	199	153

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-6.   AQAF (AL): Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	2,216	1,531	1,353	1,254	1,811	1,403	1,070	984
Mean exposure (days)	253	226	238	237	258	251	246	256
Total Medicare expenditures	25,716	29,161	28,930	37,515	25,183	25,207	27,843	31,789
Hospitalizations (all-cause)	6,107	7,596	7,259	10,216	5,261	5,657	7,400	7,459
Potentially avoidable hospitalizations	1,702	2,296	2,398	2,328	1,549	1,748	2,381	2,470
Potentially avoidable hospitalizations (all six qualifying conditions)	766	1,018	998	999	756	911	1,398	1,205
Hospitalizations (pneumonia)	271	428	466	434	312	324	574	425
Hospitalizations (CHF)	205	300	255	255	133	238	447	425
Hospitalizations (COPD/asthma)	97	47	73	49	122	95	121	87
Hospitalizations (skin infection)	15	15	19	16	52	49	30	42
Hospitalizations (dehydration)	47	42	31	69	10	26	56	63
Hospitalizations (UTI)	131	186	155	176	127	180	170	163
ED visits (all-cause)	221	256	280	326	202	249	287	316
Potentially avoidable ED visits	80	124	127	116	94	110	136	147
Potentially avoidable ED visits (all six qualifying conditions)	21	31	33	26	25	36	44	51
ED visits (pneumonia)	2	7	2	3	3	4	4	5
ED visits (CHF)	3	4	5	4	4	6	7	7
ED visits (COPD/asthma)	4	1	5	4	3	4	4	5
ED visits (skin infection)	1	1	0	1	1	1	2	4
ED visits (dehydration)	2	2	6	3	2	5	2	6
ED visits (UTI)	8	15	14	11	13	17	24	26
Acute care transitions (all-cause)	6,333	7,857	7,558	10,545	5,473	5,911	7,697	7,778
Potentially avoidable acute care transitions	1,782	2,424	2,525	2,444	1,645	1,859	2,517	2,621
Potentially avoidable acute care transitions (all six qualifying conditions)	787	1,049	1,031	1,025	782	947	1,442	1,258
Acute care transitions (pneumonia)	273	435	468	436	315	328	578	430
Acute care transitions (CHF)	208	304	261	259	137	244	454	434

(continued)

Table Q-6. AQAF (AL): Medicare expenditures, FY 2017–FY 2020 (continued)

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (COPD/asthma)	101	48	77	53	125	99	125	91
Acute care transitions (skin infection)	17	16	20	17	52	49	32	45
Acute care transitions (dehydration)	49	45	36	72	12	31	58	69
Acute care transitions (UTI)	140	201	169	187	141	196	194	189

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-7.   ATOP 2 (NV/CO): Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Event	Clinical + Payment (Nevada)					Payment-Only (Colorado)				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,141	1,162	1,129	1,108	1,048	1,869	1,805	1,784	1,719	1,643
Mean exposure (days)	231	228	230	240	250	238	243	245	231	241
Total Medicare expenditures	28,983	27,613	28,362	30,264	31,268	19,137	17,839	18,020	18,550	19,726
Hospitalizations (all-cause)	10,939	9,931	9,864	9,748	11,378	4,776	4,087	4,288	4,003	4,641
Potentially avoidable hospitalizations	2,769	2,685	2,394	2,175	1,911	1,512	1,506	1,282	1,316	1,400
Potentially avoidable hospitalizations (all six qualifying conditions)	1,228	1,403	1,169	1,001	814	808	733	674	714	722
Hospitalizations (pneumonia)	716	749	633	670	319	421	399	302	392	397
Hospitalizations (CHF)	116	233	49	40	59	134	109	135	130	85
Hospitalizations (COPD/asthma)	130	76	75	24	34	37	65	86	67	25
Hospitalizations (skin infection)	99	123	203	38	199	95	54	65	42	63
Hospitalizations (dehydration)	15	35	0	11	11	3	2	3	9	71
Hospitalizations (UTI)	153	187	208	218	191	117	103	83	74	82
ED visits (all-cause)	192	251	321	419	275	207	246	264	269	362
Potentially avoidable ED visits	67	91	141	146	104	112	110	113	132	182
Potentially avoidable ED visits (all six qualifying conditions)	10	23	34	25	21	43	38	44	43	75
ED visits (pneumonia)	1	1	14	1	3	14	12	16	15	12
ED visits (CHF)	0	1	2	4	0	6	4	3	3	8
ED visits (COPD/asthma)	2	6	3	4	2	3	3	5	3	6
ED visits (skin infection)	2	2	2	1	2	4	4	5	6	8
ED visits (dehydration)	0	2	2	2	2	3	1	1	2	9
ED visits (UTI)	6	11	10	13	12	13	15	13	15	32
Acute care transitions (all-cause)	11,168	10,226	10,196	10,239	11,673	4,987	4,346	4,588	4,315	5,045
Potentially avoidable acute care transitions	2,836	2,775	2,534	2,321	2,020	1,624	1,616	1,402	1,474	1,582
Potentially avoidable acute care transitions (all six qualifying conditions)	1,238	1,426	1,202	1,026	836	851	771	718	757	797

(continued)

Table Q-7.   ATOP 2 (NV/CO): Medicare expenditures, FY 2012–FY 2016 (continued)

(dollars, per resident-year)

Event	Clinical + Payment (Nevada)					Payment-Only (Colorado)				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (pneumonia)	716	750	647	671	322	435	411	319	406	409
Acute care transitions (CHF)	116	234	51	44	59	140	114	138	133	93
Acute care transitions (COPD/asthma)	131	82	78	27	37	40	68	90	70	31
Acute care transitions (skin infection)	101	125	205	40	201	99	57	70	48	71
Acute care transitions (dehydration)	15	37	2	13	13	6	3	4	11	80
Acute care transitions (UTI)	158	198	218	231	203	131	117	97	89	114

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-8.   ATOP 2 (NV/CO): Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Event	Clinical + Payment (Nevada)				Payment-Only (Colorado)			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,075	1,085	1,046	1,053	1,601	1,505	1,377	1,292
Mean exposure (days)	245	248	251	261	235	238	247	241
Total Medicare expenditures	32,483	32,942	35,307	46,612	21,538	22,976	24,609	29,816
Hospitalizations (all-cause)	10,145	10,891	11,698	13,736	4,847	4,406	5,159	5,419
Potentially avoidable hospitalizations	1,884	2,428	2,569	2,441	1,451	1,264	1,340	1,540
Potentially avoidable hospitalizations (all six qualifying conditions)	803	1,118	1,430	1,306	659	553	656	683
Hospitalizations (pneumonia)	341	601	658	918	276	202	262	330
Hospitalizations (CHF)	133	246	431	113	210	207	217	252
Hospitalizations (COPD/asthma)	87	54	92	16	92	29	8	17
Hospitalizations (skin infection)	63	89	35	144	13	39	51	15
Hospitalizations (dehydration)	19	33	75	34	28	13	13	9
Hospitalizations (UTI)	160	95	140	80	41	63	106	60
ED visits (all-cause)	371	340	294	311	363	344	402	404
Potentially avoidable ED visits	129	121	107	119	153	147	181	162
Potentially avoidable ED visits (all six qualifying conditions)	36	24	26	34	58	50	75	51
ED visits (pneumonia)	4	1	1	0	17	14	25	11
ED visits (CHF)	3	3	2	7	8	2	5	4
ED visits (COPD/asthma)	0	6	8	8	4	8	9	8
ED visits (skin infection)	4	4	0	4	3	6	10	6
ED visits (dehydration)	4	0	0	1	4	1	2	2
ED visits (UTI)	22	10	14	14	22	21	24	19
Acute care transitions (all-cause)	10,529	11,271	11,994	14,103	5,226	4,778	5,578	5,842
Potentially avoidable acute care transitions	2,013	2,549	2,676	2,559	1,607	1,424	1,531	1,703
Potentially avoidable acute care transitions (all six qualifying conditions)	839	1,141	1,456	1,340	717	603	731	734
Acute care transitions (pneumonia)	345	602	659	918	293	216	287	341
Acute care transitions (CHF)	137	248	433	120	218	208	222	257

(continued)

Table Q-8.   ATOP 2 (NV/CO): Medicare expenditures, FY 2017–FY 2020 (continued)

(dollars, per resident-year)

Event	Clinical + Payment (Nevada)				Payment-Only (Colorado)			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (COPD/asthma)	87	60	100	24	96	37	18	26
Acute care transitions (skin infection)	66	93	35	148	15	45	61	21
Acute care transitions (dehydration)	23	33	75	35	31	13	15	11
Acute care transitions (UTI)	181	105	154	94	63	84	130	79

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-9. MOQI (MO): Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,474	1,537	1,547	1,603	1,511	2,177	2,165	2,185	2,178	2,052
Mean exposure (days)	252	251	260	248	258	252	256	253	248	262
Total Medicare expenditures	25,499	22,769	23,617	25,518	24,096	22,809	21,213	22,081	24,486	22,213
Hospitalizations (all-cause)	7,599	5,906	5,991	6,308	5,402	6,184	5,615	5,692	6,757	5,333
Potentially avoidable hospitalizations	2,782	2,025	2,000	2,105	1,761	2,367	2,366	2,140	2,328	1,918
Potentially avoidable hospitalizations (all six qualifying conditions)	1,863	1,148	881	1,189	981	1,541	1,346	1,102	1,398	1,071
Hospitalizations (pneumonia)	1,075	559	470	602	388	775	789	601	873	525
Hospitalizations (CHF)	226	258	175	313	263	351	257	244	223	213
Hospitalizations (COPD/asthma)	112	58	56	31	76	124	67	48	71	88
Hospitalizations (skin infection)	158	76	48	123	77	99	68	19	93	46
Hospitalizations (dehydration)	44	15	17	9	15	24	19	27	17	28
Hospitalizations (UTI)	248	182	115	112	161	169	146	164	120	169
ED visits (all-cause)	242	216	216	168	220	292	274	347	353	333
Potentially avoidable ED visits	104	97	84	68	78	143	139	172	170	153
Potentially avoidable ED visits (all six qualifying conditions)	28	20	18	16	18	44	47	54	52	49
ED visits (pneumonia)	3	3	3	6	2	13	7	8	11	13
ED visits (CHF)	2	4	1	0	0	6	8	5	5	7
ED visits (COPD/asthma)	3	1	2	2	1	7	6	14	10	3
ED visits (skin infection)	0	3	1	1	2	2	3	2	2	3
ED visits (dehydration)	5	3	0	1	5	5	5	3	7	3
ED visits (UTI)	16	7	10	6	8	12	18	21	16	19
Acute care transitions (all-cause)	7,850	6,124	6,229	6,491	5,643	6,490	5,897	6,082	7,115	5,688
Potentially avoidable acute care transitions	2,887	2,121	2,084	2,173	1,842	2,518	2,507	2,331	2,499	2,072
Potentially avoidable acute care transitions (all six qualifying conditions)	1,892	1,168	899	1,205	999	1,586	1,394	1,156	1,451	1,120

(continued)

Table Q-9.   MOQI (MO): Medicare expenditures, FY 2012–FY 2016 (continued)

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (pneumonia)	1,078	561	473	607	389	787	795	609	884	538
Acute care transitions (CHF)	228	262	176	313	263	357	266	249	228	221
Acute care transitions (COPD/asthma)	114	59	59	33	77	131	72	62	82	92
Acute care transitions (skin infection)	159	78	49	124	79	101	71	21	97	49
Acute care transitions (dehydration)	49	18	17	10	21	29	25	30	24	32
Acute care transitions (UTI)	264	189	126	118	170	181	164	185	136	188

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-10. MOQI (MO): Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,441	1,355	1,307	1,183	1,927	1,788	1,628	1,480
Mean exposure (days)	255	250	254	254	259	250	250	253
Total Medicare expenditures	26,120	27,549	26,964	37,103	23,920	25,611	28,213	32,652
Hospitalizations (all-cause)	5,754	6,333	5,611	9,364	5,715	6,178	6,774	7,518
Potentially avoidable hospitalizations	1,611	1,514	1,639	1,639	2,060	2,197	2,232	2,201
Potentially avoidable hospitalizations (all six qualifying conditions)	750	765	906	764	1,064	1,186	1,006	954
Hospitalizations (pneumonia)	276	278	305	291	375	492	388	344
Hospitalizations (CHF)	261	248	314	243	322	371	253	297
Hospitalizations (COPD/asthma)	45	77	38	22	98	50	81	51
Hospitalizations (skin infection)	37	21	71	94	55	71	46	80
Hospitalizations (dehydration)	20	33	14	33	22	29	34	59
Hospitalizations (UTI)	111	109	165	81	193	173	205	124
ED visits (all-cause)	209	254	248	221	355	415	431	439
Potentially avoidable ED visits	82	85	100	89	159	184	196	189
Potentially avoidable ED visits (all six qualifying conditions)	13	25	32	26	60	73	70	81
ED visits (pneumonia)	3	5	7	6	14	16	12	18
ED visits (CHF)	0	3	4	3	5	8	6	5
ED visits (COPD/asthma)	1	4	2	0	9	6	14	8
ED visits (skin infection)	1	2	1	1	1	3	5	4
ED visits (dehydration)	1	2	0	1	10	8	10	7
ED visits (UTI)	6	9	18	15	21	31	22	39
Acute care transitions (all-cause)	5,981	6,595	5,956	9,644	6,098	6,612	7,292	7,996
Potentially avoidable acute care transitions	1,695	1,601	1,762	1,758	2,221	2,386	2,443	2,391
Potentially avoidable acute care transitions (all six qualifying conditions)	762	790	938	790	1,124	1,258	1,083	1,037
Acute care transitions (pneumonia)	279	283	312	296	389	508	400	363
Acute care transitions (CHF)	261	251	319	246	327	379	265	302

(continued)

Table Q-10. MOQI (MO): Medicare expenditures, FY 2017–FY 2020 (continued)

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (COPD/asthma)	46	80	39	22	107	57	95	60
Acute care transitions (skin infection)	37	23	72	95	56	74	51	84
Acute care transitions (dehydration)	22	35	14	34	32	36	44	66
Acute care transitions (UTI)	118	118	182	96	213	205	227	163

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-11.   NY-RAH (NY): Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	4,671	4,328	3,880	3,573	3,297	4,574	4,542	4,401	4,258	4,078
Mean exposure (days)	258	248	245	241	233	260	254	249	248	252
Total Medicare expenditures	31,020	31,239	34,491	35,460	37,028	24,951	26,595	28,047	30,647	29,615
Hospitalizations (all-cause)	13,009	12,806	13,910	13,068	13,351	9,025	9,601	9,539	9,850	8,860
Potentially avoidable hospitalizations	3,775	3,376	3,508	2,972	2,996	2,453	2,491	2,385	2,444	2,103
Potentially avoidable hospitalizations (all six qualifying conditions)	2,013	1,886	1,941	1,570	1,700	1,398	1,479	1,349	1,357	1,087
Hospitalizations (pneumonia)	854	871	769	713	803	686	766	546	664	462
Hospitalizations (CHF)	397	335	415	274	353	242	286	394	268	315
Hospitalizations (COPD/asthma)	246	155	150	165	87	106	94	92	104	55
Hospitalizations (skin infection)	149	135	195	126	99	90	75	62	78	67
Hospitalizations (dehydration)	29	36	56	16	82	33	41	39	27	46
Hospitalizations (UTI)	338	353	356	277	275	241	216	217	217	142
ED visits (all-cause)	133	159	176	215	211	172	180	201	241	215
Potentially avoidable ED visits	61	72	72	91	86	78	81	83	113	93
Potentially avoidable ED visits (all six qualifying conditions)	10	12	14	14	17	13	24	19	24	21
ED visits (pneumonia)	0	1	1	2	1	1	5	3	5	2
ED visits (CHF)	0	1	0	1	0	2	3	2	1	2
ED visits (COPD/asthma)	1	1	3	1	1	1	3	1	2	3
ED visits (skin infection)	1	1	2	2	1	1	2	1	1	1
ED visits (dehydration)	2	1	1	1	2	2	2	2	4	3
ED visits (UTI)	6	6	6	7	11	7	10	9	11	10
Acute care transitions (all-cause)	13,142	12,966	14,086	13,283	13,563	9,200	9,784	9,745	10,092	9,076
Potentially avoidable acute care transitions	3,836	3,449	3,580	3,063	3,082	2,531	2,572	2,472	2,557	2,196
Potentially avoidable acute care transitions (all six qualifying conditions)	2,023	1,898	1,955	1,584	1,717	1,412	1,503	1,368	1,381	1,109

(continued)

Table Q-11. NY-RAH (NY): Medicare expenditures, FY 2012–FY 2016 (continued)

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (pneumonia)	855	872	770	715	804	687	771	549	669	464
Acute care transitions (CHF)	397	336	415	275	353	244	289	396	269	317
Acute care transitions (COPD/asthma)	247	156	153	165	88	107	97	93	106	58
Acute care transitions (skin infection)	150	137	197	128	100	91	77	64	79	68
Acute care transitions (dehydration)	31	37	58	17	85	35	43	40	31	49
Acute care transitions (UTI)	343	360	362	284	287	248	226	226	228	152

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-12. NY-RAH (NY): Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	3,372	3,479	3,482	4,015	3,886	3,674	3,623	3,851
Mean exposure (days)	228	229	223	211	248	243	245	219
Total Medicare expenditures	38,695	42,230	42,558	60,059	30,793	34,259	35,174	48,859
Hospitalizations (all-cause)	13,508	14,200	14,256	19,566	8,614	10,133	9,927	12,741
Potentially avoidable hospitalizations	3,106	3,290	3,133	3,355	2,057	2,392	2,298	2,284
Potentially avoidable hospitalizations (all six qualifying conditions)	1,767	1,716	1,542	1,454	1,092	1,135	1,196	1,015
Hospitalizations (pneumonia)	798	821	679	575	324	522	475	392
Hospitalizations (CHF)	335	374	402	417	410	311	378	418
Hospitalizations (COPD/asthma)	214	131	91	80	131	43	69	46
Hospitalizations (skin infection)	65	71	61	92	41	78	61	36
Hospitalizations (dehydration)	85	37	38	71	38	53	31	29
Hospitalizations (UTI)	271	282	270	220	148	129	183	94
ED visits (all-cause)	229	250	289	276	220	279	294	282
Potentially avoidable ED visits	99	110	124	114	90	121	114	100
Potentially avoidable ED visits (all six qualifying conditions)	18	12	21	17	19	31	30	22
ED visits (pneumonia)	4	2	2	1	2	4	3	3
ED visits (CHF)	0	2	2	3	1	3	2	2
ED visits (COPD/asthma)	1	1	1	1	1	1	3	1
ED visits (skin infection)	1	0	2	2	1	2	2	1
ED visits (dehydration)	1	1	1	1	2	5	2	1
ED visits (UTI)	12	6	13	10	12	16	19	15
Acute care transitions (all-cause)	13,738	14,449	14,545	19,842	8,835	10,413	10,222	13,031
Potentially avoidable acute care transitions	3,205	3,400	3,257	3,469	2,148	2,513	2,412	2,384
Potentially avoidable acute care transitions (all six qualifying conditions)	1,785	1,728	1,562	1,471	1,112	1,166	1,226	1,038
Acute care transitions (pneumonia)	801	823	682	575	326	525	477	395
Acute care transitions (CHF)	335	375	404	420	411	314	380	420

(continued)

Table Q-12.   NY-RAH (NY): Medicare expenditures, FY 2017–FY 2020 (continued)

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (COPD/asthma)	215	132	92	80	133	44	72	47
Acute care transitions (skin infection)	66	71	63	94	42	80	63	37
Acute care transitions (dehydration)	85	38	39	71	40	59	32	30
Acute care transitions (UTI)	283	288	283	230	160	145	202	109

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-13. OPTIMISTIC (IN): Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,920	2,003	1,982	1,975	1,873	2,411	2,299	2,261	2,240	2,153
Mean exposure (days)	220	223	234	226	230	248	244	239	237	244
Total Medicare expenditures	27,667	27,557	28,449	29,479	28,499	23,664	23,714	24,222	26,757	25,618
Hospitalizations (all-cause)	7,028	7,172	6,821	6,542	6,285	5,253	5,602	5,477	6,158	5,623
Potentially avoidable hospitalizations	2,640	2,208	1,926	2,026	2,015	1,977	1,926	1,806	2,207	1,943
Potentially avoidable hospitalizations (all six qualifying conditions)	1,424	1,319	849	768	804	1,158	1,110	876	1,237	966
Hospitalizations (pneumonia)	778	699	487	341	413	602	488	437	707	430
Hospitalizations (CHF)	240	154	106	156	155	193	279	183	248	254
Hospitalizations (COPD/asthma)	105	127	63	24	35	93	67	68	74	113
Hospitalizations (skin infection)	70	136	34	52	39	69	63	44	67	21
Hospitalizations (dehydration)	13	0	6	22	37	9	23	6	7	17
Hospitalizations (UTI)	218	202	153	174	126	192	189	138	134	130
ED visits (all-cause)	197	212	232	226	246	266	267	293	272	282
Potentially avoidable ED visits	96	98	103	90	112	119	127	136	120	133
Potentially avoidable ED visits (all six qualifying conditions)	19	30	29	23	25	40	47	46	42	45
ED visits (pneumonia)	3	3	5	3	5	9	11	9	10	9
ED visits (CHF)	1	5	1	2	2	6	4	5	6	9
ED visits (COPD/asthma)	1	2	3	1	5	2	6	6	5	6
ED visits (skin infection)	0	1	2	1	1	4	1	3	3	3
ED visits (dehydration)	1	2	1	0	1	3	2	5	2	3
ED visits (UTI)	13	17	16	16	12	17	24	18	16	15
Acute care transitions (all-cause)	7,233	7,408	7,058	6,786	6,578	5,525	5,889	5,785	6,493	5,929
Potentially avoidable acute care transitions	2,736	2,307	2,029	2,124	2,127	2,098	2,054	1,943	2,330	2,076
Potentially avoidable acute care transitions (all six qualifying conditions)	1,443	1,350	878	791	830	1,198	1,157	922	1,279	1,011

(continued)

Table Q-13. OPTIMISTIC (IN): Medicare expenditures, FY 2012–FY 2016 (continued)

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (pneumonia)	781	702	493	343	418	611	499	446	717	439
Acute care transitions (CHF)	240	160	107	157	157	199	283	188	254	263
Acute care transitions (COPD/asthma)	106	129	66	24	39	95	74	74	79	120
Acute care transitions (skin infection)	70	137	36	53	40	73	64	47	70	24
Acute care transitions (dehydration)	14	2	7	22	38	12	25	11	9	20
Acute care transitions (UTI)	231	219	169	190	138	209	213	156	149	146

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-14. OPTIMISTIC (IN): Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,810	1,653	1,523	1,289	2,147	1,966	1,798	1,713
Mean exposure (days)	234	231	236	232	237	238	243	242
Total Medicare expenditures	30,089	32,507	34,770	42,443	26,514	28,165	27,605	31,259
Hospitalizations (all-cause)	6,667	7,241	8,156	8,692	5,329	6,458	6,300	6,352
Potentially avoidable hospitalizations	2,031	2,150	2,910	2,436	1,819	2,141	2,288	1,934
Potentially avoidable hospitalizations (all six qualifying conditions)	920	1,075	1,298	572	830	1,019	1,008	817
Hospitalizations (pneumonia)	342	413	570	162	260	421	436	337
Hospitalizations (CHF)	227	295	477	206	276	321	271	255
Hospitalizations (COPD/asthma)	151	107	70	47	143	106	57	43
Hospitalizations (skin infection)	44	61	31	14	24	26	60	26
Hospitalizations (dehydration)	12	57	48	25	21	17	54	35
Hospitalizations (UTI)	145	143	102	117	105	127	130	120
ED visits (all-cause)	212	257	292	286	289	370	418	325
Potentially avoidable ED visits	84	115	133	118	129	187	173	140
Potentially avoidable ED visits (all six qualifying conditions)	24	29	42	32	29	52	56	39
ED visits (pneumonia)	4	3	6	3	4	7	5	7
ED visits (CHF)	2	1	2	8	3	5	8	7
ED visits (COPD/asthma)	4	4	4	1	2	6	9	1
ED visits (skin infection)	1	4	2	4	2	2	2	2
ED visits (dehydration)	2	2	1	0	4	5	6	3
ED visits (UTI)	11	15	27	15	15	27	27	18
Acute care transitions (all-cause)	6,894	7,517	8,466	8,981	5,640	6,860	6,748	6,695
Potentially avoidable acute care transitions	2,117	2,265	3,042	2,554	1,948	2,329	2,463	2,088
Potentially avoidable acute care transitions (all six qualifying conditions)	944	1,105	1,339	604	859	1,071	1,064	856
Acute care transitions (pneumonia)	345	416	576	165	264	428	441	344
Acute care transitions (CHF)	229	295	479	214	279	326	279	262

(continued)

Table Q-14. OPTIMISTIC (IN): Medicare expenditures, FY 2017–FY 2020 (continued)

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (COPD/asthma)	154	111	74	49	145	112	65	44
Acute care transitions (skin infection)	45	65	32	18	26	28	62	28
Acute care transitions (dehydration)	14	59	49	25	25	23	60	39
Acute care transitions (UTI)	156	158	129	133	119	154	157	138

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-15. RAVEN (PA): Medicare expenditures, FY 2012–FY 2016

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Number of residents meeting eligibility criteria	1,637	1,574	1,600	1,616	1,597	1,938	1,827	1,770	1,757	1,788
Mean exposure (days)	272	263	261	266	274	249	249	251	252	250
Total Medicare expenditures	27,102	24,690	24,250	25,108	24,239	25,215	25,113	25,447	26,581	27,035
Hospitalizations (all-cause)	7,004	6,172	5,960	5,933	5,112	6,261	6,219	6,146	6,248	6,804
Potentially avoidable hospitalizations	2,315	2,325	1,705	1,470	1,242	2,516	2,181	2,133	2,006	2,160
Potentially avoidable hospitalizations (all six qualifying conditions)	1,515	1,300	1,044	805	497	1,607	1,386	1,083	1,144	1,039
Hospitalizations (pneumonia)	734	679	639	438	245	813	702	480	522	444
Hospitalizations (CHF)	298	227	113	130	50	315	251	219	358	246
Hospitalizations (COPD/asthma)	118	175	56	51	37	198	166	109	49	92
Hospitalizations (skin infection)	155	39	6	32	23	51	27	87	66	63
Hospitalizations (dehydration)	10	3	12	6	30	9	13	15	13	47
Hospitalizations (UTI)	200	177	217	150	111	221	227	173	137	147
ED visits (all-cause)	209	195	189	188	168	210	212	209	232	241
Potentially avoidable ED visits	89	112	84	77	79	100	95	92	88	81
Potentially avoidable ED visits (all six qualifying conditions)	23	46	29	27	27	36	27	24	32	23
ED visits (pneumonia)	5	9	7	7	6	10	4	1	4	3
ED visits (CHF)	2	4	6	2	4	8	2	3	1	2
ED visits (COPD/asthma)	2	6	3	3	4	2	4	1	2	2
ED visits (skin infection)	2	2	2	2	1	1	0	1	1	1
ED visits (dehydration)	1	7	3	1	3	4	4	4	4	1
ED visits (UTI)	12	18	8	12	10	10	12	14	20	15
Acute care transitions (all-cause)	7,218	6,399	6,157	6,128	5,286	6,475	6,446	6,373	6,488	7,046
Potentially avoidable acute care transitions	2,405	2,437	1,789	1,549	1,322	2,617	2,277	2,228	2,098	2,241
Potentially avoidable acute care transitions (all six qualifying conditions)	1,539	1,346	1,073	832	524	1,643	1,413	1,107	1,176	1,063

(continued)

Table Q-15.   RAVEN (PA): Medicare expenditures, FY 2012–FY 2016 (continued)

(dollars, per resident-year)

Event	Clinical + Payment					Payment-Only				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Acute care transitions (pneumonia)	739	689	646	445	251	823	706	481	526	447
Acute care transitions (CHF)	300	231	119	132	54	322	253	222	359	248
Acute care transitions (COPD/asthma)	120	181	59	53	41	201	169	110	51	94
Acute care transitions (skin infection)	157	41	8	34	24	52	28	88	67	63
Acute care transitions (dehydration)	11	10	15	7	33	14	17	20	17	48
Acute care transitions (UTI)	212	195	225	162	121	230	240	187	157	162

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

Table Q-16. RAVEN (PA): Medicare expenditures, FY 2017–FY 2020

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,536	1,484	1,399	1,254	1,693	1,623	1,559	1,463
Mean exposure (days)	272	269	273	269	249	254	256	251
Total Medicare expenditures	26,473	27,173	27,036	29,708	26,644	27,959	28,750	34,733
Hospitalizations (all-cause)	5,492	6,102	5,987	6,264	5,823	6,389	6,579	7,971
Potentially avoidable hospitalizations	1,474	1,530	1,884	1,244	1,730	1,700	1,854	1,803
Potentially avoidable hospitalizations (all six qualifying conditions)	709	763	808	484	913	921	969	839
Hospitalizations (pneumonia)	354	404	415	160	306	410	426	352
Hospitalizations (CHF)	125	148	184	186	300	286	342	233
Hospitalizations (COPD/asthma)	55	47	87	25	96	54	33	21
Hospitalizations (skin infection)	81	36	29	37	30	44	42	57
Hospitalizations (dehydration)	8	32	26	9	68	27	23	19
Hospitalizations (UTI)	86	96	66	68	112	100	103	158
ED visits (all-cause)	219	218	219	198	276	243	213	234
Potentially avoidable ED visits	88	77	92	87	90	95	82	85
Potentially avoidable ED visits (all six qualifying conditions)	29	28	30	38	27	32	27	26
ED visits (pneumonia)	7	6	9	6	3	3	3	2
ED visits (CHF)	7	4	4	4	4	4	1	3
ED visits (COPD/asthma)	2	2	1	1	6	4	1	1
ED visits (skin infection)	2	1	2	1	0	1	4	2
ED visits (dehydration)	1	0	1	5	2	1	0	1
ED visits (UTI)	11	15	14	20	13	20	18	18
Acute care transitions (all-cause)	5,714	6,321	6,209	6,472	6,099	6,659	6,799	8,213
Potentially avoidable acute care transitions	1,562	1,608	1,978	1,332	1,820	1,795	1,937	1,887
Potentially avoidable acute care transitions (all six qualifying conditions)	738	791	839	521	940	954	996	866
Acute care transitions (pneumonia)	361	410	424	166	309	413	430	354
Acute care transitions (CHF)	132	152	188	189	304	290	343	235

(continued)

Table Q-16. RAVEN (PA): Medicare expenditures, FY 2017–FY 2020 (continued)

(dollars, per resident-year)

Event	Clinical + Payment				Payment-Only			
	2017	2018	2019	2020	2017	2018	2019	2020
Acute care transitions (COPD/asthma)	56	49	88	27	102	58	33	21
Acute care transitions (skin infection)	83	36	31	38	31	46	46	59
Acute care transitions (dehydration)	8	32	27	14	70	28	23	20
Acute care transitions (UTI)	97	111	81	87	125	120	121	176

CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; ED = emergency department; UTI = urinary tract infection; — = not measured in specific year.

SOURCE: RTI analysis of Medicare claims data.

NOTES: Each individual resident contributes their count of events to the aggregated numerator and their count of Initiative-eligible days to the aggregated denominator. Acute care transitions include hospitalizations, ED visits, and observation stays. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*. The number of residents meeting eligibility criteria is slightly smaller for expenditure descriptive analyses than utilization descriptive analyses due to extra exclusions that were made, as described in *Table I-3* in *Appendix I*.

APPENDIX R
IMPACT OF NFI 2 ON MDS-BASED QUALITY MEASURES

R.1   Overview

In **Section II.7** of the final report, we describe results from our multivariate regression analysis of Minimum Data Set (MDS)-based quality measures for FY 2017 through FY 2019, and in **Section IV.3** we describe descriptive results for FY 2020. As context for this analysis, in this appendix we present descriptive results for MDS-based quality measures selected for the evaluation, reporting the percentage of observed quarters with each event for the average resident. **Figures R-1** through **R-10**, show the trends over time and provide comparisons between the Clinical + Payment (C+P), Payment-Only (P-O), and national comparison group for each of the quality measures. **Table R-1** presents the summary results for the national comparison group. **Tables R-2** through **R-8** present the results by intervention group (C+P and P-O), combined across all ECCPs, and then separately for each ECCP.

This appendix also includes multivariate analyses. **Tables R-9** through **R-15** present the difference-in-difference results by intervention group (C+P and P-O), combined across all ECCPs (presented in **Section II.7**), and then separately for each ECCP.

R.2   Descriptive Results

Figure R-1.   All ECCPs: Catheter inserted and left in bladder, FY 2014–FY 2020
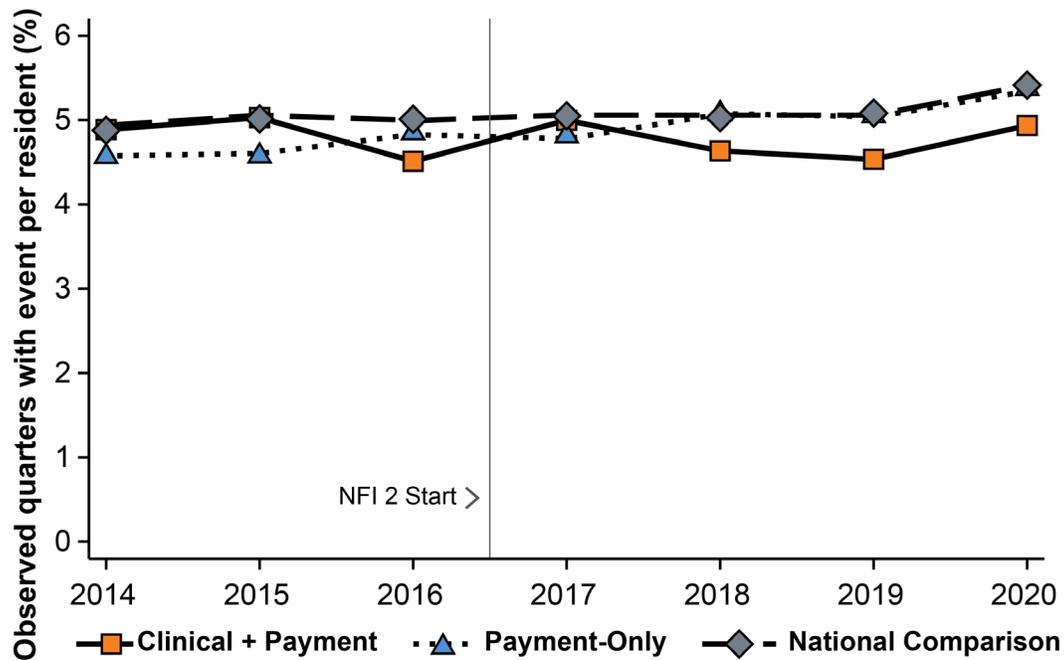
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see **Appendix J and Table I-3** in **Appendix I**.

Figure R-2.   All ECCPs: One or more falls with injuries, FY 2014–FY 2020
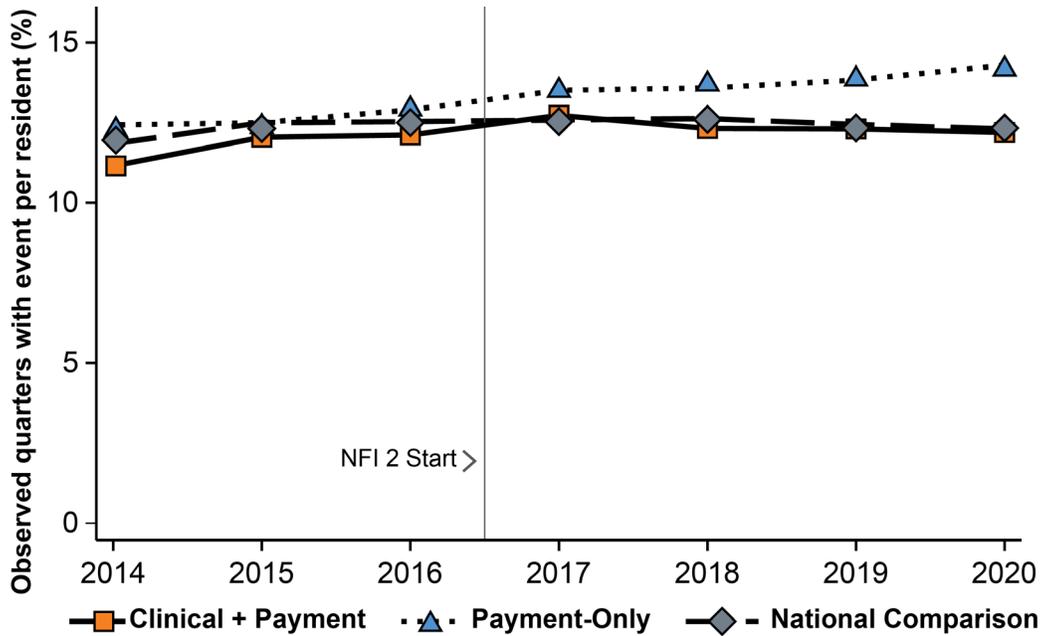
NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-3.   All ECCPs: Resident-reported moderate to severe pain, FY 2014–FY 2020
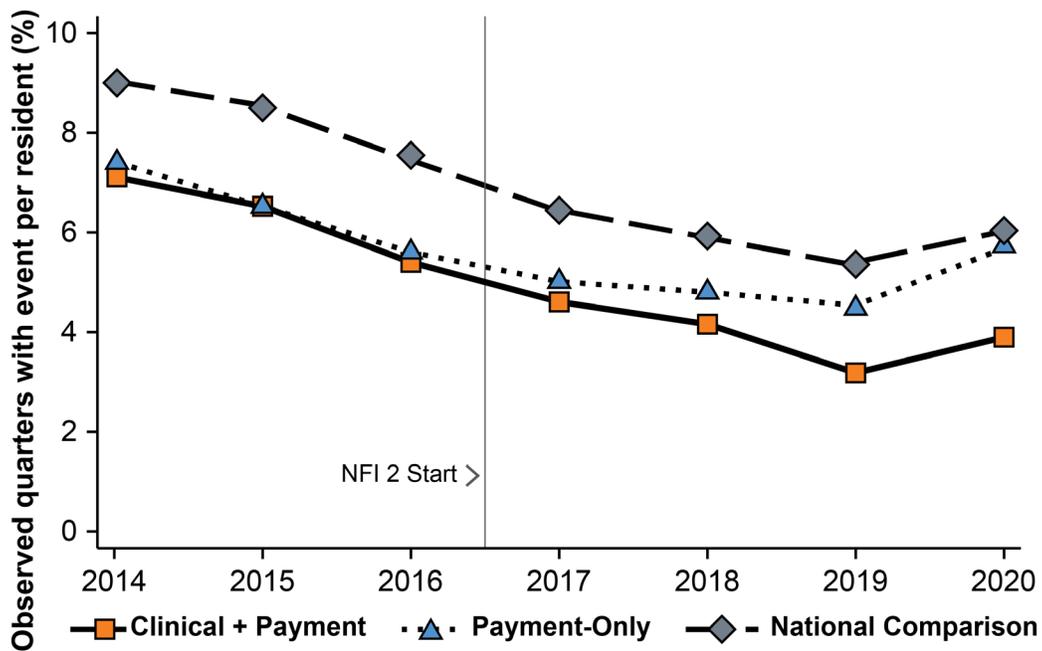
NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-4.   All ECCPs: Diagnosed with a pressure ulcer of Stage II or higher, FY 2014–FY 2020
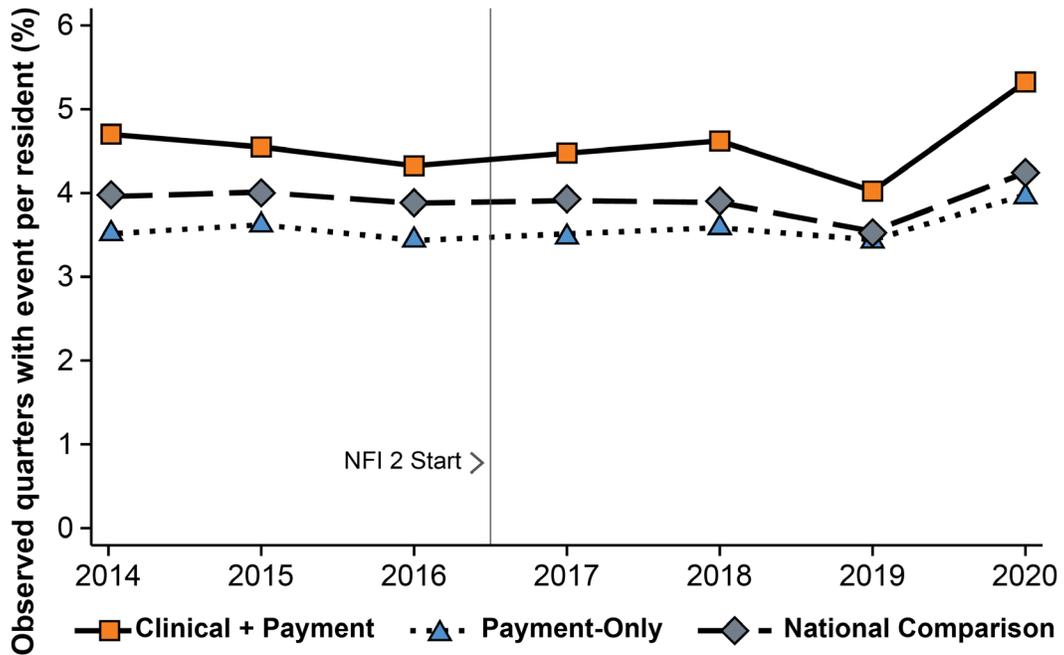
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-5.   All ECCPs: Decline in ADLs, FY 2014–FY 2020
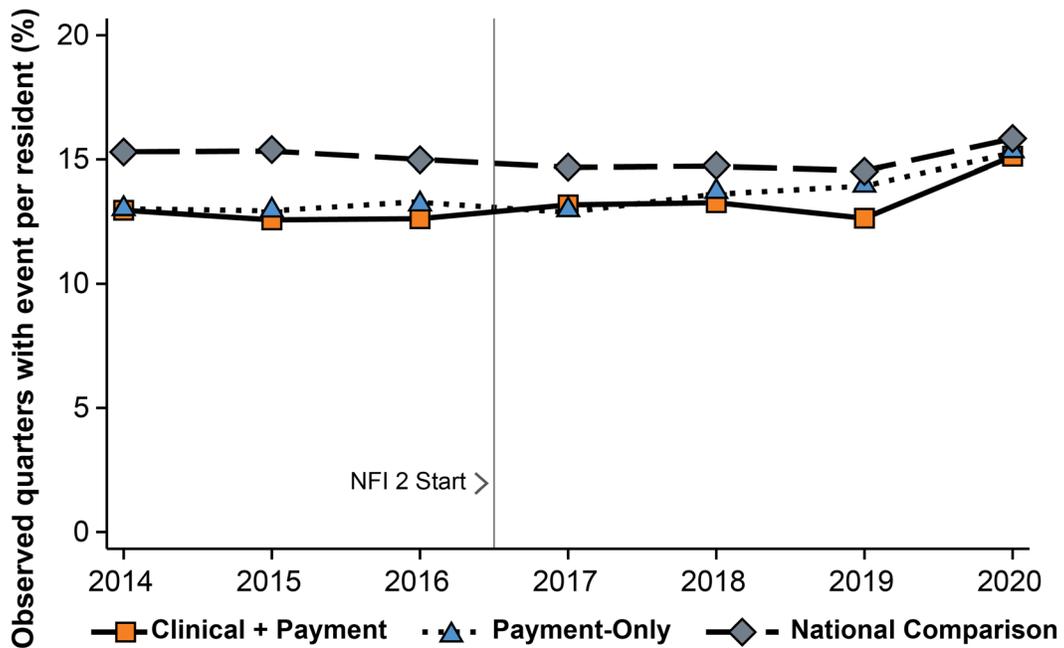
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-6.   All ECCPs: Diagnosed with a urinary tract infection, FY 2014–FY 2020
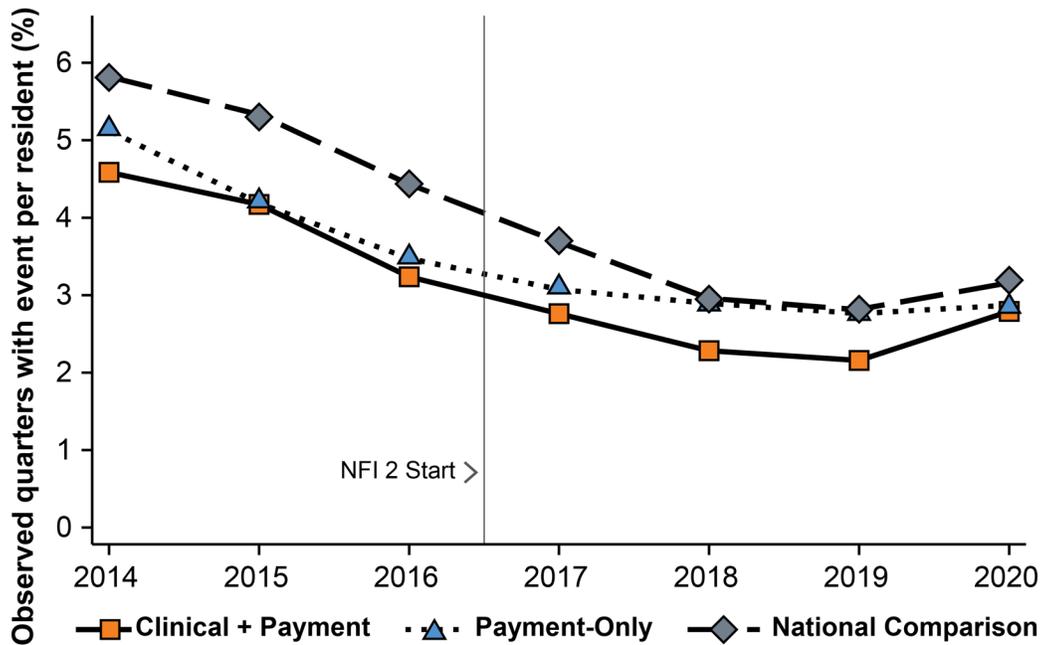
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-7.   All ECCPs: Use of antipsychotic medication, FY 2014–FY 2020
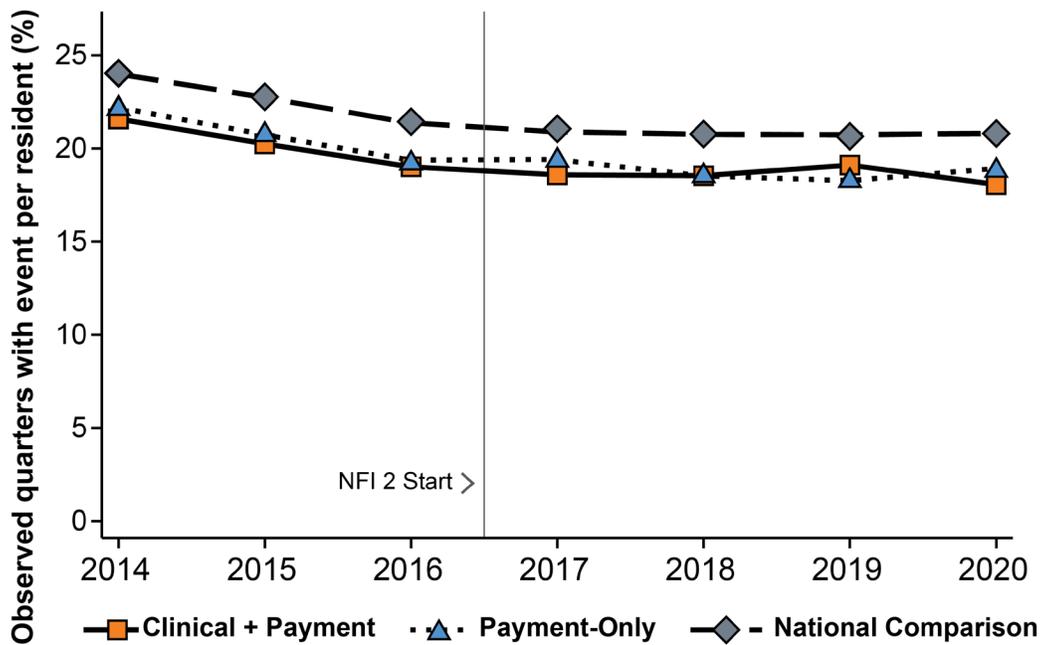
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-8. All ECCPs: Physically restrained, FY 2014–FY 2020
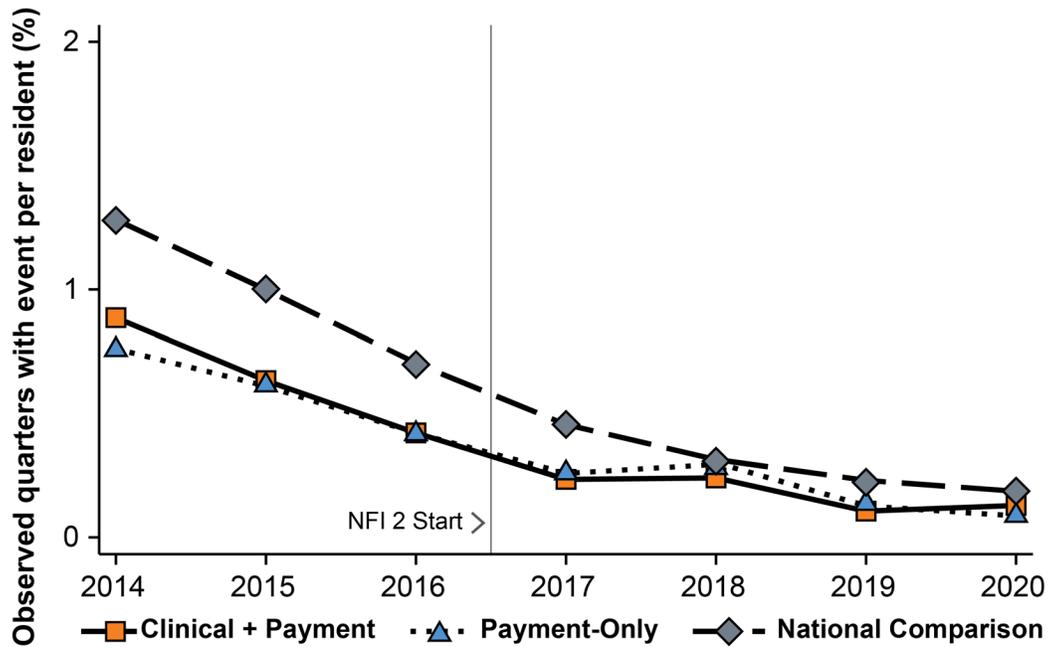
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-9. All ECCPs: Weight loss, FY 2014–FY 2020
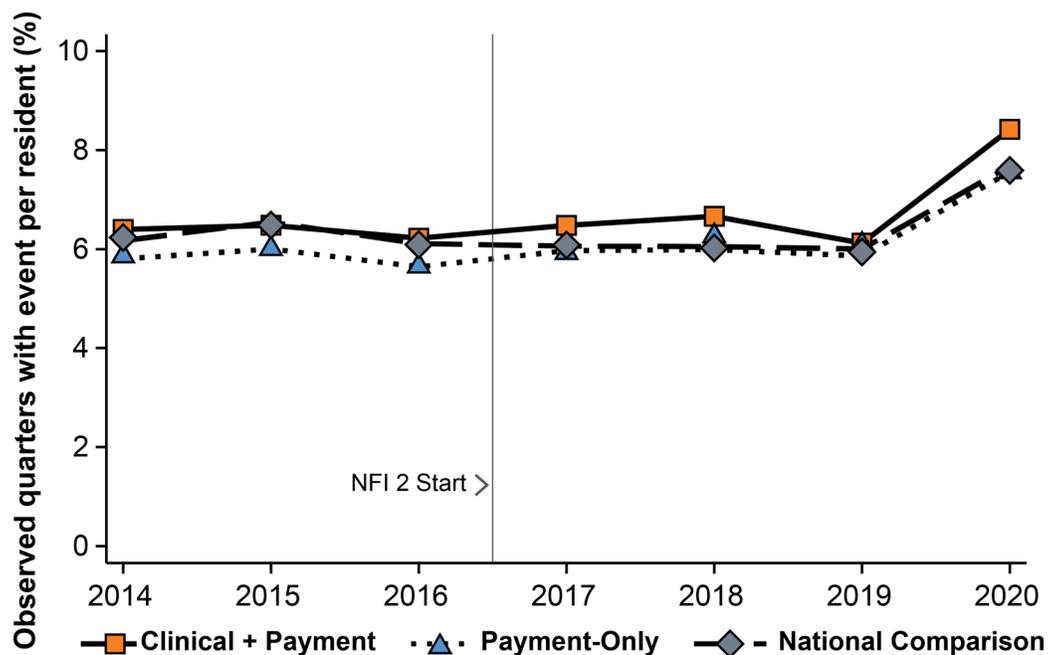
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Figure R-10. All ECCPs: Antianxiety or hypnotic medication, FY 2014–FY 2020
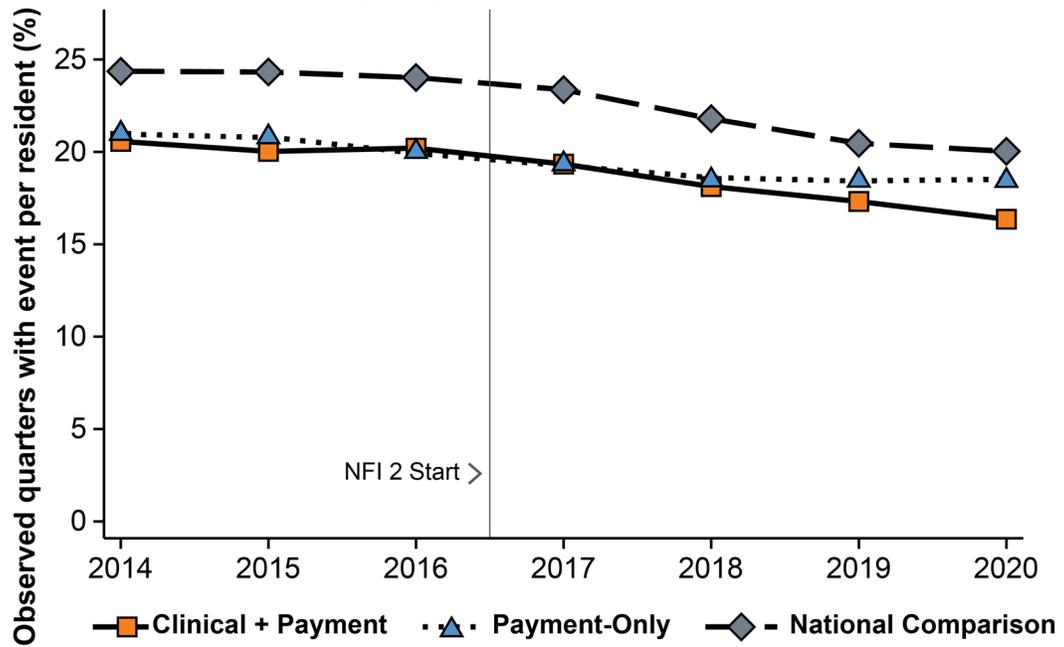
SOURCE: RTI analysis of MDS data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J and Table I-3* in *Appendix I*.

Table R-1.   National comparison group: MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	National comparison group						
	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	728,716	683,120	666,154	646,925	625,193	592,937	575,273
Mean exposure (Initiative-eligible days)	247	242	246	243	242	244	243
Catheter inserted and left in bladder	4.9	5.0	5.0	5.0	5.0	5.1	5.4
One or more fall with injury	12.0	12.3	12.5	12.5	12.6	12.3	12.3
Self-reported moderate to severe pain	9.0	8.5	7.6	6.4	5.9	5.4	6.0
Pressure ulcer Stage II or higher	4.0	4.0	3.9	3.9	3.9	3.5	4.2
Decline in ADLs	15.3	15.4	15.0	14.7	14.8	14.5	15.8
Urinary tract infection	5.8	5.3	4.4	3.7	2.9	2.8	3.2
Antipsychotic medication use	24.0	22.8	21.4	21.1	20.8	20.6	20.8
Physically restrained	1.3	1.0	0.7	0.5	0.3	0.2	0.2
Weight loss	6.2	6.5	6.1	6.1	6.0	5.9	7.6
Antianxiety or hypnotic medication use	24.4	24.3	24.0	23.4	21.8	20.5	20.0

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data

NOTE: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table R-2.   All ECCPs: MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	Clinical + Payment							Payment-Only						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	12,581	12,346	11,787	11,494	10,622	10,151	10,086	14,504	14,187	13,695	13,100	11,986	11,078	10,807
Mean exposure (Initiative-eligible days)	249	246	248	244	238	240	234	248	246	251	247	245	247	237
Catheter inserted and left in bladder	4.9	5.0	4.5	5.0	4.6	4.5	4.9	4.6	4.6	4.8	4.8	5.1	5.0	5.4
One or more fall with injury	11.1	12.0	12.1	12.7	12.3	12.3	12.2	12.3	12.4	12.9	13.5	13.7	13.9	14.2
Self-reported moderate to severe pain	7.1	6.5	5.4	4.6	4.2	3.2	3.9	7.4	6.5	5.6	5.0	4.8	4.5	5.7
Pressure ulcer Stage II or higher	4.7	4.5	4.3	4.5	4.6	4.0	5.3	3.5	3.6	3.4	3.5	3.6	3.4	4.0
Decline in ADLs	13.0	12.6	12.6	13.2	13.3	12.6	15.1	13.0	13.0	13.2	13.0	13.7	14.0	15.3
Urinary tract infection	4.6	4.2	3.2	2.8	2.3	2.2	2.8	5.1	4.2	3.5	3.1	2.9	2.8	2.9
Antipsychotic medication use	21.6	20.3	19.0	18.6	18.5	19.1	18.1	22.1	20.7	19.2	19.4	18.5	18.3	18.8
Physically restrained	0.9	0.6	0.4	0.2	0.2	0.1	0.1	0.8	0.6	0.4	0.3	0.3	0.1	0.1
Weight loss	6.4	6.5	6.2	6.5	6.7	6.1	8.4	5.9	6.0	5.7	5.9	6.3	6.1	7.6
Antianxiety or hypnotic medication use	20.6	20.0	20.2	19.3	18.1	17.3	16.4	21.0	20.8	20.0	19.3	18.5	18.5	18.4

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table R-3.   AQAF (AL): MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	Clinical + Payment							Payment-Only						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	2,391	2,425	2,411	2,218	1,532	1,355	1,255	2,072	2,001	1,950	1,814	1,403	1,070	984
Mean exposure (Initiative-eligible days)	265	259	262	253	226	237	237	253	259	259	257	251	246	256
Catheter inserted and left in bladder	4.0	3.7	3.3	3.8	2.8	3.4	4.1	4.4	4.1	4.1	3.9	4.0	3.4	4.4
One or more fall with injury	11.2	12.2	13.9	14.3	14.3	15.8	13.9	11.5	11.2	10.7	11.5	11.2	13.5	13.7
Self-reported moderate to severe pain	8.2	6.8	6.0	3.9	3.4	4.4	4.5	7.3	6.6	5.8	4.7	5.1	6.2	5.4
Pressure ulcer Stage II or higher	2.4	2.7	2.6	2.7	2.9	2.8	4.7	3.1	3.3	3.3	3.6	3.3	2.8	3.9
Decline in ADLs	12.5	12.4	12.9	14.3	13.4	11.8	15.2	11.0	12.5	11.3	12.5	13.5	13.9	15.4
Urinary tract infection	3.9	4.0	4.0	3.6	3.6	3.7	4.7	4.3	3.5	3.1	2.0	2.4	2.4	3.2
Antipsychotic medication use	24.1	23.7	20.8	21.1	22.1	23.9	24.2	24.3	23.7	22.5	24.4	23.6	22.2	22.2
Physically restrained	0.5	0.4	0.3	0.2	0.1	0.1	0.2	0.8	0.5	0.3	0.1	0.0	0.0	0.0
Weight loss	6.1	7.1	7.1	7.4	8.1	7.6	9.7	7.1	5.6	5.4	6.6	7.0	8.3	7.8
Antianxiety or hypnotic medication use	29.1	29.4	29.2	28.8	27.5	27.2	27.6	32.6	33.9	31.8	29.4	26.5	25.2	24.5

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table R-4.   ATOP2 (NV/CO): MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	Clinical + Payment (Nevada)							Payment-Only (Colorado)						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,142	1,118	1,058	1,082	1,093	1,049	1,057	1,786	1,722	1,645	1,601	1,506	1,379	1,292
Mean exposure (Initiative-eligible days)	228	238	248	243	247	251	261	245	231	241	235	238	247	241
Catheter inserted and left in bladder	8.1	8.9	8.3	8.7	7.2	7.9	9.4	5.7	6.0	6.2	6.1	7.1	7.2	7.2
One or more fall with injury	11.0	12.6	12.0	12.9	12.7	12.6	11.6	14.8	14.6	14.9	16.1	17.6	16.7	17.0
Self-reported moderate to severe pain	13.0	16.9	14.1	13.4	8.3	6.9	10.2	8.7	7.9	7.3	6.3	6.6	6.0	7.7
Pressure ulcer Stage II or higher	6.2	5.4	4.4	5.2	5.4	4.3	5.2	2.6	2.6	2.9	2.6	2.5	3.2	3.0
Decline in ADLs	15.8	14.4	14.8	14.4	14.3	11.7	14.9	13.2	13.8	14.5	13.1	12.3	12.9	14.2
Urinary tract infection	4.5	5.0	2.2	2.3	2.1	1.8	2.0	5.3	3.8	3.9	3.1	2.6	2.9	2.9
Antipsychotic medication use	20.8	18.7	18.5	18.7	22.1	22.6	18.9	16.9	17.1	16.4	16.6	15.9	16.0	15.7
Physically restrained	0.2	0.1	0.3	0.0	0.1	0.1	0.1	0.3	0.4	0.7	0.3	0.2	0.1	0.2
Weight loss	6.9	7.4	4.5	5.3	5.9	4.4	6.7	5.2	5.7	4.8	5.2	5.5	4.7	5.8
Antianxiety or hypnotic medication use	27.0	24.4	23.9	22.4	20.5	17.1	15.4	15.2	14.6	14.3	14.7	13.5	13.4	12.1

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see **Appendix J** and **Table I-3** in **Appendix I**.

Table R-5. MOQI (MO): MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	Clinical + Payment							Payment-Only						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,548	1,604	1,513	1,442	1,357	1,308	1,183	2,187	2,179	2,056	1,928	1,790	1,628	1,481
Mean exposure (Initiative-eligible days)	260	248	258	255	249	254	254	253	248	262	259	250	250	253
Catheter inserted and left in bladder	4.6	5.7	5.1	5.2	5.4	5.8	5.9	3.7	3.3	3.6	3.7	3.6	3.6	3.9
One or more fall with injury	16.1	17.3	16.6	17.0	14.9	12.6	13.0	17.2	16.3	17.4	16.3	18.2	19.3	18.3
Self-reported moderate to severe pain	8.5	7.4	4.4	4.2	5.5	3.7	4.1	9.9	8.9	7.3	6.9	6.8	6.9	11.2
Pressure ulcer Stage II or higher	3.2	3.1	3.4	3.5	3.6	3.7	4.9	2.7	2.7	2.0	2.9	3.3	2.8	3.4
Decline in ADLs	11.7	12.8	10.1	11.0	13.9	13.8	15.6	12.6	14.0	13.0	12.2	13.3	14.3	16.7
Urinary tract infection	6.9	5.5	3.7	3.2	2.7	3.1	4.1	6.2	5.3	3.7	4.7	4.3	4.1	4.6
Antipsychotic medication use	19.7	18.6	17.1	18.1	17.9	19.0	19.8	23.2	21.7	20.3	20.5	20.7	21.2	23.0
Physically restrained	0.8	0.5	0.2	0.1	0.3	0.2	0.2	0.6	0.4	0.4	0.2	0.0	0.0	0.1
Weight loss	5.0	5.6	5.9	6.1	5.2	5.5	6.8	6.3	7.4	6.2	6.6	5.5	4.8	7.8
Antianxiety or hypnotic medication use	24.1	22.8	22.4	22.6	22.7	22.2	22.3	25.0	25.1	23.3	24.0	23.0	24.6	24.4

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table R-6.   NY-RAH (NY): MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	Clinical + Payment							Payment-Only						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	3,906	3,598	3,328	3,403	3,499	3,510	4,045	4,424	4,284	4,101	3,912	3,696	3,640	3,870
Mean exposure (Initiative-eligible days)	243	240	232	227	228	222	210	248	247	251	247	242	244	219
Catheter inserted and left in bladder	4.4	4.2	4.0	4.8	4.3	3.7	3.8	4.7	4.6	5.3	5.4	5.7	5.3	6.0
One or more fall with injury	7.9	8.3	7.9	8.8	10.0	9.4	9.5	8.7	9.5	10.3	10.3	11.3	10.4	10.5
Self-reported moderate to severe pain	3.0	2.0	2.1	2.1	2.4	1.2	1.6	5.4	5.1	3.7	2.7	2.3	2.1	2.3
Pressure ulcer Stage II or higher	6.6	6.5	6.4	6.5	6.6	5.4	7.0	5.1	5.1	4.7	4.7	4.9	4.6	5.6
Decline in ADLs	11.0	9.8	9.5	10.1	9.8	9.4	12.9	12.4	11.2	11.3	11.2	11.9	12.4	13.6
Urinary tract infection	4.3	3.9	2.8	2.6	2.1	1.7	3.0	5.1	4.4	3.2	2.9	2.7	2.8	2.6
Antipsychotic medication use	18.4	16.7	15.2	13.1	12.4	11.1	11.0	24.3	23.0	21.4	20.9	19.5	18.7	18.9
Physically restrained	1.3	1.0	0.7	0.4	0.3	0.1	0.2	1.4	1.1	0.6	0.5	0.7	0.3	0.1
Weight loss	6.3	5.4	5.6	5.6	6.8	6.3	8.9	4.8	5.8	5.3	5.4	6.5	6.5	7.3
Antianxiety or hypnotic medication use	13.6	13.1	12.9	12.3	11.3	11.5	9.8	16.8	16.4	16.0	15.4	15.9	15.8	15.3

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table R-7.   OPTIMISTIC (IN): MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	Clinical + Payment							Payment-Only						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,987	1,979	1,877	1,813	1,656	1,527	1,291	2,264	2,242	2,154	2,149	1,966	1,800	1,714
Mean exposure (Initiative-eligible days)	234	225	229	234	231	235	232	239	236	244	236	238	243	241
Catheter inserted and left in bladder	4.4	4.5	4.0	4.7	4.7	4.7	4.9	4.4	4.6	4.7	4.9	4.7	4.5	4.1
One or more fall with injury	12.9	15.8	14.9	14.9	13.2	14.3	16.6	14.0	14.8	15.3	17.5	16.7	17.2	18.5
Self-reported moderate to severe pain	6.3	3.7	3.9	3.0	2.7	2.4	3.7	8.6	5.8	5.4	5.2	4.4	4.0	8.5
Pressure ulcer Stage II or higher	4.1	4.4	3.9	4.2	3.9	4.0	3.6	2.9	3.0	3.2	2.9	3.3	2.7	2.6
Decline in ADLs	13.1	12.4	12.8	13.4	14.1	15.1	16.1	15.8	14.6	15.1	16.3	16.9	15.5	16.3
Urinary tract infection	3.8	3.2	2.7	1.8	1.2	1.1	0.8	5.2	4.2	3.9	3.3	3.1	2.4	2.3
Antipsychotic medication use	19.9	17.7	18.7	18.1	16.9	18.3	17.1	22.3	20.3	16.9	16.2	16.8	16.8	18.6
Physically restrained	0.5	0.4	0.4	0.2	0.2	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.0	0.0
Weight loss	7.6	7.8	6.9	8.7	8.1	6.7	10.1	6.4	5.9	6.4	5.9	6.7	6.5	8.4
Antianxiety or hypnotic medication use	14.4	13.6	15.3	15.0	14.4	14.0	16.9	19.2	18.2	18.4	16.9	17.3	16.7	19.3

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The sample of beneficiaries used for QMs is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see **Appendix J** and **Table I-3** in **Appendix I**.

Table R-8.   RAVEN (PA): MDS-based quality measures, FY 2014–FY 2020

(percent of observed quarters with event per resident)

Measure	Clinical + Payment							Payment-Only						
	2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020
Number of residents meeting eligibility criteria	1,607	1,622	1,600	1,536	1,485	1,402	1,255	1,771	1,759	1,789	1,696	1,625	1,561	1,466
Mean exposure (Initiative-eligible days)	261	266	274	272	269	273	268	251	252	250	249	254	256	250
Catheter inserted and left in bladder	6.2	6.2	4.9	4.6	4.3	3.8	4.1	4.6	5.3	5.0	4.6	4.8	5.7	6.0
One or more fall with injury	11.8	10.2	10.4	11.8	11.9	12.8	13.1	11.4	10.8	11.7	12.4	9.2	10.2	11.4
Self-reported moderate to severe pain	10.9	10.6	7.2	6.5	5.5	3.9	4.5	6.5	6.5	6.5	7.0	6.7	5.5	4.4
Pressure ulcer Stage II or higher	5.1	4.3	4.4	3.8	3.1	2.3	3.8	2.7	3.3	3.3	2.8	2.6	2.9	3.1
Decline in ADLs	16.9	16.7	18.1	17.7	17.3	16.4	18.9	13.3	13.2	15.9	13.7	15.6	16.1	17.6
Urinary tract infection	5.1	4.4	3.7	3.0	2.3	2.2	1.9	4.9	3.7	3.6	2.7	2.2	2.0	2.1
Antipsychotic medication use	29.0	27.5	25.5	26.1	27.4	29.7	28.8	17.8	14.5	14.3	15.0	13.9	15.2	14.9
Physically restrained	1.4	0.9	0.4	0.2	0.2	0.1	0.0	0.4	0.6	0.2	0.0	0.2	0.0	0.0
Weight loss	6.6	6.6	6.6	5.7	5.4	5.7	7.4	6.5	5.7	5.9	6.4	6.2	5.9	8.2
Antianxiety or hypnotic medication use	23.0	21.9	21.0	19.5	21.9	20.4	18.1	21.0	19.9	19.4	18.9	18.2	20.3	20.1

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The sample of beneficiaries used for quality measures (QMs) is based on the sample used for utilization analyses and then excludes those beneficiaries missing QM outcome data. Each QM is treated separately and some have additional exclusion criteria. The number of beneficiaries in the table above is without applying the exclusion for missing QM outcome data. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

R.3 Multivariate Results

Table R-9. All ECCPs: Initiative effect on MDS-based quality measures, FY 2017–FY 2019

(percent of observed quarters with event per resident)

Measure	Predicted mean absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	12.1	0.3	−0.5	1.2	0.530	2.7
Self-reported moderate to severe pain	3.1	0.1	−0.4	0.6	0.652	4.6
Pressure ulcers Stage II or higher	4.4	−0.1	−0.4	0.3	0.815	−1.1
Urinary tract infection	2.2	0.2	−0.1	0.5	0.307	8.5
Catheter inserted and left in bladder	**4.4**	**0.4**	**0.0**	**0.7**	**0.054**	**8.2**
Decline in ADLs	11.9	0.8	−0.2	1.8	0.176	6.7
Antipsychotic medication use	17.8	0.9	−0.1	2.0	0.153	5.2
Payment-Only						
One or more falls with injury	**12.8**	**0.9**	**0.0**	**1.8**	**0.095**	**6.9**
Self-reported moderate to severe pain	**3.2**	**0.6**	**0.2**	**1.0**	**0.023**	**18.4**
Pressure ulcers Stage II or higher	3.6	−0.1	−0.4	0.2	0.550	−2.8
Urinary tract infection	**2.3**	**0.7**	**0.4**	**0.9**	**0.000**	**28.4**
Catheter inserted and left in bladder	4.9	0.1	−0.3	0.4	0.666	1.8
Decline in ADLs	12.8	0.5	−0.2	1.3	0.270	4.0
Antipsychotic medication use	17.3	1.4	0.7	2.2	0.002	8.2

ADLs = activities of daily living; MDS = Minimum Data Set

SOURCE: RTI analysis of MDS data.

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution. Improvement on MDS-based QMs was not a primary focus of the Initiative.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table R-10. AQAF (AL): Initiative effect on MDS-based quality measures, FY 2017–FY 2019

(percent of observed quarters with event per resident-year)

Measure	Predicted mean absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	15.1	−0.4	−1.8	1.1	0.675	−2.4
Self-reported moderate to severe pain	3.4	−0.1	−1.6	1.3	0.880	−3.8
Pressure ulcers Stage II or higher	2.9	−0.1	−0.7	0.5	0.806	−3.1
Urinary tract infection	3.2	0.4	−0.5	1.2	0.474	11.4
Catheter inserted and left in bladder	2.8	0.6	0.0	1.2	0.122	20.8
Decline in ADLs	12.5	0.4	−2.0	2.9	0.774	3.4
Antipsychotic medication use	20.5	1.7	−0.6	3.9	0.222	8.2
Payment-Only						
One or more falls with injury	10.5	1.4	−0.6	3.4	0.246	13.3
Self-reported moderate to severe pain	3.6	0.5	−0.8	1.8	0.538	13.9
Pressure ulcers Stage II or higher	3.4	−0.1	−0.9	0.6	0.772	−3.8
Urinary tract infection	2.1	0.1	−0.5	0.8	0.788	5.2
Catheter inserted and left in bladder	3.7	0.1	−0.5	0.7	0.819	2.2
Decline in ADLs	11.9	0.7	−1.0	2.4	0.514	5.6
Antipsychotic medication use	20.6	**3.0**	**1.0**	**5.1**	**0.016**	**14.8**

ADLs = activities of daily living; MDS = Minimum Data Set

SOURCE: RTI analysis of MDS data.

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution. Improvement on MDS-based QMs was not a primary focus of the Initiative.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table R-11. ATOP2 (NV/CO): Initiative effect on MDS-based quality measures, FY 2017–FY 2019

(percent of observed quarters with event per resident-year)

Measure	Predicted mean absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment (Nevada)						
One or more falls with injury	12.5	0.2	−2.1	2.4	0.892	1.5
Self-reported moderate to severe pain	10.0	−2.2	−4.7	0.3	0.149	−21.7
Pressure ulcers Stage II or higher	4.1	0.9	0.0	1.9	0.112	22.5
Urinary tract infection	1.6	0.5	−0.2	1.1	0.240	28.3
Catheter inserted and left in bladder	8.5	−0.6	−2.0	0.8	0.510	−6.7
Decline in ADLs	13.6	−0.5	−3.8	2.8	0.794	−3.8
Antipsychotic medication use	**17.4**	**3.7**	**1.5**	**6.0**	**0.006**	**21.4**
Payment-Only (Colorado)						
One or more falls with injury	**14.4**	**2.4**	**0.1**	**4.7**	**0.089**	**16.5**
Self-reported moderate to severe pain	4.4	0.7	−1.0	2.3	0.518	14.8
Pressure ulcers Stage II or higher	2.8	0.0	−0.8	0.8	0.994	0.0
Urinary tract infection	2.5	0.4	−0.2	1.0	0.297	16.3
Catheter inserted and left in bladder	6.2	0.6	−0.2	1.4	0.196	10.4
Decline in ADLs	14.1	−1.3	−3.4	0.7	0.285	−9.5
Antipsychotic medication use	16.6	−0.4	−2.0	1.2	0.662	−2.5

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution. Improvement on MDS-based QMs was not a primary focus of the Initiative.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table R-12.   MOQI (MO): Initiative effect on MDS-based quality measures, FY 2017–FY 2019

(percent of observed quarters with event per resident-year)

Measure	Predicted mean absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	16.2	−1.4	−4.5	1.8	0.484	−8.3
Self-reported moderate to severe pain	2.8	0.8	−0.2	1.8	0.202	28.5
Pressure ulcers Stage II or higher	3.2	0.4	−0.4	1.2	0.433	11.8
Urinary tract infection	**2.2**	**0.8**	**0.1**	**1.5**	**0.057**	**37.6**
Catheter inserted and left in bladder	5.0	0.5	−0.1	1.1	0.164	10.3
Decline in ADLs	**9.5**	**3.1**	**1.0**	**5.2**	**0.014**	**32.9**
Antipsychotic medication use	**15.1**	**3.2**	**1.2**	**5.2**	**0.009**	**21.1**
Payment-Only						
One or more falls with injury	16.5	1.3	−1.3	3.9	0.407	8.0
Self-reported moderate to severe pain	**4.3**	**1.2**	**0.3**	**2.1**	**0.036**	**28.1**
Pressure ulcers Stage II or higher	**2.2**	**0.8**	**0.2**	**1.5**	**0.037**	**37.6**
Urinary tract infection	**2.6**	**1.9**	**0.7**	**3.0**	**0.006**	**72.3**
Catheter inserted and left in bladder	3.7	0.0	−0.7	0.7	0.975	−0.3
Decline in ADLs	13.2	−0.2	−1.7	1.4	0.858	−1.3
Antipsychotic medication use	19.5	1.3	−0.4	3.0	0.215	6.7

ADLs = activities of daily living; MDS = Minimum Data Set.

SOURCE: RTI analysis of MDS data.

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution. Improvement on MDS-based QMs was not a primary focus of the Initiative.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table R-13. NY-RAH (NY): Initiative effect on MDS-based quality measures, FY 2017–FY 2019

(percent of observed quarters with event per resident-year)

Measure	Predicted mean absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	**7.7**	**1.7**	**0.4**	**3.0**	**0.032**	**22.0**
Self-reported moderate to severe pain	**0.9**	**0.5**	**0.1**	**0.9**	**0.026**	**58.4**
Pressure ulcers Stage II or higher	6.7	−0.5	−1.5	0.4	0.334	−8.0
Urinary tract infection	2.0	0.1	−0.3	0.6	0.647	6.5
Catheter inserted and left in bladder	3.9	0.4	−0.2	0.9	0.254	9.5
Decline in ADLs	8.2	1.1	−0.2	2.4	0.150	13.9
Antipsychotic medication use	**14.5**	**−2.3**	**−4.1**	**−0.5**	**0.035**	**−15.8**
Payment-Only						
One or more falls with injury	10.8	−0.1	−1.4	1.2	0.924	−0.7
Self-reported moderate to severe pain	1.9	0.1	−0.5	0.6	0.845	3.8
Pressure ulcers Stage II or higher	5.0	−0.3	−0.8	0.2	0.369	−5.8
Urinary tract infection	**2.1**	**0.7**	**0.1**	**1.2**	**0.037**	**32.1**
Catheter inserted and left in bladder	5.3	0.2	−0.6	0.9	0.701	3.2
Decline in ADLs	10.3	1.2	−0.2	2.6	0.151	11.8
Antipsychotic medication use	19.1	0.7	−0.8	2.1	0.459	3.5

ADLs = activities of daily living; MDS = Minimum Data Set

SOURCE: RTI analysis of MDS data.

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution. Improvement on MDS-based QMs was not a primary focus of the Initiative.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table R-14. OPTIMISTIC (IN): Initiative effect on MDS-based quality measures, FY 2017–FY 2019

(percent of observed quarters with event per resident-year)

Measure	Predicted mean absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	15.8	−1.7	−3.8	0.4	0.193	−10.6
Self-reported moderate to severe pain	1.5	0.3	−0.6	1.1	0.607	16.3
Pressure ulcers Stage II or higher	3.5	0.5	−0.1	1.2	0.187	15.1
Urinary tract infection	1.8	−0.4	−1.1	0.3	0.307	−23.2
Catheter inserted and left in bladder	4.2	0.5	−0.2	1.2	0.245	11.6
Decline in ADLs	12.7	1.7	−1.1	4.5	0.324	13.3
Antipsychotic medication use	17.6	0.2	−2.4	2.8	0.907	1.1
Payment-Only						
One or more falls with injury	15.1	2.1	−0.5	4.7	0.186	13.8
Self-reported moderate to severe pain	2.6	0.8	−0.2	1.8	0.183	32.4
Pressure ulcers Stage II or higher	3.3	−0.3	−1.1	0.4	0.497	−9.5
Urinary tract infection	2.5	0.4	−0.2	1.0	0.216	17.6
Catheter inserted and left in bladder	4.7	0.0	−0.7	0.8	0.932	0.9
Decline in ADLs	**14.2**	**2.1**	**0.1**	**4.2**	**0.082**	**15.1**
Antipsychotic medication use	15.2	1.4	−0.6	3.4	0.235	9.4

ADLs = activities of daily living; MDS = Minimum Data Set

SOURCE: RTI analysis of MDS data.

NOTE: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution. Improvement on MDS-based QMs was not a primary focus of the Initiative.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table R-15.   RAVEN (PA): Initiative effect on MDS-based quality measures, FY 2017–FY 2019

(percent of observed quarters with event per resident-year)

Measure	Predicted mean absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
One or more falls with injury	**9.3**	**2.9**	**0.6**	**5.1**	**0.039**	**30.8**
Self-reported moderate to severe pain	4.1	0.5	−1.3	2.2	0.664	10.9
Pressure ulcers Stage II or higher	**3.9**	**−0.8**	**−1.4**	**−0.2**	**0.022**	**−20.9**
Urinary tract infection	2.4	0.1	−0.9	1.1	0.878	3.8
Catheter inserted and left in bladder	3.7	0.5	−0.3	1.4	0.313	13.9
Decline in ADLs	17.6	−0.6	−3.0	1.8	0.674	−3.5
Antipsychotic medication use	24.7	3.0	−0.2	6.2	0.121	12.1
Payment-Only						
One or more falls with injury	11.5	−0.8	−2.9	1.2	0.502	−7.2
Self-reported moderate to severe pain	5.0	0.2	−1.3	1.7	0.794	4.8
Pressure ulcers Stage II or higher	3.4	−0.7	−1.4	0.1	0.150	−19.0
Urinary tract infection	2.3	0.0	−0.6	0.7	0.919	1.8
Catheter inserted and left in bladder	5.4	−0.4	−1.7	1.0	0.668	−6.5
Decline in ADLs	15.9	−0.8	−2.8	1.1	0.492	−5.1
Antipsychotic medication use	11.9	**2.8**	**0.9**	**4.7**	**0.016**	23.7

ADLs = activities of daily living; MDS = Minimum Data Set

SOURCE: RTI analysis of MDS data.

NOTES: The *predicted mean absent the Initiative* is the mean of the predicted percentage of observed quarters with event per resident per year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted mean percentage of observed quarters with event per resident per year with and without the intervention. The *relative effect* = (Initiative effect) / (predicted mean absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted probability absent the Initiative—is small. In such cases, the relative Initiative effect should be interpreted with caution. Improvement on MDS-based QMs was not a primary focus of the Initiative.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

APPENDIX S
IMPACT OF NFI 2 ON RESIDENT MORTALITY

S.1   Overview

In this appendix, we present detailed analyses of resident mortality, expanding on **Section II.8** of the main report. This appendix is organized as follows:

- **Appendix Section S.2** presents trends in resident mortality rates from FY 2012 to FY 2020 by ECCP.

- **Appendix Section S.3** presents difference-in-differences (DD) mortality model results for individual years (FY 2017–FY 2019)

- **Appendix Section S.4** presents sensitivity analyses of resident mortality using alternative DD models.

- **Appendix Section S.5** presents results from our DD model estimating the combined effects of NFI 1 and NFI 2 on mortality.

- **Appendix Section S.6** presents an examination of resident mortality in the Medicare Advantage population, which is excluded from NFI 2.

S.2   Patterns in Unadjusted Resident Mortality Rates from FY 2012 to FY 2020[26]

We conducted descriptive analyses to understand the mortality trends for Initiative-eligible residents in each Initiative group and in the national comparison group. The analyses include Initiative-eligible residents each year from FY 2012 through FY 2020 and the national comparison group residents for the same period. We examined "mortality within fiscal year," which is deaths that occurred at any time during the fiscal year (see **Section II.8** for more detail on the mortality outcome). **Figure IV-7** in the main report presents the trends for mortality rates among residents in Clinical + Payment (C+P) and Payment-Only (P-O) groups for combined ECCPs and residents in the national comparison group. The large increase in mortality in all groups in FY 2020 can be attributed to the COVID-19 pandemic.

Figures S-1 through **S-6** present the trend in resident mortality for each ECCP individually. The rates for the individual ECCPs with smaller sample sizes are subject to more variability. **Table S-1** presents resident mortality rates for the national comparison group, C+P, and P-O, for all ECCPs combined and individually.

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[26] Key results presented in **Sections II.8** and **IV.3** of the main report

Figure S-1.   AQAF (AL): Percent of residents who died each year, FY 2012–FY 2020
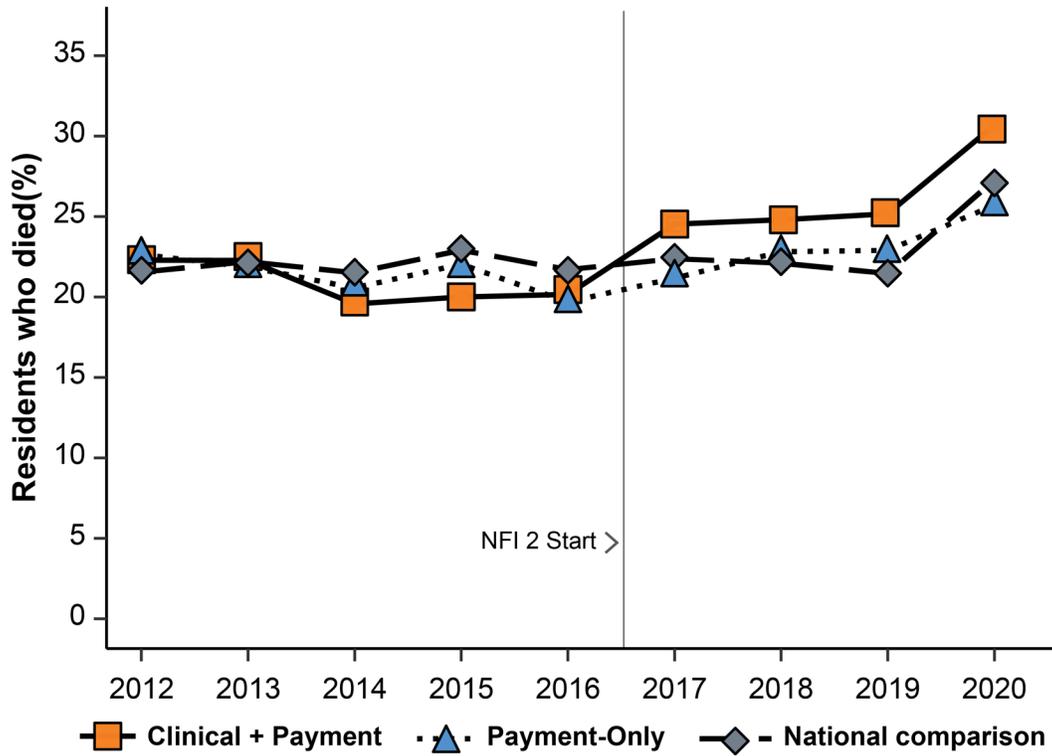
SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Figure S-2. ATOP2 (NV/CO): Percent of residents who died each year, FY 2012–FY 2020
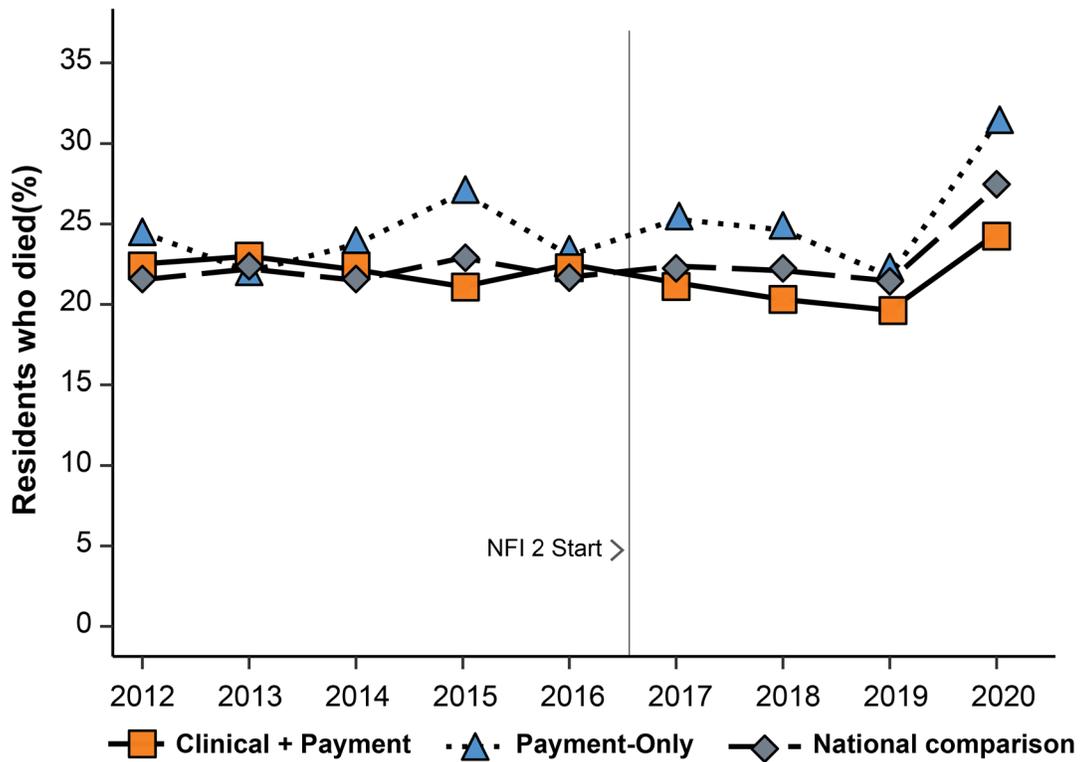
SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTE: ATOP2 consists of a Clinical + Payment group in Nevada and Payment-Only group in Colorado. The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Figure S-3.   MOQI (MO): Percent of residents who died each year, FY 2012–FY 2020
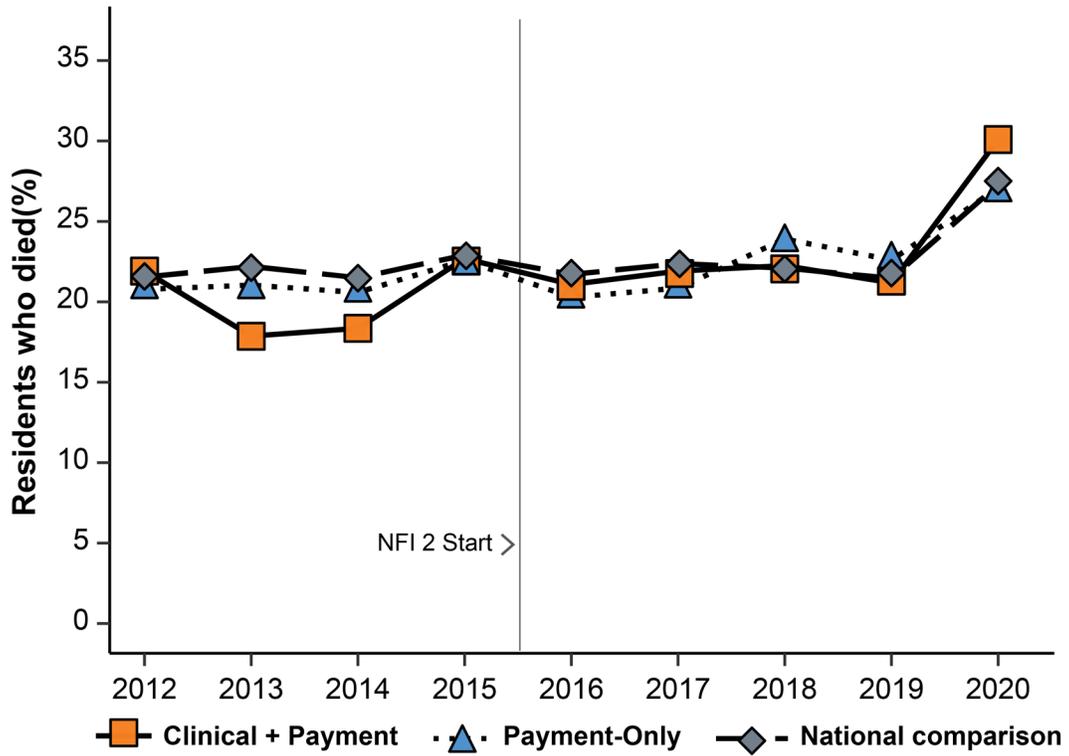
SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Figure S-4.   NY-RAH (NY): Percent of residents who died each year, FY 2012–FY 2020
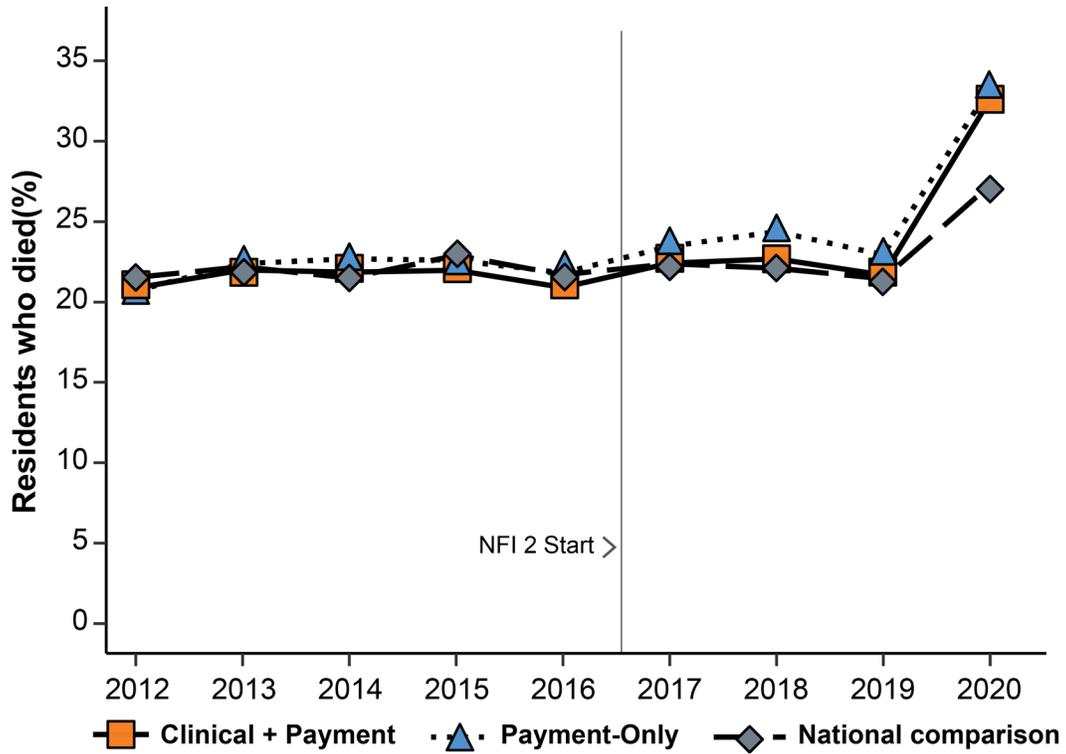
SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Figure S-5.   OPTIMISTIC (IN): Percent of residents who died each year, FY 2012–FY 2020
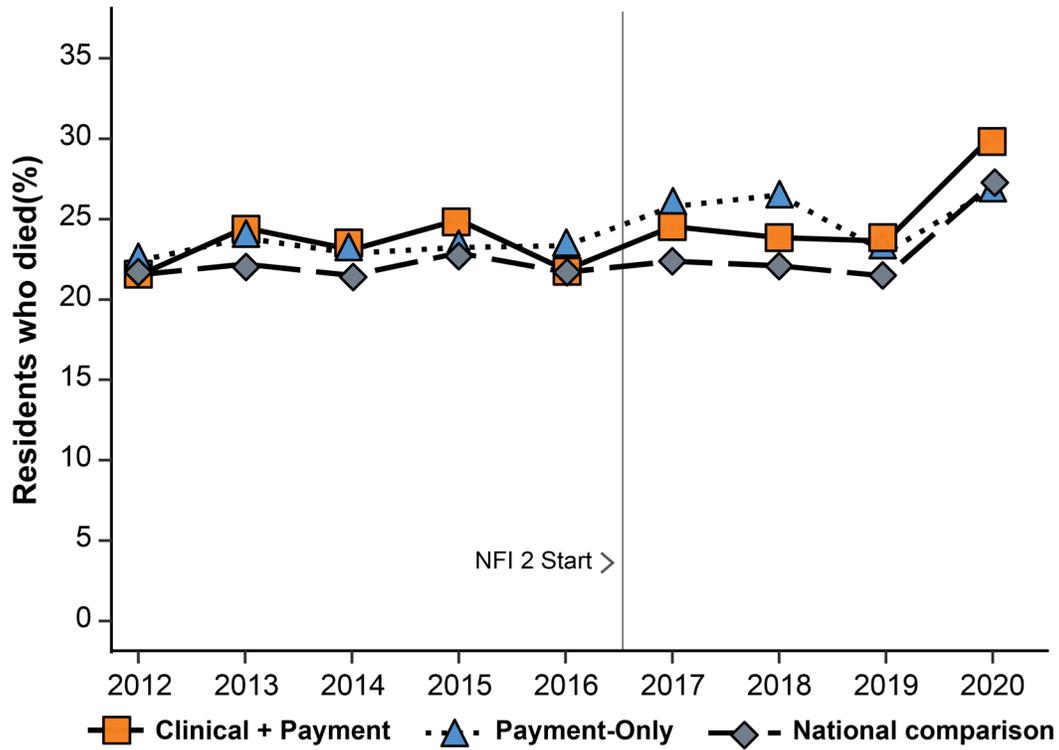
NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Figure S-6.   **RAVEN (PA): Percent of residents who died each year, FY 2012–FY 2020**
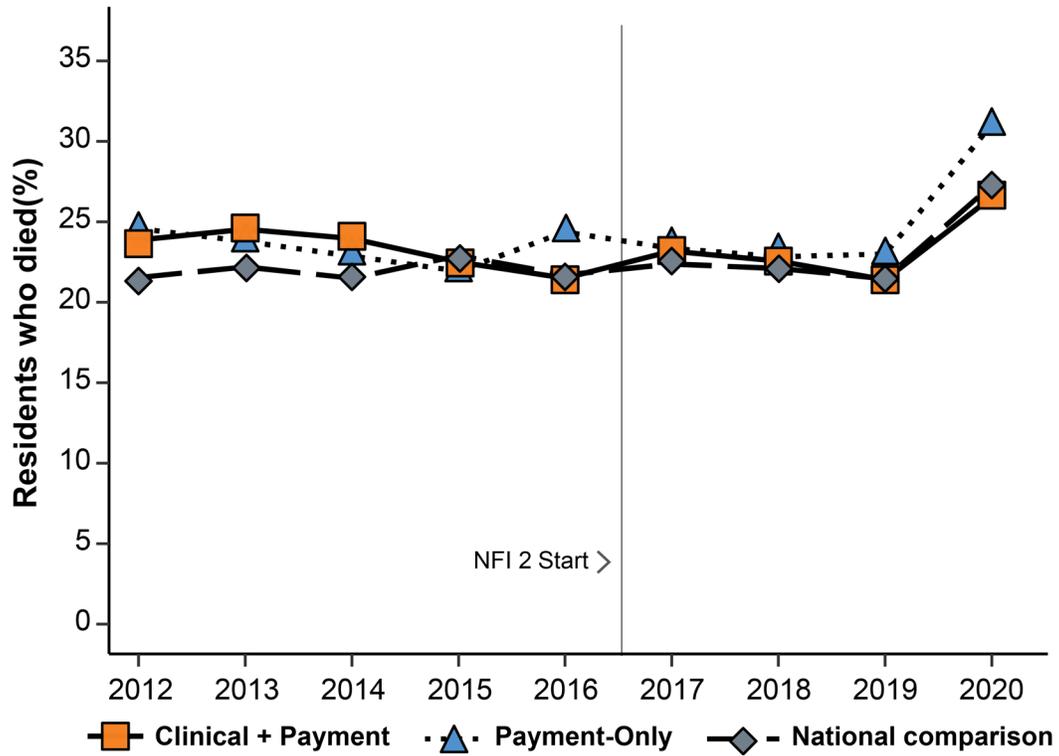
SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

Table S-1.   Percentage of residents who died each year, FY 2014–FY 2020

ECCP or Group	2014	2015	2016	2017	2018	2019	2020
National comparison group	21.5	22.9	21.7	22.4	22.1	21.5	27.3
Clinical + Payment							
All ECCPs (6 states)	21.5	22.2	21.2	23.1	22.9	22.1	30.2
AQAF (AL)	19.6	20.0	20.2	24.5	24.8	25.2	30.7
ATOP2 (NV)	22.2	21.1	22.5	21.4	20.3	19.6	24.4
MOQI (MO)	18.4	22.7	21.1	21.9	22.3	21.2	30.1
NY-RAH (NY)	21.9	22.0	20.9	22.4	22.7	21.7	32.6
OPTIMISTIC (IN)	23.1	25.0	21.8	24.5	23.9	23.6	30.2
RAVEN (PA)	24.0	22.5	21.5	23.2	22.6	21.4	26.5
Payment-Only							
All ECCPs (6 states)	22.3	23.1	22.0	23.4	24.3	22.8	30.2
AQAF (AL)	20.6	22.0	19.7	21.2	22.8	22.9	25.7
ATOP2 (CO)	23.7	27.0	23.0	25.3	24.6	21.8	31.3
MOQI (MO)	20.6	22.6	20.3	20.9	23.9	22.6	27.1
NY-RAH (NY)	22.7	22.6	21.8	23.5	24.4	22.9	33.3
OPTIMISTIC (IN)	22.9	23.2	23.4	25.8	26.5	22.9	26.8
RAVEN (PA)	22.9	21.9	24.4	23.4	22.8	23.0	31.0

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTE: The sample construction method used in FY 2020 differs from other Initiative years in that it does not exclude residents based on propensity score or missing covariates. For further details on the sample creation process, see *Appendix J* and *Table I-3* in *Appendix I*.

S.3   Impact of the Initiative on Mortality Rates Among Initiative-Eligible Residents for Individual Years

The main model examining Initiative effects on resident mortality in FY 2017–FY 2019 combined is presented in *Section II.8* of the main report. Here we present DD results for FY 2017, FY 2018, and FY 2019 as individual years. *Table S-2* presents the Initiative effects on resident mortality for all ECCPs combined, for each of FY 2017, FY 2018, and FY 2019.

Table S-2.   All ECCPs: Initiative effect on mortality for FY 2017, FY 2018, and FY 2019.

(probability of death during the year)

Year	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
2017	**21.8**	**1.3**	**0.1**	**2.5**	**0.083**	**5.9**
2018	21.8	1.0	0.0	2.1	0.112	4.7
2019	21.2	0.9	−0.2	2.0	0.171	4.4
Payment-Only						
2017	22.6	0.7	−0.5	2.0	0.330	3.3
2018	**22.7**	**1.6**	**0.4**	**2.8**	**0.028**	**7.0**
2019	22.1	0.7	−0.4	1.8	0.315	3.1

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of mortality during the fiscal year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a DD regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of mortality with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

S.4   Sensitivity Analyses Using Alternative DD Models

Similar to what we described in *Chapter II.5* and *Appendix I* for the utilization and expenditure analyses, we conducted three sensitivity analyses to confirm the robustness of our DD results. Our sensitivity analyses were performed using the combined years FY 2017–FY 2019 and on the samples that combined ECCPs within C+P and P-O groups.

The sensitivity analyses, presented in *Table S-3*, are as follows:

- Using the within-state reference group (WSRG) as the comparison group
- Parallel trends assumed with a FY 2016 baseline
- Parallel trends assumed with FY 2014–FY 2016 as the baseline.

In each of the sensitivity analyses, we observed higher-than-expected resident mortality rates in both the C+P and P-O groups, which were statistically significant (*Table S-3*). When using FY 2016 as the baseline year or using the average of FY 2014–FY 2016 as the baseline, the magnitude of the effect was smaller than the main analytic model for the C+P group and similar to the main analytic model for the P-O group. In the main analytic model, the Initiative effect was not statistically significant for the P-O group.

When comparing to the WSRG instead of the national comparison group, we found a statistically significant higher-than-expected mortality rate in both the C+P and P-O groups, and the magnitude of the effect was larger than in the main model. These results indicate that resident mortality in ECCP facilities deviated more from ECCP state trends than from the national resident mortality trend.

Table S-3.   All ECCPs: Initiative effect on mortality comparing alternative approaches, FY 2017–FY 2019

(probability of death during the year)

Sensitivity analysis	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Within-state reference group	**21.0**	**1.7**	**0.7**	**2.7**	**0.006**	**8.0**
2016 as baseline year	**21.9**	**0.8**	**0.1**	**1.6**	**0.078**	**3.8**
Average of 2014–2016 as base	**22.0**	**0.7**	**0.0**	**1.3**	**0.076**	**3.0**
Main analytic model	**21.6**	**1.1**	**0.1**	**2.1**	**0.073**	**4.9**
Payment-Only						
Within-state reference group	**21.9**	**1.6**	**0.6**	**2.6**	**0.009**	**7.4**
2016 as baseline year	**22.5**	**1.0**	**0.3**	**1.7**	**0.026**	**4.3**
Average of 2014–2016 as base	**22.6**	**0.9**	**0.3**	**1.5**	**0.008**	**4.0**
Main analytic model	22.5	1.0	0.0	2.0	0.110	4.4

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of mortality during the fiscal year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a DD regression model with a comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of mortality with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

S.5   Impact of NFI 1 and NFI 2 on Resident Mortality

We employed a DD analysis with a common comparison group and baseline (FY 2012) for all three NFI interventions: the Clinical-Only (C-O) intervention during FY 2014–FY 2016, the C+P intervention during FY 2017–FY 2019, and the P-O intervention during FY 2017–FY 2019. We applied the same methods as described in *Section III* of the main report, examining the outcome of resident mortality in each fiscal year.

Using FY 2012 as a baseline, we did not see a statistically significant Initiative effect on resident mortality in any of the three intervention groups for all ECCPs combined. The only statistically

significant result was in the AQAF C-O group (NFI 1), where resident mortality was 12.7 percent lower than expected.

Table S-4.   Initiative effect on mortality in NFI 1 and NFI 2

(probability of death during the year)

ECCP	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical- Only (NFI-1)						
All ECCPs (6 states)	22.1	−0.4	−1.2	0.3	0.357	−2.0
AQAF (AL)	**22.8**	**−2.9**	**−4.5**	**−1.3**	**0.003**	**−12.7**
ATOP2 (NV)	23.0	−1.0	−3.6	1.6	0.511	−4.5
MOQI (MO)	20.9	−0.2	−2.6	2.2	0.890	−1.0
NY-RAH (NY)	21.6	0.0	−1.3	1.3	0.970	−0.1
OPTIMISTIC (IN)	22.7	0.6	−1.5	2.8	0.643	2.7
RAVEN (PA)	22.2	0.5	−1.5	2.5	0.682	2.3
Clinical + Payment (NFI-2)						
All ECCPs (6 states)	22.4	0.3	−0.6	1.2	0.607	1.3
AQAF (AL)	23.9	0.9	−1.3	3.1	0.498	3.8
ATOP2 (NV)	22.2	−1.8	−4.5	0.9	0.282	−8.0
MOQI (MO)	20.3	1.5	−0.7	3.8	0.265	7.6
NY-RAH (NY)	22.9	−0.6	−2.2	1.0	0.530	−2.7
OPTIMISTIC (IN)	22.5	1.5	−0.8	3.8	0.283	6.7
RAVEN (PA)	21.6	0.8	−1.5	3.0	0.562	3.7
Payment-Only (NFI-2)						
All ECCPs (6 states)	22.9	0.6	−0.2	1.4	0.232	2.5
AQAF (AL)	22.2	0.0	−2.3	2.2	0.974	−0.2
ATOP2 (CO)	24.1	−0.2	−1.8	1.5	0.872	−0.7
MOQI (MO)	21.1	1.4	0.0	2.7	0.115	6.4
NY-RAH (NY)	22.7	0.9	−0.8	2.6	0.388	3.9
OPTIMISTIC (IN)	23.9	1.3	−0.5	3.1	0.242	5.4
RAVEN (PA)	23.1	−0.1	−2.3	2.1	0.955	−0.3

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of mortality during the fiscal year, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a DD regression model with a comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of mortality with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

S.6   Resident Mortality in the Medicare Advantage Population

We compared the differences in the proportion of long-stay nursing facility residents who enrolled in a Medicare Advantage (MA) plan between intervention groups and the national comparison

group and changes over time. If MA enrollees tend to be healthier than the traditional fee-for-service (FFS) Medicare population, nursing facilities and states with a higher MA enrollment might have a sicker FFS Medicare facility resident population eligible for the Initiative. If MA enrollment increased at a different rate across groups, that could lead to changes in the case-mix among Initiative-eligible residents in the intervention groups relative to those in the national comparison group.

For this analysis, we used two samples: first, Initiative-eligible residents as were used in other analyses in this report; second, long-stay residents enrolled in an MA plan, who met other Initiative eligibility criteria (this sample is referred to as "MA residents" in this appendix). We sought to examine:

1. What was the trend in MA enrollment from FY 2014 through FY 2019?
2. Did MA enrollment change differently in Initiative and comparison groups?
3. What is the difference in mortality rates between Initiative-eligible residents and MA residents?

Table S-5 compares resident counts and mortality rates by year between Initiative-eligible residents and residents enrolled in MA plans but meeting other Initiative eligibility criteria, nationally. *Table S-6* shows similar comparisons for residents in the C+P facilities and P-O facilities and MA-enrolled residents in the same facilities. *Tables S-7* through *S-12* show results for individual ECCPs.

MA enrollment increased over time in each group, but at different rates, contributing to a decline in the number of FFS Initiative-eligible residents over time. Overall, the C+P group had the highest ratio of MA residents to Initiative-eligible residents, increasing from 0.39 in the base period (FY 2014–FY 2016) to 0.55 in the combined first three years of NFI 2 (FY 2017–FY 2019).[27] The P-O group had the biggest change (increase) from the base period, increasing from 0.27 to 0.45. The ratio of MA residents to Initiative-eligible residents in the national comparison group was 0.27 in the base period and 0.37 in the first three years of NFI 2, which is a smaller change than either of the Initiative groups.

The mortality rate was generally lower among MA residents than among Initiative-eligible residents in each Initiative group and the national comparison group. For example, in facilities in the C+P group in FY 2019, the mortality rate among MA residents was 2.1 percentage points lower than the mortality rate among Initiative-eligible residents (20.0 percent compared with 22.1

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[27] The ratio of MA residents to Initiative-eligible residents is calculated by dividing the count of MA residents by the count of Initiative-eligible residents. Specifically, these ratios for the C+P group use counts provided in *Table S-4*. The ratio for the base period is calculated as (sum of counts of MA residents FY 2014–FY 2016)/(sum of counts of Initiative-eligible residents FY 2014–FY 2016); the ratio for the first three years of NFI 2 is calculated using years FY 2017–FY 2019.

percent). In P-O facilities, the mortality rate among MA residents was 1.8 percentage points lower than the mortality rate among Initiative-eligible residents in FY 2019 (21.0 percent compared with 22.8 percent). In the national comparison group, the mortality rate among MA residents was 20.1 in 2019 compared with 21.5 among Initiative-eligible residents, a 1.4 percentage point difference.

Overall, these analyses suggest that the increase in MA penetration may have led to changes in the mortality risk of Initiative-eligible residents compared to the comparison group, thus causing selection bias. This effect could potentially be the result of "cherry picking" of lower-acuity residents by MA plans, leading to an increase in the relative risk of mortality among Initiative-eligible FFS residents in ECCP facilities compared to the base period and to the national comparison group.

To help address this potential selection bias, we adjusted for MA penetration at the facility level in our DD models. Nonetheless, this may not fully resolve the potential bias created by the differences in growth of MA between the intervention and comparison groups, as we note in *Section V.1*.

Table S-5.   National comparison group facilities: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
2014	728,716	21.5	159,229	20.3
2015	683,120	22.9	197,962	20.6
2016	666,154	21.7	203,573	20.6
2017	646,925	22.4	216,319	20.9
2018	625,193	22.1	231,508	20.7
2019	592,937	21.5	243,008	20.1

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table S-6. All ECCPs: Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
Clinical + Payment Facilities				
2014	12,581	21.5	4,354	20.7
2015	12,346	22.2	4,674	19.3
2016	11,787	21.2	5,222	19.5
2017	11,494	23.1	5,419	20.4
2018	10,622	22.9	6,002	18.9
2019	10,151	22.1	6,374	20.0
Payment-Only Facilities				
2014	14,504	22.3	3,507	20.4
2015	14,187	23.1	3,863	21.6
2016	13,695	22.0	4,101	20.3
2017	13,100	23.4	4,692	22.4
2018	11,986	24.3	5,499	22.1
2019	11,078	22.8	6,103	21.0

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table S-7. AQAF (AL): Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
Clinical + Payment Facilities				
2014	2,391	19.6	347	19.9
2015	2,425	20.0	325	18.5
2016	2,411	20.2	352	17.9
2017	2,218	24.5	540	19.8
2018	1,532	24.8	1,165	15.2
2019	1,355	25.2	1,334	18.4
Payment-Only Facilities				
2014	2,072	20.6	106	15.1
2015	2,001	22.0	127	22.1
2016	1,950	19.7	142	14.1
2017	1,814	21.2	252	16.3
2018	1,403	22.8	628	14.5
2019	1,070	22.9	934	15.2

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table S-8. ATOP2 (NV/CO): Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
Clinical + Payment Facilities (Nevada)				
2014	1,142	22.2	190	23.7
2015	1,118	21.1	176	16.5
2016	1,058	22.5	200	20.0
2017	1,082	21.4	199	17.6
2018	1,093	20.3	208	19.7
2019	1,049	19.6	236	17.8
Payment-Only Facilities (Colorado)				
2014	1,786	23.7	517	18.6
2015	1,722	27.0	618	21.2
2016	1,645	23.0	662	23.1
2017	1,601	25.3	692	21.7
2018	1,506	24.6	732	26.4
2019	1,379	21.8	793	20.6

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table S-9. MOQI (MO): Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
Clinical + Payment Facilities				
2014	1,548	18.4	358	22.1
2015	1,604	22.7	375	21.6
2016	1,513	21.1	520	20.8
2017	1,442	21.9	602	19.1
2018	1,357	22.3	669	21.4
2019	1,308	21.2	677	24.4
Payment-Only Facilities				
2014	2,187	20.6	284	21.8
2015	2,179	22.6	328	20.4
2016	2,056	20.3	362	18.2
2017	1,928	20.9	439	21.6
2018	1,790	23.9	498	20.9
2019	1,628	22.6	555	19.6

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table S-10. NY-RAH (NY): Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
Clinical + Payment Facilities				
2014	3,906	21.9	1,970	17.9
2015	3,598	22.0	2,308	18.2
2016	3,328	20.9	2,681	18.1
2017	3,403	22.4	2,601	20.1
2018	3,499	22.7	2,334	18.6
2019	3,510	21.7	2,375	18.2
Payment-Only Facilities				
2014	4,424	22.7	1,398	19.3
2015	4,284	22.6	1,556	23.1
2016	4,101	21.8	1,671	19.9
2017	3,912	23.5	1,912	21.6
2018	3,696	24.4	2,124	23.3
2019	3,640	22.9	2,159	23.7

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table S-11. OPTIMISTIC (IN): Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
Clinical + Payment Facilities				
2014	1,987	23.1	359	22.6
2015	1,979	25.0	423	20.3
2016	1,877	21.8	437	20.6
2017	1,813	24.5	429	21.5
2018	1,656	23.9	540	22.8
2019	1,527	23.6	649	21.3
Payment-Only Facilities				
2014	2,264	22.9	446	25.6
2015	2,242	23.2	472	21.4
2016	2,154	23.4	503	21.3
2017	2,149	25.8	553	23.5
2018	1,966	26.5	634	20.7
2019	1,800	22.9	737	21.9

SOURCE: RTI analysis of Medicare eligibility and enrollment data.

Table S-12. RAVEN (PA): Counts of Initiative-eligible residents, MA enrollment, and mortality rates, FY 2014–FY 2019

Year	Initiative-eligible residents	Mortality of Initiative-eligible residents (%)	MA residents	Mortality of MA residents (%)
Clinical + Payment Facilities				
2014	1,607	24.0	1,130	24.4
2015	1,622	22.5	1,067	21.4
2016	1,600	21.5	1,032	22.8
2017	1,536	23.2	1,048	22.1
2018	1,485	22.6	1,086	20.0
2019	1,402	21.4	1,103	22.9
Payment-Only Facilities				
2014	1,771	22.9	756	20.6
2015	1,759	21.9	762	19.7
2016	1,789	24.4	761	20.2
2017	1,696	23.4	844	26.4
2018	1,625	22.8	883	22.8
2019	1,561	23.0	925	20.9

SOURCE: RTI analysis of Medicare eligibility and enrollment data

APPENDIX T
DESCRIPTIVE STATISTICS FOR REGRESSION COVARIATES

This appendix presents descriptive statistics on the final set of resident-, facility- and state-level model covariates, including annual percentages for categorical variables and means and standard deviations for continuous variables, from FY 2012–FY 2019. These descriptive statistics are summarized separately for the national comparison group (**Table T-1**), the Clinical + Payment (C+P) group, combining all ECCPs (**Table T-2**), and the Payment-Only (P-O) group, combining all ECCPs (**Table T-3**).

Two different hierarchical condition categories (HCC) versions were used during the study period. For 2012-2013, we used version 12 and considered these variables missing for later years. For 2014 and on, we used version 22 and considered these variables missing in the earlier years.

Table T-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Resident-level characteristics:								
Demographics								
Residents meeting eligibility criteria	772,196	769,878	728,716	683,120	666,154	646,925	625,193	592,937
Mean exposure, in days	249.0	244.9	246.9	241.8	245.6	242.9	242.5	244.2
	(132.4)	(133.0)	(132.6)	(133.5)	(133.2)	(133.1)	(133.2)	(132.8)
Exposure days 1–89	19.8	20.4	20.3	21.2	20.5	20.8	20.9	20.8
Exposure days 90–179	14.2	15.1	14.2	15.3	14.6	15.2	15.3	14.6
Exposure days 180–269	10.5	10.3	10.6	10.6	10.7	10.7	10.6	10.8
Exposure days 270–364	9.4	9.1	9.3	9.1	9.4	9.3	9.2	9.3
Exposure days 365/366	46.1	45.2	45.6	43.9	44.9	44.1	44.1	44.5
Male, < 65	5.5	5.7	5.8	5.8	6.0	6.1	6.3	6.3
Male, 65–69	3.1	3.3	3.4	3.6	3.8	4.2	4.4	4.7
Male, 70–74	3.8	3.9	4.1	4.2	4.3	4.5	4.7	5.0
Male, 75–79	4.4	4.5	4.6	4.7	4.7	4.8	5.0	5.2
Male, 80–84	5.3	5.2	5.1	5.0	5.0	5.1	5.1	5.2
Male, 85–89	5.0	4.9	4.9	4.9	4.8	4.8	4.6	4.5
Male, 90–94	2.8	2.9	2.9	3.0	3.0	2.9	2.9	2.8
Male, 95+	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0
Female, < 65	4.6	4.7	4.8	4.8	5.0	5.0	5.1	5.2
Female, 65–69	3.5	3.7	3.8	3.9	4.2	4.4	4.4	4.5
Female, 70–74	5.0	5.1	5.3	5.5	5.7	5.8	6.1	6.3
Female, 75–79	8.0	7.9	7.9	7.9	7.8	7.9	8.0	8.3
Female, 80–84	12.9	12.4	12.0	11.6	11.3	11.1	10.9	10.8
Female, 85–89	16.5	16.1	15.6	15.3	14.7	14.1	13.5	13.0
Female, 90–94	12.7	12.8	12.7	12.7	12.4	12.1	11.7	11.2
Female, 95+	6.1	6.2	6.2	6.3	6.3	6.3	6.3	6.1
White, non-Hispanic	78.4	78.1	77.6	77.7	77.5	76.9	76.3	75.5
Black, non-Hispanic	12.6	13.0	13.0	12.8	13.0	13.2	13.5	13.8
Asian	1.5	1.6	1.6	1.6	1.7	1.9	2.0	2.1
Hispanic	4.9	5.0	5.2	5.0	5.0	5.2	5.4	5.6
Other race/ethnicity	2.7	2.4	2.6	2.9	2.8	2.8	2.9	3.1
Full dual eligibility	80.1	80.8	80.6	80.0	80.7	81.0	81.7	82.5
Original eligibility due to disability	14.9	15.6	16.1	16.5	17.2	18.0	19.0	19.8

(continued)

Table T-1.   National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Health status								
Dementia	54.5	54.0	53.8	53.4	52.8	52.9	52.2	51.5
Anemia	29.4	30.0	30.3	30.3	29.8	29.7	29.8	30.3
BMI <18.5	7.0	6.9	7.0	7.1	7.0	6.9	6.9	6.6
BMI = 18.5–24.9	38.5	38.1	37.9	37.7	37.5	37.0	36.6	36.2
BMI = 25–29.9	28.6	28.6	28.5	28.3	28.1	28.1	27.9	27.9
BMI >= 30	25.9	26.4	26.6	27.0	27.4	28.0	28.6	29.3
ADL score= 0–7	14.4	13.2	12.4	11.8	11.6	11.6	11.9	12.0
ADL score= 8–14	18.0	17.2	17.1	16.8	16.9	17.0	17.3	17.7
ADL score= 15–21	45.6	48.3	50.4	52.4	53.5	54.3	54.5	54.6
ADL score= 22–28	22.1	21.4	20.0	19.0	18.0	17.0	16.3	15.7
Resident's mood assessment using PHQ	2.8 (3.8)	2.7 (3.8)	2.6 (3.6)	2.4 (3.6)	2.3 (3.4)	2.2 (3.3)	2.0 (3.2)	1.9 (3.2)
CFS= 3 (Severely impaired)	12.3	11.8	11.1	10.7	10.3	9.9	9.6	9.1
CFS= 2 (Moderately impaired)	35.9	34.9	34.8	34.4	33.6	33.2	32.7	32.7
CFS= 1 (Mildly impaired)	23.0	22.9	22.8	22.9	23.2	23.1	23.7	24.0
CFS= 0 (Cognitively intact)	28.9	30.3	31.3	32.0	32.9	33.8	34.0	34.3
Neurogenic bladder	2.0	2.2	2.4	2.5	2.7	3.1	3.3	3.5
Obstructive uropathy	0.6	0.7	0.8	0.8	1.0	1.3	1.6	1.8
ESRD patient with dialysis status	2.3	2.4	2.5	2.6	2.7	2.8	2.8	3.0
ESRD patients after transplant who are not on dialysis after transplant	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hierarchical Condition Categories								
HIV/AIDS (HCC 1)	—	—	0.3	0.3	0.3	0.3	0.4	0.4
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	—	—	12.2	13.0	14.2	14.5	15.3	15.9
Opportunistic Infections (HCC 6)	—	—	0.6	0.5	0.6	0.6	0.6	0.6
Metastatic Cancer and Acute Leukemia (HCC 8)	—	—	1.0	1.0	1.0	1.0	1.1	1.1
Lung and Other Severe Cancers (HCC 9)	—	—	1.1	1.1	1.2	1.1	1.2	1.2
Lymphoma and Other Cancers (HCC 10)	—	—	1.2	1.2	1.3	1.2	1.2	1.2
Colorectal, Bladder, and Other Cancers (HCC 11)	—	—	1.7	1.8	1.8	1.7	1.7	1.7
Breast, Prostate, and Other Cancers and Tumors (HCC 12)	—	—	3.8	3.8	3.9	3.7	3.7	3.8
Diabetes with Acute Complications (HCC 17)	—	—	1.1	1.1	1.3	1.3	1.4	1.5

(continued)

Table T-1.   National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Diabetes with Chronic Complications (HCC 18)	—	—	21.2	21.8	25.3	28.7	30.5	32.0
Diabetes without Complication (HCC 19)	—	—	17.9	17.6	14.5	11.4	10.1	9.3
Protein-Calorie Malnutrition (HCC 21)	—	—	10.6	10.5	10.9	11.1	11.9	12.3
Other Significant Endocrine and Metabolic Disorders (HCC 23)	—	—	4.5	4.6	5.1	5.3	5.8	6.3
End-Stage Liver Disease (HCC 27)	—	—	0.8	0.8	0.9	0.9	0.9	1.0
Cirrhosis of Liver (HCC 28)	—	—	0.7	0.8	0.8	0.8	0.9	1.0
Chronic Hepatitis (HCC 29)	—	—	0.4	0.4	0.5	0.6	0.7	0.7
Intestinal Obstruction/Perforation (HCC 33)	—	—	4.2	4.2	4.2	4.2	4.3	4.4
Chronic Pancreatitis (HCC 34)	—	—	0.3	0.3	0.3	0.3	0.4	0.4
Inflammatory Bowel Disease (HCC 35)	—	—	0.9	0.8	0.9	0.9	0.9	0.9
Bone/Joint/Muscle Infections/Necrosis (HCC 39)	—	—	3.1	3.2	3.4	3.3	3.4	3.7
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	—	—	4.9	5.1	5.3	5.5	5.6	5.7
Severe Hematological Disorders (HCC 46)	—	—	0.9	0.8	0.8	0.9	0.8	0.8
Disorders of Immunity (HCC 47)	—	—	1.6	1.6	1.8	1.8	1.9	2.0
Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	—	—	8.6	8.4	8.7	8.8	9.3	9.4
Drug/Alcohol Psychosis (HCC 54)	—	—	1.6	1.7	1.5	0.8	0.9	0.9
Drug/Alcohol Dependence (HCC 55)	—	—	1.8	1.9	2.5	3.4	3.6	4.0
Schizophrenia (HCC 57)	—	—	7.2	7.1	8.0	8.6	9.2	9.9
Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	—	—	17.9	18.3	21.8	26.9	30.0	32.4
Quadriplegia (HCC 70)	—	—	1.4	1.6	1.9	2.1	2.3	2.5
Paraplegia (HCC 71)	—	—	1.1	1.1	1.2	1.2	1.3	1.3
Spinal Cord Disorders/Injuries (HCC 72)	—	—	1.3	1.3	1.3	1.1	1.1	1.1
Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	—	—	0.2	0.2	0.2	0.2	0.2	0.2
Cerebral Palsy (HCC 74)	—	—	0.9	0.9	1.0	1.1	1.1	1.2
Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	—	—	1.2	1.3	1.4	1.3	1.5	1.5
Muscular Dystrophy (HCC 76)	—	—	0.1	0.1	0.2	0.2	0.2	0.2

(continued)

Table T-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Multiple Sclerosis (HCC 77)	—	—	1.6	1.6	1.7	1.7	1.7	1.7
Parkinson's and Huntington's Diseases (HCC 78)	—	—	7.5	7.5	7.6	7.8	7.8	7.9
Seizure Disorders and Convulsions (HCC 79)	—	—	12.0	12.2	12.4	12.5	12.9	13.4
Coma, Brain Compression/Anoxic Damage (HCC 80)	—	—	1.3	1.3	1.5	1.7	2.1	2.4
Respiratory Arrest (HCC 83)	—	—	0.2	0.2	0.2	0.2	0.1	0.1
Cardio-Respiratory Failure and Shock (HCC 84)	—	—	9.9	10.4	11.3	11.9	12.8	13.5
Congestive Heart Failure (HCC 85)	—	—	31.9	31.8	32.1	32.0	32.6	33.2
Acute Myocardial Infarction (HCC 86)	—	—	3.0	3.0	3.4	4.3	4.7	5.1
Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	—	—	2.6	2.6	2.5	1.9	2.0	2.1
Angina Pectoris (HCC 88)	—	—	1.9	1.9	2.2	2.8	3.0	3.1
Specified Heart Arrhythmias (HCC 96)	—	—	26.5	26.9	27.5	27.5	27.9	28.5
Cerebral Hemorrhage (HCC 99)	—	—	2.3	2.4	2.6	2.5	2.6	2.6
Ischemic or Unspecified Stroke (HCC 100)	—	—	14.7	14.5	14.4	12.3	13.0	13.5
Hemiplegia/Hemiparesis (HCC 103)	—	—	8.4	8.5	9.3	10.4	10.9	11.4
Monoplegia, Other Paralytic Syndromes (HCC 104)	—	—	0.5	0.5	0.5	0.4	0.5	0.5
Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	—	—	2.8	2.8	3.0	3.2	3.3	3.5
Vascular Disease with Complications (HCC 107)	—	—	4.0	4.0	4.2	4.2	4.4	4.5
Vascular Disease (HCC 108)	—	—	44.4	44.7	46.0	44.3	44.9	45.0
Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	—	—	25.8	25.7	26.1	26.3	26.6	27.0
Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	—	—	0.8	0.8	0.8	0.7	0.8	0.8
Aspiration and Specified Bacterial Pneumonias (HCC 114)	—	—	6.9	6.8	7.1	7.1	7.4	7.4
Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	—	—	0.7	0.6	0.8	1.2	2.5	3.2
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	—	—	1.2	1.2	1.3	1.3	1.4	1.4
Exudative Macular Degeneration (HCC 124)	—	—	2.0	2.1	2.2	2.3	2.3	2.3
Acute Renal Failure (HCC 135)	—	—	15.3	16.0	16.8	17.4	18.2	18.9

(continued)

Table T-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Chronic Kidney Disease, Stage 5 (HCC 136)	—	—	0.9	0.8	0.7	0.7	0.6	0.6
Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	—	—	1.1	1.1	1.2	1.3	1.4	1.5
Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	—	—	1.7	1.8	2.1	2.5	2.5	2.7
Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	—	—	3.4	3.5	4.2	4.8	5.2	5.6
Chronic Ulcer of Skin, Except Pressure (HCC 161)	—	—	6.7	6.6	6.6	6.1	6.6	7.0
Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	—	—	2.5	2.5	2.6	2.4	2.5	2.6
Vertebral Fractures without Spinal Cord Injury (HCC 169)	—	—	3.0	3.1	3.1	2.8	2.9	3.0
Hip Fracture/Dislocation (HCC 170)	—	—	6.7	6.8	6.8	5.8	5.7	5.7
Complications of Specified Implanted Device or Graft (HCC 176)	—	—	4.7	4.8	5.5	5.9	6.1	6.3
Artificial Openings for Feeding or Elimination (HCC 188)	—	—	5.8	5.8	6.0	6.1	6.3	6.5
Amputation Status, Lower Limb/Amputation Complications (HCC 189)	—	—	1.5	1.5	1.6	1.8	1.9	2.1
HIV/AIDS (V12_HCC1)	0.2	0.3	—	—	—	—	—	—
Septicemia/Shock (V12_HCC2)	10.0	10.3	—	—	—	—	—	—
Opportunistic Infection (V12_HCC5)	0.6	0.5	—	—	—	—	—	—
Metastatic Cancer and Acute Leukemia (V12_HCC7)	1.1	1.1	—	—	—	—	—	—
Lung, Upper Digestive Tract, and Other Severe Cancers (V12_HCC8)	1.0	0.9	—	—	—	—	—	—
Lymphatic, Head and Neck, Brain, and Other Major Cancers (V12_HCC9)	1.5	1.5	—	—	—	—	—	—
Breast, Prostate, Colorectal and Other Cancers and Tumors (V12_HCC10)	5.5	5.4	—	—	—	—	—	—
Diabetes with Renal or Peripheral Circulatory Manifestation; Diabetes with Neurologic or Other Specified Manifestation; Diabetes with Ophthalmologic or Unspecified Manifestation (V12_HCC15; V12_HCC16; V12_HCC18)	20.0	20.3	—	—	—	—	—	—
Diabetes with Acute Complications (V12_HCC17)	0.3	0.4	—	—	—	—	—	—

(continued)

Table T-1. National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Diabetes without Complication (V12_HCC19)	19.0	18.9	—	—	—	—	—	—
Protein-Calorie Malnutrition (V12_HCC21)	10.3	10.3	—	—	—	—	—	—
End-Stage Liver Disease (V12_HCC25)	0.7	0.8	—	—	—	—	—	—
Cirrhosis of Liver (V12_HCC26)	0.7	0.7	—	—	—	—	—	—
Chronic Hepatitis (V12_HCC27)	0.4	0.4	—	—	—	—	—	—
Intestinal Obstruction/Perforation (V12_HCC31)	4.4	4.3	—	—	—	—	—	—
Pancreatic Disease (V12_HCC32)	1.7	1.6	—	—	—	—	—	—
Inflammatory Bowel Disease (V12_HCC33)	0.9	0.9	—	—	—	—	—	—
Bone/Joint/Muscle Infections/Necrosis (V12_HCC37)	2.9	2.9	—	—	—	—	—	—
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (V12_HCC38)	4.7	4.7	—	—	—	—	—	—
Severe Hematological Disorders (V12_HCC44)	1.6	0.9	—	—	—	—	—	—
Disorders of Immunity (V12_HCC45)	1.0	1.6	—	—	—	—	—	—
Drug/Alcohol Psychosis (V12_HCC51)	1.6	1.6	—	—	—	—	—	—
Drug/Alcohol Dependence (V12_HCC52)	1.5	1.6	—	—	—	—	—	—
Schizophrenia (V12_HCC54)	6.7	7.0	—	—	—	—	—	—
Major Depressive, Bipolar, and Paranoid Disorders (V12_HCC55)	16.8	17.2	—	—	—	—	—	—
Quadriplegia, Other Extensive Paralysis (V12_HCC67)	1.3	1.5	—	—	—	—	—	—
Paraplegia (V12_HCC68)	1.0	1.0	—	—	—	—	—	—
Spinal Cord Disorders/Injuries (V12_HCC69)	1.2	1.2	—	—	—	—	—	—
Muscular Dystrophy (V12_HCC70)	0.1	0.1	—	—	—	—	—	—
Polyneuropathy (V12_HCC71)	10.6	11.2	—	—	—	—	—	—
Multiple Sclerosis (V12_HCC72)	1.6	1.6	—	—	—	—	—	—
Parkinson's and Huntington's Diseases (V12_HCC73)	7.7	7.6	—	—	—	—	—	—
Seizure Disorders and Convulsions (V12_HCC74)	11.6	11.8	—	—	—	—	—	—
Coma, Brain Compression/Anoxic Damage (V12_HCC75)	1.2	1.3	—	—	—	—	—	—
Respiratory Arrest (V12_HCC78)	0.2	0.2	—	—	—	—	—	—
Cardio-Respiratory Failure and Shock (V12_HCC79)	13.2	13.6	—	—	—	—	—	—

(continued)

Table T-1. **National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Congestive Heart Failure (V12_HCC80)	32.4	32.0	—	—	—	—	—	—
Acute Myocardial Infarction (V12_HCC81)	3.0	3.0	—	—	—	—	—	—
Unstable Angina and Other Acute Ischemic Heart Disease (V12_HCC82)	2.6	2.6	—	—	—	—	—	—
Angina Pectoris/Old Myocardial Infarction (V12_HCC83)	6.2	6.1	—	—	—	—	—	—
Specified Heart Arrhythmias (V12_HCC92)	25.6	26.1	—	—	—	—	—	—
Cerebral Hemorrhage (V12_HCC95)	2.1	2.2	—	—	—	—	—	—
Ischemic or Unspecified Stroke (V12_HCC96)	15.2	14.9	—	—	—	—	—	—
Hemiplegia/Hemiparesis (V12_HCC100)	8.1	8.2	—	—	—	—	—	—
Cerebral Palsy and Other Paralytic Syndromes (V12_HCC101)	1.0	1.0	—	—	—	—	—	—
Vascular Disease with Complications (V12_HCC104)	5.6	5.5	—	—	—	—	—	—
Vascular Disease (V12_HCC105)	43.8	43.7	—	—	—	—	—	—
Cystic Fibrosis; Chronic Obstructive Pulmonary Disease (V12_HCC107; V12_HCC108)	25.8	25.7	—	—	—	—	—	—
Aspiration and Specified Bacterial Pneumonias (V12_HCC111)	6.9	6.9	—	—	—	—	—	—
Pneumococcal Pneumonia, Empyema, Lung Abscess (V12_HCC112)	0.8	0.7	—	—	—	—	—	—
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (V12_HCC119)	1.1	1.2	—	—	—	—	—	—
Renal Failure (V12_HCC131)	25.9	26.8	—	—	—	—	—	—
Nephritis (V12_HCC132)	0.2	0.2	—	—	—	—	—	—
Decubitus Ulcer of Skin (V12_HCC148)	12.3	12.4	—	—	—	—	—	—
Chronic Ulcer of Skin, Except Decubitus (V12_HCC149)	5.0	4.9	—	—	—	—	—	—
Severe Head Injury; Major Head Injury (V12_HCC154; V12_HCC155)	2.4	2.4	—	—	—	—	—	—
Vertebral Fractures without Spinal Cord Injury (V12_HCC157)	2.9	2.9	—	—	—	—	—	—
Hip Fracture/Dislocation (V12_HCC158)	6.8	6.7	—	—	—	—	—	—
Major Complications of Medical Care and Trauma (V12_HCC164)	6.9	6.9	—	—	—	—	—	—
Artificial Openings for Feeding or Elimination (V12_HCC176)	5.6	5.7	—	—	—	—	—	—

(continued)

Table T-1. **National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Amputation Status, Lower Limb/Amputation Complications (V12_HCC177)	1.7	1.8	—	—	—	—	—	—
HCC count = 0-2	35.8	35.5	36.6	36.0	33.4	32.7	30.5	28.7
HCC count = 3-4	27.1	27.0	27.3	27.3	27.3	27.1	27.0	26.8
HCC count = 5-7	22.3	22.5	21.7	21.8	22.9	23.0	23.9	24.5
HCC count >= 8	14.8	15.0	14.5	14.9	16.3	17.1	18.6	20.0
Participation in other initiatives								
Community-based Care Transition Program (CCTP)	—.	0.3	0.7	0.9	0.7	0.2	—	—
Comprehensive ESRD Care (CEC)	—	—	—	—	0.1	0.2	0.4	0.5
Comprehensive Primary Care Initiative (CPCI)	—.	0.3	0.3	0.3	0.2	0.1	.	.
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	—	—	—	—	—	0.6	0.8	0.8
Comprehensive Primary Care Plus (CPC+), SSP Participants	—	—	—	—	—	0.7	0.8	0.9
MMCO Financial Alignment Demonstration (Duals) (DEMME)	—	0.0	0.3	0.4	0.4	0.6	0.7	0.6
Multi-Payer Advanced Primary Care Practice (MAPAC) Demonstrations	0.0	0.0	0.0	0.0	—	—	—	—
Next Generation Accountable Care Organization (NGACO)	—	—	—	—	1.4	3.3	4.2	4.0
Pioneer Accountable Care Organization Model	1.9	3.0	3.0	2.5	2.0	0.5	—.	—
Medicare Shared Savings Program	4.1	10.4	16.0	20.3	23.4	23.2	21.6	27.3
Vermont All-Payer ACO Model	—	—	—	—	—	—	—	0.1
Maryland Total Cost of Care, Primary Care Program	—	—	—	—	—	—	—	0.1
Facility-level characteristics								
% MA residents in month 6(March) of the FY is less than 10	73.9	72.0	65.3	58.9	55.3	50.0	45.3	39.8
% MA residents in month 6(March) of the FY is between 10 and 20	16.5	17.6	22.0	24.1	25.0	27.8	30.3	31.7
% MA residents in month 6(March) of the FY is between 20 and 30	5.6	6.0	7.2	9.2	10.8	12.2	13.0	14.9
% MA residents in month 6(March) of the FY is greater than 30	4.1	4.3	5.5	7.7	8.9	10.1	11.5	13.6
Nursing home facility in the hospital	1.9	2.5	2.1	1.4	2.5	2.1	2.3	2.1
For-profit nursing homes	75.8	75.6	76.5	75.8	75.4	75.8	75.9	75.5
Metropolitan	74.0	73.6	73.7	73.1	72.3	72.4	72.4	72.6

(continued)

Table T-1. **National comparison group: Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Rural	3.0	3.2	3.1	3.2	3.3	3.3	3.3	3.3
Urban Non-Metropolitan	23.0	23.3	23.2	23.7	24.4	24.2	24.3	24.1
N (Facilities)	11,094	11,220	10,917	10,917	11,004	11,038	11,196	11,031

ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; MA = Medicare Advantage; PHQ = Patient Health Questionnaire; — = not measured in specific year.

SOURCES: RTI analysis of MDS 3.0, Medicare claims data, and CASPER data.

NOTE: Number in parentheses are standard deviations for continuous variables.

Table T-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Resident-level characteristics:								
Demographics								
Residents meeting eligibility criteria	13,403	13,090	12,581	12,346	11,787	11,494	10,622	10,151
Mean exposure, in days	250.7 (132.1)	245.5 (133.8)	248.9 (132.8)	245.6 (133.6)	248.0 (133.4)	244.1 (133.2)	238.3 (134.5)	240.0 (135.0)
Exposure days 1–89	19.5	20.8	20.4	20.6	20.1	20.9	21.9	22.6
Exposure days 90–179	13.8	14.5	13.3	14.9	14.5	14.7	16.0	13.8
Exposure days 180–269	10.3	9.9	10.3	10.0	10.1	10.6	10.3	11.0
Exposure days 270–364	10.0	9.2	9.1	8.2	8.8	8.6	8.5	8.8
Exposure days 365/366	46.4	45.7	46.8	46.2	46.5	45.1	43.4	43.8
Male, < 65	5.0	5.5	6.0	6.5	6.5	6.8	6.8	6.8
Male, 65–69	3.3	3.2	3.4	3.6	4.2	4.7	4.9	5.5
Male, 70–74	4.1	4.3	4.3	4.4	4.5	4.4	4.8	5.3
Male, 75–79	4.6	4.8	4.7	4.8	4.5	5.1	5.3	5.2
Male, 80–84	5.3	4.9	4.8	5.1	4.8	4.8	5.3	5.3
Male, 85–89	4.5	4.4	4.6	4.8	4.4	4.4	4.5	4.4
Male, 90–94	2.5	2.4	2.3	2.3	2.3	2.3	2.5	2.6
Male, 95+	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.9
Female, < 65	4.6	4.7	5.0	5.1	5.6	5.3	5.3	5.6
Female, 65–69	3.4	3.6	3.9	4.1	4.1	4.4	4.5	4.8
Female, 70–74	5.0	5.3	5.7	6.1	6.0	6.0	6.4	6.5
Female, 75–79	8.3	8.9	8.5	8.3	8.2	7.9	8.0	7.8
Female, 80–84	13.4	12.6	12.2	11.6	11.8	11.0	10.4	10.3
Female, 85–89	16.7	16.1	15.6	14.9	14.5	13.8	12.9	12.6
Female, 90–94	12.5	12.5	12.5	12.0	12.0	12.1	11.5	10.1
Female, 95+	5.9	6.2	5.8	5.6	5.9	6.2	6.1	6.3
White, non-Hispanic	74.2	73.4	74.0	73.3	73.7	72.7	71.7	70.7
Black, non-Hispanic	18.0	18.6	18.4	18.6	18.2	18.7	19.1	19.0
Asian	1.2	1.2	1.2	1.4	1.7	1.9	2.4	2.6
Hispanic	5.2	5.1	4.5	4.1	4.0	4.2	4.6	5.2
Other race/ethnicity	1.3	1.6	1.8	2.6	2.3	2.4	2.2	2.4
Full dual eligibility	85.1	85.8	85.1	85.3	85.4	85.9	85.8	86.2
Original eligibility because of disability	15.4	16.2	16.8	17.3	17.4	18.9	19.0	19.9

(continued)

Table T-2.   Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Health status								
Dementia	57.0	55.7	55.5	54.9	54.2	53.3	52.4	51.5
Anemia	28.9	30.1	31.0	33.0	31.9	31.4	31.7	31.9
BMI <18.5	7.4	7.3	7.1	6.8	7.6	8.0	8.0	7.3
BMI = 18.5–24.9	39.4	38.9	39.2	38.4	37.4	37.5	37.9	38.0
BMI = 25–29.9	28.8	28.5	28.2	28.4	28.1	27.2	26.5	26.9
BMI >= 30	24.4	25.3	25.4	26.5	26.8	27.4	27.5	27.9
ADL score= 0–7	10.4	10.1	9.4	9.9	10.3	9.8	8.8	9.1
ADL score= 8–14	16.4	14.9	15.0	14.7	14.3	14.9	15.0	15.2
ADL score= 15–21	46.5	49.8	51.6	53.0	54.1	54.8	56.2	54.8
ADL score= 22–28	26.7	25.3	24.0	22.4	21.4	20.5	20.0	20.9
Resident's mood assessment using PHQ	2.2 (3.4)	2.3 (3.4)	2.3 (3.4)	2.4 (3.5)	2.6 (3.7)	2.6 (3.6)	2.3 (3.3)	2.2 (3.3)
CFS= 3 (Severely impaired)	14.0	14.0	12.4	11.6	10.9	10.5	10.6	9.7
CFS= 2 (Moderately impaired)	32.8	31.9	32.4	32.1	33.3	32.2	31.6	32.2
CFS= 1 (Mildly impaired)	23.2	22.5	22.1	22.4	22.2	22.6	23.0	22.9
CFS= 0 (Cognitively intact)	30.1	31.6	33.0	33.8	33.5	34.8	34.8	35.1
Neurogenic bladder	1.6	2.2	2.5	2.7	2.8	2.9	3.1	3.3
Obstructive uropathy	0.5	0.6	0.7	0.9	1.1	1.5	1.8	2.0
ESRD patient with dialysis status	3.1	3.1	3.4	3.4	3.7	3.6	4.1	4.5
ESRD patients after transplant who are not on dialysis after transplant	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1
Hierarchical Condition Categories								
HIV/AIDS (HCC 1)	—	—	0.7	0.7	0.8	0.8	1.0	0.9
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	—	—	13.6	13.7	14.4	15.1	16.1	16.5
Opportunistic Infections (HCC 6)	—	—	0.6	0.5	0.6	0.6	0.6	0.6
Metastatic Cancer and Acute Leukemia (HCC 8)	—	—	1.1	1.1	1.2	1.2	1.3	1.3
Lung and Other Severe Cancers (HCC 9)	—	—	1.3	1.4	1.2	1.3	1.2	1.4
Lymphoma and Other Cancers (HCC 10)	—	—	1.4	1.4	1.3	1.2	1.3	1.4
Colorectal, Bladder, and Other Cancers (HCC 11)	—	—	1.7	1.8	1.9	1.7	2.0	1.8
Breast, Prostate, and Other Cancers and Tumors (HCC 12)	—	—	4.0	4.1	4.1	3.8	3.9	3.8

(continued)

Table T-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Diabetes with Acute Complications (HCC 17)	—	—	1.2	1.0	1.5	1.5	1.7	1.9
Diabetes with Chronic Complications (HCC 18)	—	—	19.4	20.6	23.5	27.7	29.3	30.9
Diabetes without Complication (HCC 19)	—	—	20.0	19.3	17.4	13.0	11.9	10.7
Protein-Calorie Malnutrition (HCC 21)	—	—	11.4	11.5	11.2	10.8	12.7	13.4
Other Significant Endocrine and Metabolic Disorders (HCC 23)	—	—	4.9	4.5	5.0	5.7	6.3	6.7
End-Stage Liver Disease (HCC 27)	—	—	0.9	0.6	0.7	0.8	0.8	0.9
Cirrhosis of Liver (HCC 28)	—	—	0.7	0.7	0.8	0.7	0.9	1.1
Chronic Hepatitis (HCC 29)	—	—	0.5	0.6	0.7	0.7	0.9	1.1
Intestinal Obstruction/Perforation (HCC 33)	—	—	4.8	4.5	4.5	4.6	4.9	4.7
Chronic Pancreatitis (HCC 34)	—	—	0.3	0.3	0.4	0.4	0.4	0.3
Inflammatory Bowel Disease (HCC 35)	—	—	1.2	0.8	1.0	1.1	1.1	1.2
Bone/Joint/Muscle Infections/Necrosis (HCC 39)	—	—	3.8	3.7	3.9	3.7	4.1	4.3
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	—	—	4.5	4.7	5.2	4.8	5.1	5.4
Severe Hematological Disorders (HCC 46)	—	—	1.0	0.9	0.8	0.9	0.9	0.9
Disorders of Immunity (HCC 47)	—	—	1.7	1.5	1.8	1.7	1.9	2.3
Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	—	—	10.2	9.6	9.8	9.8	10.1	10.4
Drug/Alcohol Psychosis (HCC 54)	—	—	1.6	1.8	1.7	1.1	0.8	1.0
Drug/Alcohol Dependence (HCC 55)	—	—	1.7	1.9	2.2	3.0	3.7	4.0
Schizophrenia (HCC 57)	—	—	6.1	6.6	6.9	8.2	9.3	9.9
Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	—	—	17.3	19.4	23.3	26.8	31.1	33.6
Quadriplegia (HCC 70)	—	—	1.8	2.2	2.1	2.3	2.6	2.7
Paraplegia (HCC 71)	—	—	1.0	1.2	1.0	1.4	1.4	1.5
Spinal Cord Disorders/Injuries (HCC 72)	—	—	1.5	1.6	1.2	1.0	1.0	1.3
Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	—	—	0.2	0.2	0.3	0.2	0.3	0.2

(continued)

Table T-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Cerebral Palsy (HCC 74)	—	—	1.2	1.2	1.2	1.3	1.2	1.4
Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	—	—	1.5	1.5	1.6	1.5	1.6	1.7
Muscular Dystrophy (HCC 76)	—	—	0.2	0.2	0.2	0.2	0.2	0.2
Multiple Sclerosis (HCC 77)	—	—	1.9	2.1	2.4	2.4	2.4	2.4
Parkinson's and Huntington's Diseases (HCC 78)	—	—	7.3	7.8	7.5	7.8	8.2	8.0
Seizure Disorders and Convulsions (HCC 79)	—	—	14.2	14.6	14.8	14.3	14.6	15.0
Coma, Brain Compression/Anoxic Damage (HCC 80)	—	—	1.4	1.7	1.6	1.8	2.6	2.7
Respiratory Arrest (HCC 83)	—	—	0.2	0.2	0.2	0.1	0.1	0.2
Cardio-Respiratory Failure and Shock (HCC 84)	—	—	9.9	10.9	11.1	12.0	13.2	13.4
Congestive Heart Failure (HCC 85)	—	—	33.6	33.6	34.1	34.7	34.3	35.2
Acute Myocardial Infarction (HCC 86)	—	—	3.5	3.0	3.6	4.6	4.8	5.4
Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	—	—	3.1	3.3	3.1	2.2	2.9	3.3
Angina Pectoris (HCC 88)	—	—	1.5	1.5	2.1	2.9	3.2	2.8
Specified Heart Arrhythmias (HCC 96)	—	—	26.3	26.7	27.2	26.7	26.9	28.0
Cerebral Hemorrhage (HCC 99)	—	—	2.5	2.7	2.9	2.9	3.1	3.0
Ischemic or Unspecified Stroke (HCC 100)	—	—	16.1	15.3	15.3	12.8	13.7	14.5
Hemiplegia/Hemiparesis (HCC 103)	—	—	9.4	9.8	10.1	10.4	11.2	11.2
Monoplegia, Other Paralytic Syndromes (HCC 104)	—	—	0.6	0.4	0.4	0.4	0.4	0.5
Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	—	—	2.9	3.1	3.6	3.8	4.0	4.0
Vascular Disease with Complications (HCC 107)	—	—	4.5	4.0	4.1	4.2	4.6	5.2
Vascular Disease (HCC 108)	—	—	45.8	44.3	44.4	46.4	44.5	45.4
Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	—	—	25.9	25.9	26.7	26.8	26.8	28.3
Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	—	—	0.8	0.8	0.7	0.7	0.7	0.7

(continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Aspiration and Specified Bacterial Pneumonias (HCC 114)	—	—	7.0	7.1	7.0	7.0	8.2	7.9
Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	—	—	0.8	0.7	0.8	1.0	2.2	3.0
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	—	—	1.1	1.3	1.3	1.2	1.0	1.1
Exudative Macular Degeneration (HCC 124)	—	—	1.6	1.8	1.7	1.8	1.9	1.7
Acute Renal Failure (HCC 135)	—	—	15.7	16.6	16.6	17.4	18.4	20.1
Chronic Kidney Disease, Stage 5 (HCC 136)	—	—	1.2	1.1	0.8	0.9	0.7	1.1
Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	—	—	0.9	1.0	1.0	1.3	1.4	1.3
Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	—	—	2.4	2.3	2.6	3.3	3.2	3.4
Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	—	—	4.0	4.5	5.4	6.8	7.1	7.5
Chronic Ulcer of Skin, Except Pressure (HCC 161)	—	—	8.0	7.9	7.5	5.7	6.4	7.0
Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	—	—	2.4	2.3	2.3	2.5	2.3	2.6
Vertebral Fractures without Spinal Cord Injury (HCC 169)	—	—	2.4	2.5	2.7	2.3	2.6	2.8
Hip Fracture/Dislocation (HCC 170)	—	—	6.3	6.4	6.1	5.5	5.2	5.1
Complications of Specified Implanted Device or Graft (HCC 176)	—	—	4.8	5.2	5.9	6.1	6.9	6.9
Artificial Openings for Feeding or Elimination (HCC 188)	—	—	7.0	7.2	6.7	6.7	7.0	7.3
Amputation Status, Lower Limb/Amputation Complications (HCC 189)	—	—	1.4	1.6	1.5	1.7	1.8	1.9
HIV/AIDS (V12_HCC1)	0.5	0.6	—	—	—	—	—	—
Septicemia/Shock (V12_HCC2)	11.5	11.7	—	—	—	—	—	—
Opportunistic Infection (V12_HCC5)	0.6	0.5	—	—	—	—	—	—
Metastatic Cancer and Acute Leukemia (V12_HCC7)	1.3	1.3	—	—	—	—	—	—
Lung, Upper Digestive Tract, and Other Severe Cancers (V12_HCC8)	1.2	1.0	—	—	—	—	—	—

Table T-2. **Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Lymphatic, Head and Neck, Brain, and Other Major Cancers (V12_HCC9)	1.8	1.7	—	—	—	—	—	—
Breast, Prostate, Colorectal and Other Cancers and Tumors (V12_HCC10)	5.9	5.9	—	—	—	—	—	—
Diabetes with Renal or Peripheral Circulatory Manifestation; Diabetes with Neurologic or Other Specified Manifestation; Diabetes with Ophthalmologic or Unspecified Manifestation (V12_HCC15; V12_HCC16; V12_HCC18)	19.7	19.5	—	—	—	—	—	—
Diabetes with acute complications (V12_HCC17)	0.5	0.5	—	—	—	—	—	—
Diabetes without Complication (V12_HCC19)	21.1	21.3	—	—	—	—	—	—
Protein-Calorie Malnutrition (V12_HCC21)	11.0	10.9	—	—	—	—	—	—
End-Stage Liver Disease (V12_HCC25)	0.6	0.8	—	—	—	—	—	—
Cirrhosis of Liver (V12_HCC26)	0.6	0.7	—	—	—	—	—	—
Chronic Hepatitis (V12_HCC27)	0.5	0.5	—	—	—	—	—	—
Intestinal Obstruction/Perforation (V12_HCC31)	4.9	4.4	—	—	—	—	—	—
Pancreatic Disease (V12_HCC32)	2.0	1.6	—	—	—	—	—	—
Inflammatory Bowel Disease (V12_HCC33)	1.1	1.2	—	—	—	—	—	—
Bone/Joint/Muscle Infections/Necrosis (V12_HCC37)	3.6	3.5	—	—	—	—	—	—
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (V12_HCC38)	4.3	4.3	—	—	—	—	—	—
Severe Hematological Disorders (V12_HCC44)	1.8	1.0	—	—	—	—	—	—
Disorders of Immunity (V12_HCC45)	1.0	1.7	—	—	—	—	—	—
Drug/Alcohol Psychosis (V12_HCC51)	1.5	1.4	—	—	—	—	—	—
Drug/Alcohol Dependence (V12_HCC52)	1.2	1.3	—	—	—	—	—	—
Schizophrenia (V12_HCC54)	5.7	5.9	—	—	—	—	—	—

(continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Major Depressive, Bipolar, and Paranoid Disorders (V12_HCC55)	15.0	15.8	—	—	—	—	—	—
Quadriplegia, Other Extensive Paralysis (V12_HCC67)	1.7	2.0	—	—	—	—	—	—
Paraplegia (V12_HCC68)	1.0	1.1	—	—	—	—	—	—
Spinal Cord Disorders/Injuries (V12_HCC69)	1.2	1.4	—	—	—	—	—	—
Muscular Dystrophy (V12_HCC70)	0.2	0.2	—	—	—	—	—	—
Polyneuropathy (V12_HCC71)	10.8	10.9	—	—	—	—	—	—
Multiple Sclerosis (V12_HCC72)	2.0	2.1	—	—	—	—	—	—
Parkinson's and Huntington's Diseases (V12_HCC73)	8.0	7.5	—	—	—	—	—	—
Seizure Disorders and Convulsions (V12_HCC74)	13.8	14.0	—	—	—	—	—	—
Coma, Brain Compression/Anoxic Damage (V12_HCC75)	1.5	1.5	—	—	—	—	—	—
Respiratory Arrest (V12_HCC78)	0.4	0.2	—	—	—	—	—	—
Cardio-Respiratory Failure and Shock (V12_HCC79)	13.2	14.2	—	—	—	—	—	—
Congestive Heart Failure (V12_HCC80)	35.3	34.0	—	—	—	—	—	—
Acute Myocardial Infarction (V12_HCC81)	3.8	3.6	—	—	—	—	—	—
Unstable Angina and Other Acute Ischemic Heart Disease (V12_HCC82)	3.3	3.1	—	—	—	—	—	—
Angina Pectoris/Old Myocardial Infarction (V12_HCC83)	6.1	5.8	—	—	—	—	—	—
Specified Heart Arrhythmias (V12_HCC92)	26.6	26.1	—	—	—	—	—	—
Cerebral Hemorrhage (V12_HCC95)	2.2	2.7	—	—	—	—	—	—
Ischemic or Unspecified Stroke (V12_HCC96)	17.4	16.7	—	—	—	—	—	—
Hemiplegia/Hemiparesis (V12_HCC100)	9.4	9.1	—	—	—	—	—	—
Cerebral Palsy and Other Paralytic Syndromes (V12_HCC101)	0.9	0.9	—	—	—	—	—	—
Vascular Disease with Complications (V12_HCC104)	6.4	6.3	—	—	—	—	—	—
Vascular Disease (V12_HCC105)	46.3	47.1	—	—	—	—	—	—

(continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Cystic Fibrosis; Chronic Obstructive Pulmonary Disease (V12_HCC107; V12_HCC108)	26.8	25.8	—	—	—	—	—	—
Aspiration and Specified Bacterial Pneumonias (V12_HCC111)	7.3	7.1	—	—	—	—	—	—
Pneumococcal Pneumonia, Empyema, Lung Abscess (V12_HCC112)	0.9	1.0	—	—	—	—	—	—
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (V12_HCC119)	1.2	1.3	—	—	—	—	—	—
Renal Failure (V12_HCC131)	27.3	27.9	—	—	—	—	—	—
Nephritis (V12_HCC132)	0.2	0.2	—	—	—	—	—	—
Decubitus Ulcer of Skin (V12_HCC148)	17.7	16.7	—	—	—	—	—	—
Chronic Ulcer of Skin, Except Decubitus (V12_HCC149)	5.5	5.5	—	—	—	—	—	—
Severe Head Injury; Major Head Injury (V12_HCC154; V12_HCC155)	2.1	2.6	—	—	—	—	—	—
Vertebral Fractures without Spinal Cord Injury (V12_HCC157)	2.7	2.5	—	—	—	—	—	—
Hip Fracture/Dislocation (V12_HCC158)	6.4	6.3	—	—	—	—	—	—
Major Complications of Medical Care and Trauma (V12_HCC164)	8.3	7.5	—	—	—	—	—	—
Artificial Openings for Feeding or Elimination (V12_HCC176)	6.6	6.6	—	—	—	—	—	—
Amputation Status, Lower Limb/Amputation Complications (V12_HCC177)	1.7	1.8	—	—	—	—	—	—
HCC count = 0-2	32.8	32.9	34.5	33.4	31.7	31.0	28.6	26.9
HCC count = 3-4	26.2	26.4	26.6	27.7	27.1	27.0	26.9	26.4
HCC count = 5-7	23.5	23.2	22.5	22.2	23.4	23.8	23.8	24.6
HCC count >= 8	17.5	17.6	16.4	16.7	17.8	18.3	20.6	22.1
Participation in other initiatives								
Community-based Care Transition Program (CCTP)	—	0.2	0.2	0.5	0.6	0.3	—	—
Comprehensive ESRD Care (CEC)	—	—	—	—	0.0	0.4	1.1	1.2
Comprehensive Primary Care Initiative (CPCI)	—	0.0	0.0	0.0	—	—	—	—
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	—	—	—	—	—	0.0	0.0	0.1

(continued)

Table T-2. Clinical + Payment (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Comprehensive Primary Care Plus (CPC+), SSP Participants	—	—	—	—	—	0.0	0.0	0.0
MMCO Financial Alignment Demonstration (Duals) (DEMME)	—	0.1	0.1	—	—	—	—	—
Multi-Payer Advanced Primary Care Practice (MAPAC) Demonstrations	—	0.0	0.0	—	—	—	—	—
Next Generation Accountable Care Organization (NGACO)	—	—	—	—	0.0	1.8	4.2	4.2
Pioneer Accountable Care Organization Model	4.5	5.7	5.2	1.6	1.4	0.8	—	—
Medicare Shared Savings Program	2.6	4.3	9.1	14.6	19.0	18.7	19.8	27.1
Vermont All-Payer ACO Model	—	—	—	—	—	—	—	0.0
Maryland Total Cost of Care, Primary Care Program	—	—	—	—	—	—	—	—
Facility-level characteristics								
% MA residents in month 6(March) of the FY is less than 10	52.9	45.4	45.3	39.0	39.2	29.7	24.9	17.9
% MA residents in month 6(March) of the FY is between 10 and 20	20.7	30.1	25.2	34.4	27.0	35.6	25.8	25.9
% MA residents in month 6(March) of the FY is between 20 and 30	17.4	16.5	16.6	13.3	14.9	17.1	23.0	22.9
% MA residents in month 6(March) of the FY is greater than 30	8.9	7.9	12.9	13.3	19.0	17.6	26.3	33.3
Nursing home facility in the hospital	1.0	1.2	1.0	0.9	0.9	0.8	1.1	0.9
For-profit nursing homes	54.1	54.1	67.7	63.4	62.4	63.7	64.6	63.4
Metropolitan	89.3	89.3	89.1	89.0	88.6	88.9	91.2	91.0
Rural	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.8
Urban Non-Metropolitan	10.1	10.0	10.2	10.1	10.5	10.2	8.0	8.2
N (Facilities)	112	112	112	112	112	112	111	111

ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; MA = Medicare Advantage; PHQ = Patient Health Questionnaire; — = not measured in specific year.

SOURCES: RTI analysis of MDS 3.0, Medicare claims data, and CASPER data.

NOTE: Number in parentheses are standard deviations for continuous variables.

Table T-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Resident-level characteristics:								
Demographics								
Residents meeting eligibility criteria	15,123	14,706	14,504	14,187	13,695	13,100	11,986	11,078
Mean exposure, in days	251.6 (131.3)	250.9 (131.6)	248.0 (132.4)	245.7 (132.2)	251.4 (131.6)	247.3 (132.7)	244.9 (132.2)	246.8 (131.6)
Exposure days 1–89	18.9	19.1	20.0	19.7	19.3	20.1	20.0	19.9
Exposure days 90–179	14.4	14.5	14.3	15.7	13.9	14.7	15.6	14.7
Exposure days 180–269	10.6	9.9	10.7	10.2	10.7	10.3	10.7	10.8
Exposure days 270–364	9.1	9.1	8.5	9.1	9.5	8.8	9.1	9.5
Exposure days 365/366	47.1	47.3	46.5	45.2	46.7	46.1	44.7	45.0
Male, < 65	4.7	4.6	4.7	4.8	5.0	5.0	5.0	5.0
Male, 65–69	2.5	2.8	3.1	3.3	3.5	3.4	3.4	3.6
Male, 70–74	3.5	3.6	3.6	3.5	3.6	4.0	4.3	4.6
Male, 75–79	4.1	4.2	4.5	4.6	4.4	4.3	4.5	4.7
Male, 80–84	5.6	5.1	5.1	5.0	5.1	5.1	4.9	5.0
Male, 85–89	4.5	4.9	5.0	5.1	5.1	5.0	5.1	4.9
Male, 90–94	2.8	2.9	3.0	3.1	3.1	3.4	3.3	3.1
Male, 95+	0.8	0.9	1.0	1.0	1.0	1.1	1.0	1.1
Female, < 65	3.8	3.9	3.9	3.9	3.9	4.3	4.4	4.7
Female, 65–69	2.8	2.8	2.9	3.3	3.5	3.5	3.6	3.7
Female, 70–74	4.8	4.9	5.1	5.0	5.2	5.3	5.0	5.0
Female, 75–79	8.0	7.9	7.8	7.8	7.9	7.8	8.0	8.3
Female, 80–84	13.4	12.8	12.3	12.2	11.8	11.2	11.2	10.8
Female, 85–89	17.6	17.0	16.5	15.9	15.4	15.1	14.7	13.9
Female, 90–94	14.4	14.9	14.4	14.1	14.4	14.0	14.0	13.9
Female, 95+	6.8	6.8	7.0	7.2	7.2	7.5	7.7	7.6
White, non-Hispanic	83.1	82.5	81.8	82.0	82.1	81.6	82.3	81.4
Black, non-Hispanic	11.3	11.3	11.7	11.8	12.1	12.1	11.6	11.7
Asian	0.6	0.6	0.7	0.8	1.0	1.2	1.2	1.3
Hispanic	3.3	3.3	3.5	3.4	3.1	3.3	3.4	3.7
Other race/ethnicity	1.8	2.3	2.3	2.0	1.7	1.7	1.6	1.9
Full dual eligibility	80.9	81.6	81.3	82.0	82.8	82.7	82.6	82.8
Original eligibility because of disability	14.8	15.3	15.9	16.0	16.2	16.7	17.5	17.7

(continued)

Table T-3.   Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Health status								
Dementia	56.9	56.6	56.2	56.3	56.3	55.3	54.9	53.5
Anemia	28.3	28.6	28.2	28.9	29.2	28.2	27.6	27.2
BMI <18.5	7.1	6.6	6.9	7.0	6.7	6.2	6.6	6.1
BMI = 18.5–24.9	38.8	38.2	38.0	38.1	37.8	37.2	36.0	36.0
BMI = 25–29.9	28.5	29.5	29.3	28.5	28.7	28.1	28.2	28.5
BMI >= 30	25.6	25.7	25.8	26.4	26.9	28.4	29.2	29.4
ADL score= 0–7	11.1	10.3	10.1	10.3	10.7	11.0	11.5	11.5
ADL score= 8–14	16.6	15.2	14.7	15.1	15.0	15.3	15.8	15.9
ADL score= 15–21	51.8	54.1	56.5	58.1	59.0	58.5	57.8	58.8
ADL score= 22–28	20.5	20.4	18.7	16.5	15.3	15.1	14.9	13.8
Resident's mood assessment using PHQ	2.8 (3.8)	3.0 (4.0)	2.8 (3.9)	2.8 (4.0)	2.7 (3.9)	2.4 (3.6)	2.2 (3.4)	2.3 (3.4)
CFS= 3 (Severely impaired)	12.3	11.9	11.3	11.1	10.9	10.5	9.7	9.2
CFS= 2 (Moderately impaired)	36.2	35.2	34.7	34.1	34.0	34.0	33.6	33.5
CFS= 1 (Mildly impaired)	23.0	23.0	23.0	22.5	22.6	22.8	24.4	24.1
CFS= 0 (Cognitively intact)	28.5	29.9	31.0	32.3	32.5	32.7	32.3	33.2
Neurogenic bladder	1.7	2.1	2.1	2.2	2.4	2.5	2.9	3.1
Obstructive uropathy	0.6	0.8	1.1	1.2	1.2	1.5	1.8	2.0
ESRD patient with dialysis status	1.8	2.1	2.2	2.4	2.5	2.7	2.8	3.3
ESRD patients after transplant who are not on dialysis after transplant	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1
Hierarchical Condition Categories								
HIV/AIDS (HCC 1)	—	—	0.2	0.2	0.3	0.3	0.4	0.3
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	—	—	11.6	11.4	13.5	12.9	14.5	15.2
Opportunistic Infections (HCC 6)	—	—	0.4	0.4	0.5	0.6	0.5	0.6
Metastatic Cancer and Acute Leukemia (HCC 8)	—	—	0.9	1.0	1.1	1.1	1.1	0.9
Lung and Other Severe Cancers (HCC 9)	—	—	1.5	1.3	1.1	1.1	1.2	1.2
Lymphoma and Other Cancers (HCC 10)	—	—	1.3	1.2	1.4	1.4	1.3	1.3
Colorectal, Bladder, and Other Cancers (HCC 11)	—	—	1.6	1.5	1.7	1.6	1.7	2.0
Breast, Prostate, and Other Cancers and Tumors (HCC 12)	—	—	3.9	3.8	4.1	3.7	3.8	3.8

(continued)

Table T-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Diabetes with Acute Complications (HCC 17)	—	—	1.1	0.9	1.2	1.1	1.4	1.4
Diabetes with Chronic Complications (HCC 18)	—	—	18.9	18.7	21.8	25.7	27.5	29.5
Diabetes without Complication (HCC 19)	—	—	18.5	19.3	15.6	12.6	11.5	11.1
Protein-Calorie Malnutrition (HCC 21)	—	—	8.0	8.6	9.2	8.8	8.8	9.3
Other Significant Endocrine and Metabolic Disorders (HCC 23)	—	—	4.0	4.2	4.9	4.8	5.0	5.7
End-Stage Liver Disease (HCC 27)	—	—	0.7	0.7	0.7	0.7	0.8	0.8
Cirrhosis of Liver (HCC 28)	—	—	0.6	0.5	0.6	0.7	0.7	0.8
Chronic Hepatitis (HCC 29)	—	—	0.3	0.4	0.5	0.5	0.5	0.6
Intestinal Obstruction/Perforation (HCC 33)	—	—	3.9	3.9	4.1	3.7	4.0	3.9
Chronic Pancreatitis (HCC 34)	—	—	0.3	0.3	0.2	0.3	0.3	0.3
Inflammatory Bowel Disease (HCC 35)	—	—	1.2	0.9	1.0	1.0	0.9	1.2
Bone/Joint/Muscle Infections/Necrosis (HCC 39)	—	—	3.1	3.2	3.3	3.1	3.1	3.9
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	—	—	4.8	5.0	5.3	5.6	5.7	5.9
Severe Hematological Disorders (HCC 46)	—	—	0.7	0.8	0.7	0.9	0.8	0.8
Disorders of Immunity (HCC 47)	—	—	1.4	1.5	1.6	1.4	1.7	1.8
Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	—	—	8.9	7.9	8.8	8.2	8.6	8.4
Drug/Alcohol Psychosis (HCC 54)	—	—	1.5	1.6	1.5	0.6	0.6	0.7
Drug/Alcohol Dependence (HCC 55)	—	—	1.1	1.4	1.8	2.3	2.5	2.7
Schizophrenia (HCC 57)	—	—	6.5	6.5	7.0	7.5	7.4	7.8
Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	—	—	14.5	14.7	19.2	23.8	25.7	28.4
Quadriplegia (HCC 70)	—	—	1.0	1.2	1.5	1.7	1.9	2.0
Paraplegia (HCC 71)	—	—	0.7	0.9	1.0	0.8	0.9	1.0
Spinal Cord Disorders/Injuries (HCC 72)	—	—	1.5	1.3	1.3	1.0	0.8	1.1
Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	—	—	0.2	0.2	0.2	0.1	0.1	0.2

(continued)

Table T-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Cerebral Palsy (HCC 74)	—	—	1.1	1.1	1.1	1.3	1.2	1.1
Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	—	—	1.1	1.4	1.5	1.0	1.1	1.2
Muscular Dystrophy (HCC 76)	—	—	0.1	0.1	0.2	0.1	0.1	0.2
Multiple Sclerosis (HCC 77)	—	—	1.6	1.6	1.5	1.6	1.5	1.8
Parkinson's and Huntington's Diseases (HCC 78)	—	—	8.0	7.8	8.5	8.4	8.3	7.9
Seizure Disorders and Convulsions (HCC 79)	—	—	11.3	11.9	11.9	11.9	12.3	12.5
Coma, Brain Compression/Anoxic Damage (HCC 80)	—	—	1.0	1.2	1.2	1.5	1.8	1.8
Respiratory Arrest (HCC 83)	—	—	0.2	0.2	0.2	0.2	0.2	0.0
Cardio-Respiratory Failure and Shock (HCC 84)	—	—	10.0	10.2	11.3	11.7	12.6	13.1
Congestive Heart Failure (HCC 85)	—	—	32.2	32.2	32.9	31.7	33.0	34.5
Acute Myocardial Infarction (HCC 86)	—	—	2.9	2.6	3.4	4.4	4.9	4.9
Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	—	—	2.7	2.8	2.7	2.3	2.3	2.3
Angina Pectoris (HCC 88)	—	—	1.4	1.5	1.8	2.3	2.6	2.8
Specified Heart Arrhythmias (HCC 96)	—	—	26.8	26.9	27.9	27.6	28.4	29.2
Cerebral Hemorrhage (HCC 99)	—	—	2.2	2.1	2.3	2.3	2.7	2.7
Ischemic or Unspecified Stroke (HCC 100)	—	—	14.1	14.2	13.4	11.4	12.1	13.0
Hemiplegia/Hemiparesis (HCC 103)	—	—	7.7	7.9	8.7	9.0	9.8	9.9
Monoplegia, Other Paralytic Syndromes (HCC 104)	—	—	0.4	0.4	0.4	0.3	0.3	0.4
Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	—	—	2.8	2.6	2.7	2.9	3.1	3.2
Vascular Disease with Complications (HCC 107)	—	—	4.3	3.9	4.3	4.2	4.6	5.1
Vascular Disease (HCC 108)	—	—	48.6	49.2	47.3	45.5	45.7	48.0
Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	—	—	26.1	25.8	25.8	25.8	26.8	26.5
Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	—	—	0.7	0.6	0.7	0.7	0.8	1.0

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Table T-3.   Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Aspiration and Specified Bacterial Pneumonias (HCC 114)	—	—	6.2	5.8	6.0	6.0	6.4	5.9
Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	—	—	0.8	0.6	0.8	1.0	3.0	3.5
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	—	—	1.0	1.1	1.3	1.1	1.0	1.3
Exudative Macular Degeneration (HCC 124)	—	—	2.2	2.2	2.4	2.5	2.7	2.7
Acute Renal Failure (HCC 135)	—	—	14.0	14.1	15.6	15.7	16.3	17.0
Chronic Kidney Disease, Stage 5 (HCC 136)	—	—	0.6	0.6	0.8	0.8	0.6	0.7
Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	—	—	1.1	1.2	1.2	1.4	1.6	1.5
Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	—	—	1.6	1.5	1.8	2.0	2.0	2.3
Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	—	—	3.4	3.0	3.7	4.8	5.0	5.8
Chronic Ulcer of Skin, Except Pressure (HCC 161)	—	—	7.1	6.6	6.4	5.8	6.1	6.4
Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	—	—	2.4	2.7	2.6	2.3	2.4	2.9
Vertebral Fractures without Spinal Cord Injury (HCC 169)	—	—	2.8	3.1	3.5	2.8	2.9	3.1
Hip Fracture/Dislocation (HCC 170)	—	—	6.4	6.1	6.4	5.8	5.6	6.0
Complications of Specified Implanted Device or Graft (HCC 176)	—	—	4.3	4.1	5.3	5.7	6.1	6.3
Artificial Openings for Feeding or Elimination (HCC 188)	—	—	4.9	4.7	5.0	5.1	5.2	5.5
Amputation Status, Lower Limb/Amputation Complications (HCC 189)	—	—	1.3	1.2	1.4	1.6	1.6	1.8
HIV/AIDS (V12_HCC1)	0.2	0.2	—	—	—	—	—	—
Septicemia/Shock (V12_HCC2)	9.4	9.8	—	—	—	—	—	—
Opportunistic Infection (V12_HCC5)	0.5	0.5	—	—	—	—	—	—
Metastatic Cancer and Acute Leukemia (V12_HCC7)	1.2	1.1	—	—	—	—	—	—

(continued)

Table T-3. Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Lung, Upper Digestive Tract, and Other Severe Cancers (V12_HCC8)	1.0	0.9	—	—	—	—	—	—
Lymphatic, Head and Neck, Brain, and Other Major Cancers (V12_HCC9)	1.5	1.4	—	—	—	—	—	—
Breast, Prostate, Colorectal and Other Cancers and Tumors (V12_HCC10)	5.9	5.9	—	—	—	—	—	—
Diabetes with Renal or Peripheral Circulatory Manifestation; Diabetes with Neurologic or Other Specified Manifestation; Diabetes with Ophthalmologic or Unspecified Manifestation (V12_HCC15; V12_HCC16; V12_HCC18)	18.6	18.7	—	—	—	—	—	—
Diabetes with Acute Complications (V12_HCC17)	0.7	0.8	—	—	—	—	—	—
Diabetes without Complication (V12_HCC19)	18.5	18.4	—	—	—	—	—	—
Protein-Calorie Malnutrition (V12_HCC21)	8.0	7.9	—	—	—	—	—	—
End-Stage Liver Disease (V12_HCC25)	0.4	0.6	—	—	—	—	—	—
Cirrhosis of Liver (V12_HCC26)	0.6	0.5	—	—	—	—	—	—
Chronic Hepatitis (V12_HCC27)	0.4	0.4	—	—	—	—	—	—
Intestinal Obstruction/Perforation (V12_HCC31)	4.2	4.0	—	—	—	—	—	—
Pancreatic Disease (V12_HCC32)	1.6	1.6	—	—	—	—	—	—
Inflammatory Bowel Disease (V12_HCC33)	0.9	0.8	—	—	—	—	—	—
Bone/Joint/Muscle Infections/Necrosis (V12_HCC37)	2.7	2.8	—	—	—	—	—	—
Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (V12_HCC38)	4.5	4.5	—	—	—	—	—	—
Severe Hematological Disorders (V12_HCC44)	1.3	0.8	—	—	—	—	—	—
Disorders of Immunity (V12_HCC45)	0.8	1.3	—	—	—	—	—	—
Drug/Alcohol Psychosis (V12_HCC51)	1.3	1.1	—	—	—	—	—	—
Drug/Alcohol Dependence (V12_HCC52)	1.1	1.1	—	—	—	—	—	—

(continued)

Table T-3.   Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Schizophrenia (V12_HCC54)	6.4	6.5	—	—	—	—	—	—
Major Depressive, Bipolar, and Paranoid Disorders (V12_HCC55)	12.8	13.4	—	—	—	—	—	—
Quadriplegia, Other Extensive Paralysis (V12_HCC67)	1.1	1.1	—	—	—	—	—	—
Paraplegia (V12_HCC68)	0.9	0.8	—	—	—	—	—	—
Spinal Cord Disorders/Injuries (V12_HCC69)	1.1	1.2	—	—	—	—	—	—
Muscular Dystrophy (V12_HCC70)	0.1	0.1	—	—	—	—	—	—
Polyneuropathy (V12_HCC71)	9.4	9.7	—	—	—	—	—	—
Multiple Sclerosis (V12_HCC72)	1.5	1.6	—	—	—	—	—	—
Parkinson's and Huntington's Diseases (V12_HCC73)	8.1	8.3	—	—	—	—	—	—
Seizure Disorders and Convulsions (V12_HCC74)	11.1	10.8	—	—	—	—	—	—
Coma, Brain Compression/Anoxic Damage (V12_HCC75)	0.8	1.0	—	—	—	—	—	—
Respiratory Arrest (V12_HCC78)	0.3	0.3	—	—	—	—	—	—
Cardio-Respiratory Failure and Shock (V12_HCC79)	12.9	14.1	—	—	—	—	—	—
Congestive Heart Failure (V12_HCC80)	32.7	32.2	—	—	—	—	—	—
Acute Myocardial Infarction (V12_HCC81)	2.8	2.9	—	—	—	—	—	—
Unstable Angina and Other Acute Ischemic Heart Disease (V12_HCC82)	2.4	2.5	—	—	—	—	—	—
Angina Pectoris/Old Myocardial Infarction (V12_HCC83)	5.6	5.7	—	—	—	—	—	—
Specified Heart Arrhythmias (V12_HCC92)	25.8	26.4	—	—	—	—	—	—
Cerebral Hemorrhage (V12_HCC95)	1.8	1.9	—	—	—	—	—	—
Ischemic or Unspecified Stroke (V12_HCC96)	14.2	14.2	—	—	—	—	—	—
Hemiplegia/Hemiparesis (V12_HCC100)	7.8	7.5	—	—	—	—	—	—
Cerebral Palsy and Other Paralytic Syndromes (V12_HCC101)	1.0	1.1	—	—	—	—	—	—
Vascular Disease with Complications (V12_HCC104)	5.0	5.1	—	—	—	—	—	—

(continued)

Table T-3.   Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Vascular Disease (V12_HCC105)	46.5	47.9	—	—	—	—	—	—
Cystic Fibrosis; Chronic Obstructive Pulmonary Disease (V12_HCC107; V12_HCC108)	25.4	26.2	—	—	—	—	—	—
Aspiration and Specified Bacterial Pneumonias (V12_HCC111)	6.2	6.0	—	—	—	—	—	—
Pneumococcal Pneumonia, Empyema, Lung Abscess (V12_HCC112)	0.9	0.6	—	—	—	—	—	—
Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (V12_HCC119)	1.0	1.0	—	—	—	—	—	—
Renal Failure (V12_HCC131)	25.0	26.5	—	—	—	—	—	—
Nephritis (V12_HCC132)	0.1	0.1	—	—	—	—	—	—
Decubitus Ulcer of Skin (V12_HCC148)	12.9	13.1	—	—	—	—	—	—
Chronic Ulcer of Skin, Except Decubitus (V12_HCC149)	5.2	5.3	—	—	—	—	—	—
Severe Head Injury; Major Head Injury (V12_HCC154; V12_HCC155)	2.1	2.3	—	—	—	—	—	—
Vertebral Fractures without Spinal Cord Injury (V12_HCC157)	2.8	2.8	—	—	—	—	—	—
Hip Fracture/Dislocation (V12_HCC158)	6.5	6.6	—	—	—	—	—	—
Major Complications of Medical Care and Trauma (V12_HCC164)	6.2	6.1	—	—	—	—	—	—
Artificial Openings for Feeding or Elimination (V12_HCC176)	4.7	4.6	—	—	—	—	—	—
Amputation Status, Lower Limb/Amputation Complications (V12_HCC177)	1.7	1.6	—	—	—	—	—	—
HCC count = 0-2	37.0	36.1	37.2	36.9	35.3	35.0	33.8	31.2
HCC count = 3-4	28.1	28.0	28.6	28.3	27.2	27.8	27.0	26.3
HCC count = 5-7	21.6	22.7	21.1	21.8	22.7	22.1	22.0	24.2
HCC count >= 8	13.3	13.3	13.0	13.0	14.8	15.1	17.2	18.3
Participation in other initiatives								
Community-based Care Transition Program (CCTP)	—	0.0	0.2	0.4	0.5	0.3	—	—
Comprehensive ESRD Care (CEC)	—	—	—	—	0.1	0.4	0.6	0.7
Comprehensive Primary Care Initiative (CPCI)	—	1.1	1.4	1.4	0.9	0.3	—	—

(continued)

Table T-3.   **Payment-Only (All ECCPs): Resident-, facility-, and state-level characteristics, FY 2012–FY 2019 (continued)**

(annual percentages [categorical variables] or means and standard deviations [continuous variables])

Characteristic	2012	2013	2014	2015	2016	2017	2018	2019
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	—	—	—	—	—	1.4	2.8	2.9
Comprehensive Primary Care Plus (CPC+), SSP Participants	—	—	—	—	—	0.9	0.4	0.7
MMCO Financial Alignment Demonstration (Duals) (DEMME)	—	0.0	0.1	3.1	4.6	5.3	4.4	—
Multi-Payer Advanced Primary Care Practice (MAPAC) Demonstrations	0.1	0.2	0.1	0.0	—	—	—	—
Next Generation Accountable Care Organization (NGACO)	—	—	—	—	0.0	1.7	3.4	3.5
Pioneer Accountable Care Organization Model	0.9	1.2	1.0	0.5	1.1	0.6	—	—
Medicare Shared Savings Program	4.4	6.8	11.2	15.9	18.7	19.3	20.1	25.0
Vermont All-Payer ACO Model	—	—	—	—	—	—	—	0.0
Maryland Total Cost of Care, Primary Care Program	—	—	—	—	—	—	—	—
Facility-level characteristics								
% MA residents in month 6(March) of the FY is less than 10	58.6	64.6	56.8	50.4	49.7	37.1	28.0	23.7
% MA residents in month 6(March) of the FY is between 10 and 20	29.5	18.0	23.1	28.2	23.7	32.9	31.8	29.8
% MA residents in month 6(March) of the FY is between 20 and 30	8.5	13.2	15.2	11.6	14.2	16.2	22.5	20.3
% MA residents in month 6(March) of the FY is greater than 30	3.3	4.1	4.9	9.8	12.5	13.8	17.7	26.2
Nursing home facility in the hospital	—	0.6	—	—	—	0.7	0.8	0.6
For-profit nursing homes	65.8	66.5	64.7	64.8	64.4	66.7	67.3	67.2
Metropolitan	73.8	73.6	73.3	72.5	72.5	72.1	71.6	73.3
Rural	2.2	2.3	2.3	2.5	2.5	2.6	2.3	2.0
Urban Non-Metropolitan	24.0	24.1	24.4	25.0	25.0	25.3	26.1	24.7
N (Facilities)	148	148	148	148	148	148	148	148

ADL = activities of daily living; BMI = body mass index; CFS = cognitive function scale; ESRD = end-stage renal disease; MA = Medicare Advantage; PHQ = Patient Health Questionnaire; — = not measured in specific year.

SOURCES: RTI analysis of MDS 3.0, Medicare claims data, and CASPER data.

NOTE: Number in parentheses are standard deviations for continuous variables.

APPENDIX U
YEAR-SPECIFIC AND POOLED NFI 2 UTILIZATION AND EXPENDITURE EVALUATION RESULTS, FY 2017–FY 2019

Appendix U presents the complete NFI 2 utilization and expenditure results for all ECCPs combined. ***Tables U-1*** through ***U-3*** display the results pooled across FY 2017–FY 2019 for the probability, expenditure, and count models, respectively. ***Table U-1*** and ***Table U-2*** correspond to ***Figure II-11*** and ***Figure II-12***, respectively, in the main report. The count results were not displayed in the main report. There were a few more statistically significant unfavorable increases in count outcomes than probability outcomes for the Clinical + Payment (C+P) group. For the Payment-Only (P-O) group, the count results were similar to the probability results; no increases or decreases in the count or probability measures were statistically significant. ***Tables U-4*** through ***U-7*** display the complete utilization and expenditure results for FY 2017, FY 2018, and FY 2019 individually along with the pooled FY 2017–FY 2019 results, separately for the C+P and P-O groups. These results were discussed in ***Chapter II.5*** of the main report.

Table U-1. All ECCPs: Pooled Initiative effect on hospital-related utilization (probability), FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	26.2	−0.3	−1.6	1.1	0.744	−1.0
Potentially avoidable	10.6	1.0	−0.1	2.0	0.136	9.1
Six qualifying conditions	5.4	0.7	−0.1	1.4	0.142	12.3
Any emergency department visit						
All-cause	**18.2**	**2.1**	**0.8**	**3.3**	**0.007**	**11.4**
Potentially avoidable	**9.9**	**1.0**	**0.1**	**1.9**	**0.063**	**10.1**
Six qualifying conditions	2.5	−0.1	−0.5	0.4	0.795	−2.8
Any acute care transition						
All-cause	36.2	1.0	−0.7	2.6	0.334	2.7
Potentially avoidable	18.6	1.3	−0.1	2.7	0.124	7.2
Six qualifying conditions	7.7	0.4	−0.5	1.3	0.490	4.8
Payment-Only						
Any hospitalization						
All-cause	25.7	−0.4	−1.5	0.7	0.508	−1.7
Potentially avoidable	11.2	0.5	−0.2	1.2	0.269	4.4
Six qualifying conditions	6.5	0.0	−0.7	0.6	0.937	−0.5
Any emergency department visit						
All-cause	23.7	0.1	−1.2	1.3	0.927	0.3
Potentially avoidable	13.6	−0.4	−1.4	0.6	0.481	−3.1
Six qualifying conditions	3.9	0.0	−0.5	0.5	0.955	0.5
Any acute care transition						
All-cause	39.5	−0.7	−2.0	0.6	0.357	−1.8
Potentially avoidable	21.8	−0.1	−1.2	1.0	0.870	−0.5
Six qualifying conditions	9.4	0.0	−0.8	0.8	0.961	−0.2

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, emergency department visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table U-2.   All ECCPs: Pooled Initiative effect on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	**32,149**	**1,282**	**11**	**2,552**	**0.097**	**4.0**
Hospitalization expenditures						
All-cause	9,878	366	−309	1,040	0.373	3.7
Potentially avoidable	**2,259**	**321**	**47**	**596**	**0.054**	**14.2**
Six qualifying conditions	**1,020**	**225**	**54**	**397**	**0.030**	**22.1**
Emergency department visit expenditures						
All-cause	264	9	−17	34	0.579	3.2
Potentially avoidable	103	6	−7	19	0.427	5.9
Six qualifying conditions	26	0	−6	7	0.963	0.7
Acute care transition expenditures						
All-cause	10,438	258	−473	989	0.562	2.5
Potentially avoidable	**2,388**	**325**	**48**	**602**	**0.053**	**13.6**
Six qualifying conditions	**1,044**	**223**	**52**	**394**	**0.032**	**21.4**
Payment-Only						
Total Medicare expenditures	28,052	585	−271	1,441	0.261	2.1
Hospitalization expenditures						
All-cause	7,825	61	−386	507	0.823	0.8
Potentially avoidable	2,161	40	−143	224	0.717	1.9
Six qualifying conditions	1,123	−28	−171	116	0.753	−2.4
Emergency department visit expenditures						
All-cause	313	9	−19	37	0.596	2.8
Potentially avoidable	134	2	−11	16	0.763	1.8
Six qualifying conditions	45	−1	−9	6	0.751	−3.3
Acute care transition expenditures						
All-cause	8,284	15	−447	476	0.958	0.2
Potentially avoidable	2,339	12	−183	206	0.921	0.5
Six qualifying conditions	1,189	−52	−196	93	0.555	−4.4

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table U-3. **All ECCPs: Pooled Initiative effect on hospital-related utilization (count), FY 2017–FY 2019**

(count of events, per resident)

Measure	Predicted count absent the Initiative (events per year)	Initiative effect (events per year)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Hospitalizations						
All-cause	0.414	0.004	−0.024	0.031	0.828	0.9
Potentially avoidable	**0.126**	**0.015**	**0.001**	**0.030**	**0.085**	**12.0**
Six qualifying conditions	**0.062**	**0.009**	**0.000**	**0.019**	**0.097**	**15.3**
Emergency department visits						
All-cause	**0.266**	**0.033**	**0.010**	**0.055**	**0.017**	**12.3**
Potentially avoidable	**0.116**	**0.017**	**0.005**	**0.029**	**0.023**	**14.3**
Six qualifying conditions	0.027	0.000	−0.006	0.005	0.897	−1.5
Acute care transitions						
All-cause	0.676	0.039	−0.004	0.082	0.133	5.8
Potentially avoidable	**0.244**	**0.031**	**0.008**	**0.053**	**0.024**	**12.5**
Six qualifying conditions	0.088	0.009	−0.003	0.021	0.208	10.2
Payment-Only						
Hospitalizations						
All-cause	0.392	0.000	−0.023	0.022	0.975	−0.1
Potentially avoidable	0.135	0.008	−0.003	0.018	0.218	5.6
Six qualifying conditions	0.074	0.002	−0.006	0.010	0.708	2.4
Emergency department visits						
All-cause	0.351	0.011	−0.014	0.035	0.472	3.0
Potentially avoidable	0.169	−0.003	−0.017	0.010	0.671	−2.0
Six qualifying conditions	0.044	−0.001	−0.007	0.005	0.850	−1.6
Acute care transitions						
All-cause	0.746	0.008	−0.030	0.047	0.720	1.1
Potentially avoidable	0.305	0.004	−0.014	0.023	0.715	1.3
Six qualifying conditions	0.119	0.001	−0.011	0.012	0.928	0.5

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted count absent the Initiative* is the mean of the predicted counts of events, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted counts with and without the intervention. The *relative effect* = (Initiative effect) / (predicted count absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, emergency department visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table U-4. Clinical + Payment: Year-specific and pooled Initiative effects on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Fiscal year	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization							
All-cause	2017–2019	26.2	−0.3	−1.6	1.1	0.744	−1.0
All-cause	2017	26.1	−0.2	−1.6	1.3	0.859	−0.6
All-cause	2018	26.5	−0.1	−1.5	1.3	0.886	−0.5
All-cause	2019	26.0	−0.4	−1.9	1.2	0.697	−1.4
Potentially avoidable	2017–2019	10.6	1.0	−0.1	2.0	0.136	9.1
Potentially avoidable	2017	10.8	0.6	−0.5	1.8	0.351	5.9
Potentially avoidable	2018	10.6	0.9	−0.2	1.9	0.191	8.1
Potentially avoidable	2019	**10.3**	**1.6**	**0.3**	**2.9**	**0.044**	**15.3**
Six qualifying conditions	2017–2019	5.4	0.7	−0.1	1.4	0.142	12.3
Six qualifying conditions	2017	5.6	0.4	−0.4	1.3	0.389	7.7
Six qualifying conditions	2018	**5.4**	**0.8**	**0.0**	**1.5**	**0.092**	**13.8**
Six qualifying conditions	2019	**5.2**	**0.9**	**0.0**	**1.8**	**0.084**	**18.0**
Any emergency department visit							
All-cause	2017–2019	**18.2**	**2.1**	**0.8**	**3.3**	**0.007**	**11.4**
All-cause	2017	**18.2**	**1.8**	**0.4**	**3.1**	**0.032**	**9.6**
All-cause	2018	**18.2**	**1.8**	**0.4**	**3.1**	**0.028**	**9.8**
All-cause	2019	**18.1**	**2.8**	**1.1**	**4.4**	**0.005**	**15.2**
Potentially avoidable	2017–2019	**9.9**	**1.0**	**0.1**	**1.9**	**0.063**	**10.1**
Potentially avoidable	2017	10.1	0.6	−0.4	1.6	0.321	5.9
Potentially avoidable	2018	9.9	0.8	−0.1	1.8	0.136	8.5
Potentially avoidable	2019	**9.8**	**1.7**	**0.5**	**2.8**	**0.018**	**16.9**
Six qualifying conditions	2017–2019	2.5	−0.1	−0.5	0.4	0.795	−2.8
Six qualifying conditions	2017	2.6	−0.2	−0.7	0.4	0.629	−6.1
Six qualifying conditions	2018	2.5	−0.3	−0.8	0.2	0.274	−12.7
Six qualifying conditions	2019	2.5	0.3	−0.3	0.8	0.415	11.4
Any acute care transition							
All-cause	2017–2019	36.2	1.0	−0.7	2.6	0.334	2.7
All-cause	2017	36.2	1.1	−0.7	2.9	0.332	2.9
All-cause	2018	36.3	0.9	−0.9	2.6	0.412	2.4
All-cause	2019	35.9	1.1	−0.9	3.1	0.362	3.1
Potentially avoidable	2017–2019	18.6	1.3	−0.1	2.7	0.124	7.2
Potentially avoidable	2017	18.9	0.9	−0.7	2.4	0.347	4.6
Potentially avoidable	2018	18.5	1.3	−0.1	2.8	0.128	7.2
Potentially avoidable	2019	**18.2**	**1.9**	**0.2**	**3.6**	**0.059**	**10.7**

(continued)

Table U-4. Clinical + Payment: Year-specific and pooled Initiative effects on hospital-related utilization, FY 2017–FY 2019 (continued)

(probability of any utilization, per resident)

Measure	Fiscal year	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any acute care transition (continued)							
Six qualifying conditions	2017–2019	7.7	0.4	−0.5	1.3	0.490	4.8
Six qualifying conditions	2017	7.9	0.0	−0.9	1.0	0.958	0.4
Six qualifying conditions	2018	7.7	0.3	−0.6	1.2	0.596	3.8
Six qualifying conditions	2019	7.4	0.9	−0.1	2.0	0.146	12.5

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, emergency department visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table U-5. Clinical + Payment: Year-specific and pooled Initiative effects on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Fiscal year	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	2017–2019	**32,149**	**1,282**	**11**	**2,552**	**0.097**	**4.0**
Total Medicare expenditures	2017	29,933	1,156	−47	2,359	0.114	3.9
Total Medicare expenditures	2018	**33,228**	**1,377**	**9**	**2,744**	**0.098**	**4.1**
Total Medicare expenditures	2019	34,022	888	−820	2,595	0.393	2.6
Hospitalization expenditures							
All-cause	2017–2019	9,878	366	−309	1,040	0.373	3.7
All-cause	2017	9,071	284	−393	961	0.490	3.1
All-cause	2018	10,154	433	−341	1,206	0.358	4.3
All-cause	2019	10,546	363	−489	1,215	0.483	3.4
Potentially avoidable	2017–2019	**2,259**	**321**	**47**	**596**	**0.054**	**14.2**
Potentially avoidable	2017	2,150	160	−111	432	0.331	7.5
Potentially avoidable	2018	2,299	288	−3	580	0.104	12.5
Potentially avoidable	2019	**2,325**	**567**	**202**	**933**	**0.011**	**24.4**
Six qualifying conditions	2017–2019	**1,020**	**225**	**54**	**397**	**0.030**	**22.1**
Six qualifying conditions	2017	975	143	−33	319	0.181	14.7
Six qualifying conditions	2018	**1,040**	**211**	**32**	**390**	**0.052**	**20.3**
Six qualifying conditions	2019	**1,039**	**352**	**127**	**577**	**0.010**	**33.9**
Emergency department visit expenditures							
All-cause	2017–2019	264	9	−17	34	0.579	3.2
All-cause	2017	242	5	−21	31	0.746	2.1
All-cause	2018	272	4	−24	33	0.807	1.6
All-cause	2019	286	12	−20	44	0.542	4.2
Potentially avoidable	2017–2019	103	6	−7	19	0.427	5.9
Potentially avoidable	2017	97	−1	−14	11	0.859	−1.4
Potentially avoidable	2018	106	6	−8	21	0.483	5.9
Potentially avoidable	2019	110	13	−3	29	0.194	11.7
Six qualifying conditions	2017–2019	26	0	−6	7	0.963	0.7
Six qualifying conditions	2017	25	−1	−8	5	0.729	−5.9
Six qualifying conditions	2018	27	−2	−9	5	0.650	−7.3
Six qualifying conditions	2019	27	4	−4	12	0.380	15.2
Acute care transition expenditures							
All-cause	2017–2019	10,438	258	−473	989	0.562	2.5
All-cause	2017	9,543	213	−511	938	0.628	2.2
All-cause	2018	10,743	294	−531	1,119	0.558	2.7
All-cause	2019	11,183	245	−723	1,213	0.677	2.2

(continued)

Table U-5. Clinical + Payment: Year-specific and pooled Initiative effects on Medicare expenditures, FY 2017–FY 2019 (continued)

(dollars, per resident-year)

Measure	Fiscal year	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Potentially avoidable	2017–2019	**2,388**	**325**	48	602	**0.053**	**13.6**
Potentially avoidable	2017	2,262	150	−124	424	0.368	6.6
Potentially avoidable	2018	2,434	282	−7	571	0.108	11.6
Potentially avoidable	2019	**2,469**	**604**	225	983	**0.009**	**24.5**
Six qualifying conditions	2017–2019	**1,044**	**223**	52	394	**0.032**	**21.4**
Six qualifying conditions	2017	994	132	−42	307	0.212	13.3
Six qualifying conditions	2018	**1,065**	**201**	17	384	**0.072**	**18.9**
Six qualifying conditions	2019	**1,069**	**370**	147	592	**0.006**	**34.6**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table U-6. Payment-Only: Year-specific and pooled Initiative effects on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Fiscal year	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization							
All-cause	2017–2019	25.7	−0.4	−1.5	0.7	0.508	−1.7
All-cause	2017	**25.6**	**−1.3**	**−2.4**	**−0.2**	**0.050**	**−5.0**
All-cause	2018	25.8	0.1	−1.2	1.4	0.921	0.3
All-cause	2019	25.5	0.3	−1.1	1.6	0.737	1.1
Potentially avoidable	2017–2019	11.2	0.5	−0.2	1.2	0.269	4.4
Potentially avoidable	2017	11.4	−0.3	−1.1	0.5	0.513	−2.7
Potentially avoidable	2018	**11.2**	**1.0**	**0.1**	**1.9**	**0.062**	**9.2**
Potentially avoidable	2019	**10.9**	**1.0**	**0.2**	**1.9**	**0.050**	**9.5**
Six qualifying conditions	2017–2019	6.5	0.0	−0.7	0.6	0.937	−0.5
Six qualifying conditions	2017	6.7	−0.4	−1.1	0.3	0.299	−6.6
Six qualifying conditions	2018	6.5	0.0	−0.7	0.8	0.941	0.5
Six qualifying conditions	2019	6.1	0.5	−0.3	1.3	0.297	8.3
Any emergency department visit							
All-cause	2017–2019	23.7	0.1	−1.2	1.3	0.927	0.3
All-cause	2017	23.4	−0.3	−1.6	1.0	0.685	−1.4
All-cause	2018	23.9	0.1	−1.3	1.5	0.908	0.4
All-cause	2019	23.7	0.5	−1.0	2.1	0.565	2.3
Potentially avoidable	2017–2019	13.6	−0.4	−1.4	0.6	0.481	−3.1
Potentially avoidable	2017	13.6	−0.8	−1.8	0.3	0.231	−5.5
Potentially avoidable	2018	13.7	−0.1	−1.2	1.0	0.855	−0.9
Potentially avoidable	2019	13.6	−0.3	−1.5	0.8	0.629	−2.5
Six qualifying conditions	2017–2019	3.9	0.0	−0.5	0.5	0.955	0.5
Six qualifying conditions	2017	3.9	−0.3	−0.9	0.2	0.316	−8.5
Six qualifying conditions	2018	3.9	0.1	−0.5	0.7	0.821	2.0
Six qualifying conditions	2019	3.8	0.4	−0.3	1.0	0.341	9.5
Any acute care transition							
All-cause	2017–2019	39.5	−0.7	−2.0	0.6	0.357	−1.8
All-cause	2017	39.3	−1.2	−2.6	0.1	0.123	−3.2
All-cause	2018	39.7	−0.6	−2.0	0.8	0.483	−1.5
All-cause	2019	39.4	0.0	−1.7	1.6	0.984	−0.1
Potentially avoidable	2017–2019	21.8	−0.1	−1.2	1.0	0.870	−0.5
Potentially avoidable	2017	22.0	−0.8	−2.0	0.4	0.262	−3.6
Potentially avoidable	2018	21.9	0.5	−0.8	1.8	0.530	2.2
Potentially avoidable	2019	21.5	0.2	−1.1	1.6	0.788	1.0

(continued)

Table U-6.   Payment-Only: Year-specific and pooled Initiative effects on hospital-related utilization, FY 2017–FY 2019 (continued)

(probability of any utilization, per resident)

Measure	Fiscal year	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any acute care transition (continued)							
Six qualifying conditions	2017–2019	9.4	0.0	−0.8	0.8	0.961	−0.2
Six qualifying conditions	2017	9.6	−0.5	−1.3	0.4	0.348	−5.0
Six qualifying conditions	2018	9.5	0.0	−0.9	0.9	0.955	−0.3
Six qualifying conditions	2019	9.1	0.6	−0.4	1.6	0.296	7.0

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, emergency department visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table U-7. Payment-Only: Year-specific and pooled Initiative effects on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Fiscal year	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	2017–2019	28,052	585	−271	1,441	0.261	2.1
Total Medicare expenditures	2017	26,680	283	−592	1,157	0.595	1.1
Total Medicare expenditures	2018	28,144	830	−114	1,775	0.148	3.0
Total Medicare expenditures	2019	30,085	187	−948	1,321	0.786	0.6
Hospitalization expenditures							
All-cause	2017–2019	7,825	61	−386	507	0.823	0.8
All-cause	2017	7,408	−277	−747	192	0.331	−3.7
All-cause	2018	7,882	273	−264	810	0.403	3.5
All-cause	2019	8,277	238	−339	814	0.498	2.9
Potentially avoidable	2017–2019	2,161	40	−143	224	0.717	1.9
Potentially avoidable	2017	2,095	−90	−285	105	0.449	−4.3
Potentially avoidable	2018	2,178	89	−128	305	0.500	4.1
Potentially avoidable	2019	2,199	171	−57	399	0.217	7.8
Six qualifying conditions	2017–2019	1,123	−28	−171	116	0.753	−2.4
Six qualifying conditions	2017	1,097	-97	−247	52	0.285	−8.9
Six qualifying conditions	2018	1,142	−3	−163	157	0.976	−0.3
Six qualifying conditions	2019	1,115	49	−128	226	0.649	4.4
Emergency department visit expenditures							
All-cause	2017–2019	313	9	−19	37	0.596	2.8
All-cause	2017	290	−3	−28	22	0.854	−1.0
All-cause	2018	322	10	−22	43	0.597	3.3
All-cause	2019	338	15	−21	50	0.498	4.3
Potentially avoidable	2017–2019	134	2	−11	16	0.763	1.8
Potentially avoidable	2017	125	−6	−19	7	0.465	−4.7
Potentially avoidable	2018	137	8	−8	24	0.407	5.8
Potentially avoidable	2019	143	3	−14	21	0.736	2.4
Six qualifying conditions	2017–2019	45	−1	−9	6	0.751	−3.3
Six qualifying conditions	2017	42	−6	−14	1	0.150	−15.5
Six qualifying conditions	2018	47	0	−9	9	0.962	−0.6
Six qualifying conditions	2019	47	3	−7	12	0.657	5.6
Acute care transition expenditures							
All-cause	2017–2019	8,284	15	−447	476	0.958	0.2
All-cause	2017	7,825	−324	−830	182	0.292	−4.1
All-cause	2018	8,353	226	−321	774	0.496	2.7
All-cause	2019	8,786	188	−404	780	0.602	2.1

(continued)

Table U-7. Payment-Only: Year-specific and pooled Initiative effects on Medicare expenditures, FY 2017–FY 2019 (continued)

(dollars, per resident-year)

Measure	Fiscal year	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Acute care transition expenditures (continued)							
Potentially avoidable	2017–2019	2,339	12	−183	206	0.921	0.5
Potentially avoidable	2017	2,255	−134	−337	69	0.278	−5.9
Potentially avoidable	2018	2,363	81	−146	308	0.556	3.4
Potentially avoidable	2019	2,396	134	−106	375	0.359	5.6
Six qualifying conditions	2017–2019	1,189	−52	−196	93	0.555	−4.4
Six qualifying conditions	2017	1,157	−125	−275	25	0.170	−10.8
Six qualifying conditions	2018	1,211	−20	−185	144	0.840	−1.7
Six qualifying conditions	2019	1,188	18	−156	193	0.864	1.5

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

APPENDIX V
NFI 2 ECCP-SPECIFIC UTILIZATION AND EXPENDITURE EVALUATION RESULTS, FY 2017–FY 2019

This appendix contains the FY 2017–FY 2019 utilization and expenditure NFI 2 evaluation results for each of the six ECCPs individually. This appendix is complementary to the ECCP-specific results presented in *Chapter II.5* of the main report. For each ECCP, we display the results from the model estimating NFI 2's effect on the probability of hospital-related utilization in the first table and the results from the model estimating NFI 2's effect on Medicare expenditures in the second table. We also include a table analyzing the consistency of the NFI 2 effect on utilization and on expenditures. This table presents the correlation between these two effects.

- AQAF: *Tables V-1* and *V-2*
- ATOP2: *Tables V-3* and *V-4*
- MOQI: *Tables V-5* and *V-6*
- NY-RAH: *Tables V-7* and *V-8*
- OPTIMISTIC: *Tables V-9* and *V-10*
- RAVEN: *Tables V-11* and *V-12*
- Correlation of effects: *Table V-13*

Table V-1. AQAF (AL): Initiative effect on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	32.5	−3.1	−6.4	0.2	0.126	−9.6
Potentially avoidable	13.8	0.5	−2.1	3.1	0.733	3.9
Six qualifying conditions	6.5	0.8	−0.7	2.2	0.380	11.7
Any emergency department visit						
All-cause	22.3	2.0	−0.3	4.2	0.153	8.8
Potentially avoidable	13.6	0.8	−1.5	3.1	0.561	5.9
Six qualifying conditions	4.4	−0.9	−2.0	0.2	0.169	−21.3
Any acute care transition						
All-cause	42.7	−0.7	−4.2	2.8	0.752	−1.6
Potentially avoidable	24.1	0.5	−3.0	4.0	0.812	2.1
Six qualifying conditions	10.3	−0.4	−2.1	1.4	0.749	−3.4
Payment-Only						
Any hospitalization						
All-cause	27.6	0.8	−2.2	3.8	0.660	2.9
Potentially avoidable	**11.9**	**2.6**	**0.4**	**4.8**	**0.055**	**21.7**
Six qualifying conditions	7.1	1.0	−0.9	3.0	0.384	14.5
Any emergency department visit						
All-cause	26.2	0.4	−2.5	3.4	0.815	1.6
Potentially avoidable	15.4	−0.5	−3.6	2.6	0.791	−3.3
Six qualifying conditions	4.4	0.0	−1.6	1.6	0.971	−0.9
Any acute care transition						
All-cause	43.0	−0.4	−3.7	3.0	0.864	−0.8
Potentially avoidable	24.2	1.0	−2.2	4.3	0.604	4.3
Six qualifying conditions	10.7	0.8	−1.7	3.3	0.584	7.8

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-2.   AQAF (AL): Initiative effect on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	28,871	−115	−2,126	1,897	0.925	−0.4
Hospitalization expenditures						
All-cause	8,060	−186	−1,143	771	0.749	−2.3
Potentially avoidable	2,196	127	−375	628	0.677	5.8
Six qualifying conditions	859	167	−53	386	0.212	19.4
Emergency department visit expenditures						
All-cause	249	13	−23	50	0.556	5.2
Potentially avoidable	100	11	−11	32	0.422	10.5
Six qualifying conditions	30	−2	−12	9	0.810	−5.1
Acute care transition expenditures						
All-cause	8,785	−451	−1,407	504	0.437	−5.1
Potentially avoidable	2,353	122	−340	585	0.663	5.2
Six qualifying conditions	871	175	−39	390	0.178	20.2
Payment-Only						
Total Medicare expenditures	25,695	1,035	−1,108	3,177	0.427	4.0
Hospitalization expenditures						
All-cause	6,124	355	−494	1,204	0.491	5.8
Potentially avoidable	**1,586**	**378**	**38**	**718**	**0.068**	**23.8**
Six qualifying conditions	**744**	**280**	**59**	**500**	**0.037**	**37.6**
Emergency department visit expenditures						
All-cause	258	−5	−52	42	0.861	−1.9
Potentially avoidable	107	10	−19	38	0.578	8.9
Six qualifying conditions	42	−6	−26	13	0.603	−14.9
Acute care transition expenditures						
All-cause	6,463	383	−426	1,192	0.436	5.9
Potentially avoidable	**1,708**	**405**	**75**	**736**	**0.044**	**23.7**
Six qualifying conditions	**773**	**283**	**79**	**488**	**0.023**	**36.6**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-3.   ATOP2 (NV/CO): Initiative effect on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment (Nevada)						
Any hospitalization						
All-cause	28.6	−2.1	−5.2	1.0	0.273	−7.2
Potentially avoidable	**8.9**	**2.5**	**0.9**	**4.0**	**0.009**	**27.7**
Six qualifying conditions	**4.6**	**1.3**	**0.3**	**2.2**	**0.036**	**27.6**
Any emergency department visit						
All-cause	19.0	2.4	−1.8	6.6	0.339	12.8
Potentially avoidable	9.4	1.9	−1.8	5.6	0.389	20.6
Six qualifying conditions	3.2	−0.7	−3.4	2.1	0.686	−21.1
Any acute care transition						
All-cause	39.7	−1.1	−6.2	4.1	0.733	−2.7
Potentially avoidable	17.1	2.8	−0.9	6.4	0.215	16.2
Six qualifying conditions	7.2	0.6	−2.2	3.4	0.725	8.2
Payment-Only (Colorado)						
Any hospitalization						
All-cause	18.9	0.7	−1.7	3.1	0.634	3.7
Potentially avoidable	7.9	0.1	−1.7	1.9	0.907	1.7
Six qualifying conditions	4.7	−0.4	−2.0	1.2	0.671	−8.6
Any emergency department visit						
All-cause	24.8	−1.0	−3.6	1.5	0.506	−4.2
Potentially avoidable	14.0	−0.9	−3.1	1.3	0.501	−6.5
Six qualifying conditions	**6.6**	**−1.9**	**−3.3**	**−0.4**	**0.042**	**−28.1**
Any acute care transition						
All-cause	35.1	−0.4	−3.2	2.4	0.822	−1.1
Potentially avoidable	19.6	−1.0	−3.7	1.8	0.572	−4.8
Six qualifying conditions	9.9	−1.9	−4.1	0.4	0.174	−18.9

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-4.   ATOP2 (NV/CO): Initiative effect on Medicare expenditures, FY 2017–FY 2019
(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment (Nevada)						
Total Medicare expenditures	33,714	455	−4,039	4,949	0.868	1.3
Hospitalization expenditures						
All-cause	14,693	−2,281	−5,679	1,117	0.270	−15.5
Potentially avoidable	**2,026**	**594**	**39**	**1,149**	**0.078**	**29.3**
Six qualifying conditions	924	376	−15	768	0.114	40.7
Emergency department visit expenditures						
All-cause	329	33	−74	139	0.613	9.9
Potentially avoidable	107	21	−31	72	0.511	19.3
Six qualifying conditions	17	14	−4	32	0.204	81.4
Acute care transition expenditures						
All-cause	15,324	−2,275	−6,831	2,281	0.411	−14.8
Potentially avoidable	2,196	625	−192	1,442	0.208	28.5
Six qualifying conditions	1,017	337	−247	921	0.343	33.1
Payment-Only (Colorado)						
Total Medicare expenditures	**19,713**	**2,674**	**813**	**4,535**	**0.018**	**13.6**
Hospitalization expenditures						
All-cause	4,996	103	−870	1,076	0.862	2.1
Potentially avoidable	1,647	−176	−664	312	0.554	−10.7
Six qualifying conditions	828	−155	−516	205	0.478	−18.8
Emergency department visit expenditures						
All-cause	450	−78	−197	41	0.280	−17.4
Potentially avoidable	**247**	**−89**	**−149**	**−30**	**0.014**	**−36.2**
Six qualifying conditions	**101**	**−42**	**−73**	**−11**	**0.027**	**−41.2**
Acute care transition expenditures						
All-cause	5,528	−53	−1,062	956	0.931	−1.0
Potentially avoidable	1,959	−328	−794	137	0.246	−16.7
Six qualifying conditions	954	−220	−573	132	0.304	−23.1

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-5.   MOQI (MO): Initiative effect on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	**22.3**	**3.1**	**0.6**	**5.6**	**0.040**	**14.0**
Potentially avoidable	9.6	1.5	−0.8	3.8	0.284	15.6
Six qualifying conditions	5.3	1.2	−0.7	3.0	0.309	21.8
Any emergency department visit						
All-cause	**15.1**	**4.2**	**1.2**	**7.3**	**0.021**	**28.2**
Potentially avoidable	**7.9**	**2.2**	**0.1**	**4.2**	**0.080**	**27.2**
Six qualifying conditions	**1.5**	**1.0**	**0.0**	**1.9**	**0.086**	**66.2**
Any acute care transition						
All-cause	**31.3**	**5.2**	**2.3**	**8.1**	**0.003**	**16.7**
Potentially avoidable	15.9	2.9	−0.3	6.0	0.137	18.0
Six qualifying conditions	**6.3**	**2.2**	**0.2**	**4.2**	**0.067**	**34.8**
Payment-Only						
Any hospitalization						
All-cause	28.7	0.2	−2.4	2.9	0.891	0.8
Potentially avoidable	14.9	−0.2	−2.2	1.8	0.856	−1.5
Six qualifying conditions	9.2	−0.7	−2.3	0.9	0.474	−7.6
Any emergency department visit						
All-cause	28.2	1.9	−1.3	5.1	0.330	6.7
Potentially avoidable	17.2	0.8	−1.7	3.3	0.589	4.8
Six qualifying conditions	**5.0**	**1.6**	**0.1**	**3.0**	**0.072**	**31.7**
Any acute care transition						
All-cause	43.6	2.2	−1.0	5.3	0.259	5.0
Potentially avoidable	26.8	1.2	−2.1	4.4	0.567	4.3
Six qualifying conditions	12.5	0.5	−1.8	2.9	0.703	4.3

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, emergency department visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-6.   MOQI (MO): Initiative effect on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	**25,462**	**2,226**	**521**	**3,930**	**0.032**	**8.7**
Hospitalization expenditures						
All-cause	**5,374**	**1,048**	**394**	**1,702**	**0.008**	**19.5**
Potentially avoidable	1,639	57	−449	563	0.852	3.5
Six qualifying conditions	1,005	−137	−541	267	0.577	−13.6
Emergency department visit expenditures						
All-cause	213	31	−19	82	0.312	14.6
Potentially avoidable	76	16	−7	39	0.250	21.2
Six qualifying conditions	20	4	−10	19	0.643	20.3
Acute care transition expenditures						
All-cause	**5,698**	**1,145**	**404**	**1,885**	**0.011**	**20.1**
Potentially avoidable	1,672	138	−314	589	0.616	8.2
Six qualifying conditions	1,001	−108	−489	274	0.643	−10.8
Payment-Only						
Total Medicare expenditures	25,024	963	−403	2,329	0.246	3.8
Hospitalization expenditures						
All-cause	6,480	331	−494	1,156	0.510	5.1
Potentially avoidable	2,118	252	−111	615	0.254	11.9
Six qualifying conditions	1,268	−89	−359	182	0.589	−7.0
Emergency department visit expenditures						
All-cause	375	39	−38	115	0.405	10.3
Potentially avoidable	167	16	−16	48	0.413	9.5
Six qualifying conditions	56	12	−7	31	0.304	21.3
Acute care transition expenditures						
All-cause	6,985	325	−473	1,122	0.503	4.6
Potentially avoidable	2,314	234	−232	699	0.410	10.1
Six qualifying conditions	1,359	−120	−412	173	0.501	−8.8

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-7.   NY-RAH (NY): Initiative effect on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	27.8	−0.4	−3.1	2.4	0.833	−1.3
Potentially avoidable	11.3	0.1	−2.5	2.6	0.971	0.5
Six qualifying conditions	7.0	−1.0	−2.8	0.8	0.377	−14.0
Any emergency department visit						
All-cause	17.3	1.8	−0.8	4.3	0.248	10.1
Potentially avoidable	8.9	0.7	−0.5	2.0	0.352	8.0
Six qualifying conditions	1.8	−0.1	−0.9	0.6	0.760	−7.9
Any acute care transition						
All-cause	36.6	1.1	−2.5	4.7	0.619	3.0
Potentially avoidable	18.5	0.3	−2.5	3.1	0.865	1.6
Six qualifying conditions	8.5	−1.2	−3.3	0.8	0.334	−14.3
Payment-Only						
Any hospitalization						
All-cause	25.9	−1.5	−3.5	0.6	0.246	−5.6
Potentially avoidable	9.5	0.7	−0.4	1.7	0.293	7.0
Six qualifying conditions	5.5	−0.1	−1.2	1.1	0.943	−0.9
Any emergency department visit						
All-cause	20.8	−0.7	−3.4	2.0	0.678	−3.4
Potentially avoidable	11.8	−0.9	−2.7	0.9	0.394	−8.0
Six qualifying conditions	2.4	0.0	−0.7	0.7	0.986	0.4
Any acute care transition						
All-cause	37.9	−1.8	−4.1	0.5	0.201	−4.7
Potentially avoidable	19.0	−0.1	−2.0	1.7	0.902	−0.7
Six qualifying conditions	7.4	0.1	−1.2	1.3	0.942	0.8

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-8. NY-RAH (NY): Initiative effect on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	40,172	1,763	−1,832	5,359	0.420	4.4
Hospitalization expenditures						
All-cause	15,280	363	−1,835	2,561	0.786	2.4
Potentially avoidable	3,127	447	−362	1,257	0.363	14.3
Six qualifying conditions	1,813	27	−538	593	0.937	1.5
Emergency department visit expenditures						
All−cause	296	−14	−77	49	0.714	−4.7
Potentially avoidable	115	0	−29	29	0.986	0.3
Six qualifying conditions	25	−7	−19	5	0.356	−27.3
Acute care transition expenditures						
All−cause	16,084	290	−2,095	2,675	0.842	1.8
Potentially avoidable	3,227	505	−272	1,281	0.285	15.6
Six qualifying conditions	1,888	−10	−594	573	0.977	−0.5
Payment-Only						
Total Medicare expenditures	31,631	1,405	−58	2,867	0.114	4.4
Hospitalization expenditures						
All-cause	10,156	462	−540	1,463	0.448	4.5
Potentially avoidable	2,357	118	−279	514	0.626	5.0
Six qualifying conditions	1,195	76	−240	392	0.693	6.3
Emergency department visit expenditures						
All-cause	270	14	−31	59	0.602	5.3
Potentially avoidable	117	−3	−26	19	0.810	−2.8
Six qualifying conditions	26	3	−7	13	0.625	11.8
Acute care transition expenditures						
All−cause	10,587	372	−656	1,400	0.552	3.5
Potentially avoidable	2,515	82	−332	496	0.745	3.3
Six qualifying conditions	1,238	74	−234	383	0.691	6.0

SOURCE: RTI analysis of Medicare claims data

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-9. OPTIMISTIC (IN): Initiative effect on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	25.0	−0.2	−3.7	3.3	0.932	−0.7
Potentially avoidable	11.6	0.1	−2.1	2.2	0.953	0.7
Six qualifying conditions	5.5	0.2	−1.2	1.7	0.787	4.3
Any emergency department visit						
All−cause	21.5	−1.4	−4.9	2.0	0.499	−6.7
Potentially avoidable	11.6	−0.2	−2.3	2.0	0.902	−1.4
Six qualifying conditions	2.5	0.2	−0.7	1.1	0.717	8.5
Any acute care transition						
All−cause	38.6	−2.3	−6.1	1.5	0.326	−5.9
Potentially avoidable	20.9	−0.1	−2.8	2.7	0.979	−0.2
Six qualifying conditions	8.1	−0.1	−1.7	1.5	0.902	−1.5
Payment-Only						
Any hospitalization						
All-cause	25.0	0.0	−2.2	2.3	0.986	0.1
Potentially avoidable	11.8	0.5	−1.2	2.1	0.649	3.8
Six qualifying conditions	6.5	−0.1	−1.7	1.5	0.922	−1.5
Any emergency department visit						
All-cause	23.7	2.1	−0.7	4.8	0.215	8.8
Potentially avoidable	15.2	−0.3	−2.8	2.2	0.835	−2.1
Six qualifying conditions	3.8	0.1	−1.4	1.5	0.932	1.9
Any acute care transition						
All-cause	39.1	0.3	−2.6	3.1	0.877	0.7
Potentially avoidable	23.1	0.1	−2.4	2.5	0.971	0.2
Six qualifying conditions	8.9	0.4	−1.5	2.3	0.732	4.5

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-10.   OPTIMISTIC (IN): Initiative effect on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	33,550	−408	−3,413	2,597	0.823	−1.2
Hospitalization expenditures						
All-cause	7,967	139	−963	1,241	0.836	1.7
Potentially avoidable	2,541	29	−543	600	0.934	1.1
Six qualifying conditions	**833**	**316**	**26**	**605**	**0.073**	**37.9**
Emergency department visit expenditures						
All−cause	306	−42	−104	19	0.261	−13.8
Potentially avoidable	129	−16	−50	18	0.446	−12.3
Six qualifying conditions	27	6	−9	22	0.482	24.4
Acute care transition expenditures						
All−cause	8,559	−67	−1,123	989	0.917	−0.8
Potentially avoidable	2,789	−74	−784	635	0.864	−2.7
Six qualifying conditions	**859**	**307**	**4**	**611**	**0.096**	**35.8**
Payment-Only						
Total Medicare expenditures	29,396	−1,166	−2,975	642	0.289	−4.0
Hospitalization expenditures						
All-cause	7,171	−284	−1,262	694	0.633	−4.0
Potentially avoidable	2,488	−163	−643	317	0.576	−6.6
Six qualifying conditions	1,339	−292	−742	158	0.285	−21.8
Emergency department visit expenditures						
All-cause	**294**	**81**	**28**	**135**	**0.013**	**27.6**
Potentially avoidable	**135**	**34**	**2**	**65**	**0.078**	**24.9**
Six qualifying conditions	45	1	−18	21	0.905	3.2
Acute care transition expenditures						
All-cause	7,718	−315	−1,642	1,012	0.696	−4.1
Potentially avoidable	2,653	−97	−591	396	0.745	−3.7
Six qualifying conditions	1,412	−313	−764	137	0.252	−22.2

SOURCE: RTI analysis of Medicare claims data

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-11. RAVEN (PA): Initiative effect on hospital-related utilization, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	19.3	1.4	−0.8	3.6	0.298	7.2
Potentially avoidable	**7.6**	**2.4**	**0.2**	**4.5**	**0.072**	**31.3**
Six qualifying conditions	**3.0**	**2.3**	**1.0**	**3.6**	**0.005**	**76.4**
Any emergency department visit						
All−cause	**15.1**	**3.8**	**1.1**	**6.4**	**0.021**	**24.8**
Potentially avoidable	8.4	1.5	−0.7	3.8	0.265	18.2
Six qualifying conditions	2.4	0.5	−0.7	1.6	0.501	19.1
Any acute care transition						
All−cause	28.5	3.1	−0.5	6.8	0.160	11.0
Potentially avoidable	14.2	3.1	−0.3	6.6	0.136	22.1
Six qualifying conditions	**5.0**	**2.3**	**0.7**	**4.0**	**0.019**	**46.5**
Payment-Only						
Any hospitalization						
All-cause	27.4	−1.7	−4.8	1.4	0.372	−6.2
Potentially avoidable	13.3	−1.3	−3.5	0.9	0.342	−9.7
Six qualifying conditions	7.1	−0.2	−2.3	1.9	0.862	−3.1
Any emergency department visit						
All-cause	22.2	−2.3	−5.5	1.0	0.254	−10.2
Potentially avoidable	10.4	−0.5	−3.0	2.0	0.746	−4.8
Six qualifying conditions	3.3	−0.4	−1.7	1.0	0.680	−10.5
Any acute care transition						
All-cause	40.1	−3.5	−7.4	0.5	0.147	−8.6
Potentially avoidable	21.6	−2.4	−5.7	0.8	0.221	−11.2
Six qualifying conditions	10.1	−0.9	−3.1	1.4	0.535	−8.5

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table V-12.   RAVEN (PA): Initiative effect on Medicare expenditures, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	**24,677**	**2,332**	**226**	**4,437**	**0.069**	**9.4**
Hospitalization expenditures						
All-cause	**5,238**	**883**	**30**	**1,737**	**0.089**	**16.9**
Potentially avoidable	**1,168**	**551**	**111**	**991**	**0.039**	**47.2**
Six qualifying conditions	**391**	**427**	**202**	**652**	**0.002**	**109.2**
Emergency department visit expenditures						
All–cause	178	48	−7	102	0.152	26.8
Potentially avoidable	84	5	−27	36	0.808	5.6
Six qualifying conditions	32	−1	−22	21	0.955	−2.3
Acute care transition expenditures						
All–cause	5,410	837	−88	1,762	0.137	15.5
Potentially avoidable	**1,270**	**525**	**105**	**944**	**0.040**	**41.3**
Six qualifying conditions	**422**	**427**	**216**	**638**	**0.001**	**101.2**
Payment-Only						
Total Medicare expenditures	31,010	−2,001	−5,245	1,243	0.310	−6.5
Hospitalization expenditures						
All-cause	8,176	−1,126	−2,450	198	0.162	−13.8
Potentially avoidable	**2,531**	**−583**	**−1,089**	**−76**	**0.058**	**−23.0**
Six qualifying conditions	1,260	−248	−669	174	0.334	−19.7
Emergency department visit expenditures						
All-cause	304	−47	−130	36	0.355	−15.4
Potentially avoidable	86	6	−19	32	0.685	7.2
Six qualifying conditions	29	2	−14	18	0.805	8.2
Acute care transition expenditures						
All-cause	8,663	−1,215	−2,502	71	0.120	−14.0
Potentially avoidable	**2,723**	**−677**	**−1,246**	**−108**	**0.050**	**−24.9**
Six qualifying conditions	1,322	−283	−741	174	0.308	−21.4

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

We tried to understand how consistent the utilization and expenditure measures were for the identical outcome. For example, was there consistency between the estimates for the Initiative effect on all-cause hospitalization and expenditures for all-cause hospitalization. *Table V-13* shows the consistency between the estimated relative Initiative effects on hospital-related utilization and Medicare expenditures. There are 126 pairs of estimates for each of the 6 ECCPs and for all ECCPs combined, across two groups (C+ P and P-O) and 9 outcome categories. Estimates correspond in direction 71.4% of the time, with a correlation coefficient of 0.611. Stratifying by statistical significance shows estimates only disagree with each other substantially when neither are statistically significant. When both effects are significant, the estimates are always in the same direction with a very high correlation of 0.961, and when at least one measure is statistically significant, the measures change in the same direction over 90% of the time with a strong correlation of 0.685.

Table V-13. All ECCPs combined: Correlation between paired Initiative effects on hospital-related utilization and on Medicare expenditures, FY 2017–FY 2019

Measure	N	Consistent effect direction (N)	Consistent effect direction (%)	Utilization & Expenditure Correlation
All Reported Initiative Effects	126	90	71.4%	0.611
Both Statistically Significant Effects	8	8	100.0%	0.961
1 or More Statistically Significant Effects	33	30	90.9%	0.685
No Statistically Significant Effects	93	60	64.5%	0.190

SOURCE: RTI analysis of Medicare claims data.

NOTE: The utilization measure used for this analysis is the probability of any hospital-related utilization, per resident. A p-value cutoff of 0.1 was used to determine statistical significance.

APPENDIX W
SENSITIVITY ANALYSES FOR NFI 2 UTILIZATION AND EXPENDITURE EVALUATION RESULTS, FY 2017–FY 2019

W.1   Overview

We conducted three sensitivity analyses to confirm the robustness of the main results from our NFI 2 evaluation of utilization and expenditure outcomes across FY 2017–FY 2019. As a reminder, these main models used a national comparison group (NCG) and incorporated differing trends between the NCG and the Initiative groups during the FY 2014–FY 2016 baseline period. The full results of the main analysis can be found in **Appendix U**. As in the fourth annual report (RTI International, 2021), we present the sensitivity analyses under three scenarios for all ECCPs combined:

- Using a within-state reference group (WSRG) instead of the NCG

- Using FY 2016 as the baseline year with parallel trends assumed instead of FY 2014– FY 2016 with differing trends

- Using the average of FY 2014–FY 2016 as the baseline with parallel trends assumed, instead of using FY 2014–FY 2016 with differing trends.

Aside from the above stated differences, the models were the same as the difference-in-differences (DD) models used for the main analysis. We discuss why these models are not considered the primary models in **Chapter II.5** of the main report and in **Appendix I**. We provide additional discussion of these sensitivity analysis results in **Chapter II.5** and **Chapter V.1.**

We first summarize the differences between the results of each of the sensitivity analyses and the main analysis for the Clinical + Payment (C+P) and Payment-Only (P-O) groups in **Table W-1**. We then present a side-by-side comparison of the relative effect estimates from the main analysis and those from the sensitivity analyses using the WSRG, using FY 2016 as the baseline year, and using the average of FY 2014–FY 2016 as our baseline in **Tables W-2** (probability models) and **W-3** (expenditure models).

Complete results for the sensitivity analysis using the WSRG for both the C+P and P-O facilities are presented in **Tables W-4** (probability models) and **W-5** (expenditure models). Complete results for the sensitivity analysis using FY 2016 as the baseline year for both the C+P and P-O facilities are displayed in **Tables W-6** (probability models) and **W-7** (expenditure models). Complete results for the sensitivity analysis using the average of FY 2014–FY 2016 as our baseline for both intervention groups are in **Tables W-8** (probability models) and **W-9** (expenditure models).

W.2 Results

When comparing to the WSRG instead of the NCG, the pattern of unfavorable increases in utilization and expenditure measures in the C+P group remains, although the effect is slightly weakened, with fewer statistically significant increases. In the P-O group, the WSRG analysis suggests slightly more favorable results with a weak pattern of decreases. There is one statistically significant decrease in the probability of all-cause acute care transitions. These results, however, do not show dramatic differences from the mixed statistically non-significant results of the main analysis.

When using FY 2016 as the baseline year instead of FY 2014–FY 2016 with a linear trend, we found that the consistent pattern of increases in the utilization and expenditure measures in the C+P group weakened, with fewer statistically significant increases. In the P-O group, the pattern of mixed results found in the main analysis remains for the most part. The utilization results show a weak pattern of slight decreases with no statistically significant results, and the expenditure results show a statistically significant increase in one measure.

When using the average of FY 2014–FY 2016 as the baseline instead of FY 2014–FY 2016 with a linear trend, the results from the C+P group are much more favorable than the consistent increases shown in the results from the main analysis. The results show a pattern of favorable decreases with statistically significant decreases in two utilization measures and a statistically significant decrease in one expenditure measure. For this sensitivity analysis, the results for the P-O group show strong evidence of decreases in both utilization and expenditure measures, with statistically significant decreases in six utilization measures and in four expenditure measures. This is a departure from the mixed non-significant results of the main analysis. We discuss the meaning of these sensitivity analysis findings in *Chapter II.5* and *Chapter V.1*.

Table W-1.   Summary of sensitivity analyses results compared to main analysis results

Intervention group	Sensitivity analysis type	Comparison to the main analysis
Clinical + Payment	WSRG	Results are more favorable; pattern of unfavorable increases is marginally weakened
Payment-Only	WSRG	Results are more favorable; weak pattern of decreases emerged
Clinical + Payment	FY 2016 as baseline year	Results are more favorable; pattern of unfavorable increases is marginally weakened
Payment-Only	FY 2016 as baseline year	Results are consistent with the main analysis
Clinical + Payment	Average of FY 2014–FY 2016 as baseline	Results are more favorable; pattern of decreases emerged
Payment-Only	Average of FY 2014–FY 2016 as baseline	Results are more favorable; strong pattern of decreases emerged

WSRG = within-state reference group.

Table W-2. All ECCPs: Initiative effect on hospital-related utilization by sensitivity analysis type, FY 2017–FY 2019

(Relative effect [percent])

Measure	Main analysis	Using a within-state reference group	Using FY 2016 as the baseline	Using the average of FY 2014–FY 2016 as the baseline
Clinical + Payment				
Any hospitalization				
All-cause	−1.0	−2.0	**−4.2***	**−6.1***
Potentially avoidable	9.1	6.5	3.6	−1.2
Six qualifying conditions	12.3	9.5	3.4	−2.9
Any emergency department visit				
All-cause	**11.4***	**7.1***	4.7	−1.3
Potentially avoidable	**10.1***	5.0	5.9	2.1
Six qualifying conditions	−2.8	−8.0	−6.8	−4.2
Any acute care transition				
All-cause	2.7	0.7	−1.0	**−4.0**
Potentially avoidable	7.2	3.8	2.6	−1.3
Six qualifying conditions	4.8	2.0	−1.5	−4.4
Payment-Only				
Any hospitalization				
All-cause	−1.7	−2.7	−2.0	**−4.2***
Potentially avoidable	4.4	1.9	1.4	−3.6
Six qualifying conditions	−0.5	−2.9	−2.4	**−8.3**
Any emergency department visit				
All-cause	0.3	−3.3	−1.0	**−4.1***
Potentially avoidable	−3.1	−7.3	−2.7	−4.5
Six qualifying conditions	0.5	−4.6	−3.1	−6.2
Any acute care transition				
All-cause	−1.8	**−3.6***	−1.6	**−3.6***
Potentially avoidable	−0.5	−3.5	−1.4	**−4.4**
Six qualifying conditions	−0.2	−2.9	−3.5	**−8.7***

*/**/*** = Significantly different from zero based on a *p*-value cutoff of 0.1/0.05/0.01.

SOURCE: RTI analysis of Medicare claims data.

NOTES: The relative Initiative effect is the Initiative effect (percentage points) divided by the mean predicted probability of experiencing the event under the scenario that the intervention did not occur. All predictions are based on difference-in-differences regression models with either a national comparison group or a WSRG and adjusted for resident-level and facility-level characteristics. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table W-3.   All ECCPS: Initiative effect on Medicare expenditures by sensitivity analysis type, FY 2017–FY 2019

(Relative effect [percent])

Measure	Main analysis	Using a within-state reference group	Using FY 2016 as the baseline	Using the average of FY 2014–FY 2016 as the baseline
Clinical + Payment				
Total Medicare expenditures	**4.0***	3.7	2.0	1.1
Hospitalization expenditures				
All-cause	3.7	2.8	−0.9	−2.8
Potentially avoidable	**14.2***	10.1	7.5	3.0
Six qualifying conditions	**22.1****	**19.5***	**13.4***	4.9
Emergency department visit expenditures				
All-cause	3.2	−1.2	−1.1	−4.6
Potentially avoidable	5.9	−0.8	0.9	−2.6
Six qualifying conditions	0.7	−6.0	−5.8	−7.1
Acute care transition expenditures				
All-cause	2.5	1.6	−2.4	**−4.2***
Potentially avoidable	**13.6***	9.6	6.6	2.0
Six qualifying conditions	**21.4****	**18.6***	**12.2***	3.8
Payment-Only				
Total Medicare expenditures	2.1	1.8	**2.6***	0.3
Hospitalization expenditures				
All-cause	0.8	−0.1	−0.2	**−5.5****
Potentially avoidable	1.9	−1.8	1.5	−3.4
Six qualifying conditions	−2.4	−4.5	−0.2	**−8.2***
Emergency department visit expenditures				
All-cause	2.8	−1.2	−0.3	−4.2
Potentially avoidable	1.8	−4.3	−0.9	−4.2
Six qualifying conditions	−3.3	−9.7	−5.7	−3.9
Acute care transition expenditures				
All-cause	0.2	−0.6	−0.8	**−5.8****
Potentially avoidable	0.5	−2.9	−0.2	−3.9
Six qualifying conditions	−4.4	−6.4	−2.3	**−8.9****

*/**/*** = Significantly different from zero based on a *p*-value cutoff of 0.1/0.05/0.01.

SOURCES: RTI analysis of Medicare claims data.

NOTES: The relative Initiative effect is the Initiative effect (dollars) divided by the mean predicted expenditures under the scenario that the intervention did not occur. All predictions are based on difference-in-differences regression models with either a NCG or a WSRG and adjusted for resident-level and facility-level characteristics. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table W-4. All ECCPs: Initiative effect on hospital-related utilization—sensitivity analysis using a within-state reference group, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	26.5	−0.5	−1.9	0.8	0.519	−2.0
Potentially avoidable	10.9	0.7	−0.4	1.8	0.293	6.5
Six qualifying conditions	5.6	0.5	−0.2	1.3	0.260	9.5
Any emergency department visit						
All-cause	**18.9**	**1.3**	**0.0**	**2.7**	**0.095**	**7.1**
Potentially avoidable	10.4	0.5	−0.4	1.5	0.360	5.0
Six qualifying conditions	2.7	−0.2	−0.7	0.3	0.485	−8.0
Any acute care transition						
All-cause	36.9	0.3	−1.4	2.0	0.796	0.7
Potentially avoidable	19.2	0.7	−0.7	2.2	0.414	3.8
Six qualifying conditions	7.9	0.2	−0.8	1.1	0.783	2.0
Payment-Only						
Any hospitalization						
All-cause	26.0	−0.7	−1.8	0.4	0.309	−2.7
Potentially avoidable	11.5	0.2	−0.6	1.0	0.644	1.9
Six qualifying conditions	6.7	−0.2	−0.9	0.5	0.653	−2.9
Any emergency department visit						
All-cause	24.6	−0.8	−2.1	0.5	0.322	−3.3
Potentially avoidable	14.3	−1.0	−2.1	0.0	0.105	−7.3
Six qualifying conditions	4.1	−0.2	−0.8	0.4	0.585	−4.6
Any acute care transition						
All-cause	**40.2**	**−1.4**	**−2.8**	**−0.1**	**0.074**	**−3.6**
Potentially avoidable	22.5	−0.8	−2.0	0.4	0.281	−3.5
Six qualifying conditions	9.7	−0.3	−1.1	0.6	0.585	−2.9

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a WSRG and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table W-5. All ECCPs: Initiative effect on Medicare expenditures—sensitivity analysis using a within-state reference group, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	32,249	1,181	−123	2,486	0.136	3.7
Hospitalization expenditures						
All-cause	9,962	282	−415	979	0.506	2.8
Potentially avoidable	2,344	236	−51	523	0.177	10.1
Six qualifying conditions	**1,043**	**203**	**26**	**380**	**0.059**	**19.5**
Emergency department visit expenditures						
All-cause	276	−3	−30	24	0.844	−1.2
Potentially avoidable	110	−1	−14	13	0.919	−0.8
Six qualifying conditions	28	−2	−9	5	0.696	−6.0
Acute care transition expenditures						
All-cause	10,525	171	−583	925	0.709	1.6
Potentially avoidable	2,476	237	−53	526	0.179	9.6
Six qualifying conditions	**1,068**	**199**	**23**	**376**	**0.064**	**18.6**
Payment-Only						
Total Medicare expenditures	28,136	501	−391	1,394	0.356	1.8
Hospitalization expenditures						
All-cause	7,892	−6	−474	461	0.982	−0.1
Potentially avoidable	2,242	−41	−237	156	0.733	−1.8
Six qualifying conditions	1,146	−51	−202	99	0.576	−4.5
Emergency department visit expenditures						
All-cause	326	−4	−33	25	0.820	−1.2
Potentially avoidable	142	−6	−21	8	0.487	−4.3
Six qualifying conditions	48	−5	−13	4	0.365	−9.7
Acute care transition expenditures						
All-cause	8,349	−50	−533	434	0.865	−0.6
Potentially avoidable	2,422	−71	−279	137	0.574	−2.9
Six qualifying conditions	1,215	−78	−229	74	0.398	−6.4

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the residents in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). *The Initiative effect* is calculated based on a difference-in-differences regression model with a WSRG and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table W-6.   All ECCPs: Initiative effect on hospital-related utilization—sensitivity analysis using FY 2016 as the baseline year, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	**27.1**	**−1.1**	**−2.1**	**−0.2**	**0.056**	**−4.2**
Potentially avoidable	11.2	0.4	−0.4	1.3	0.433	3.6
Six qualifying conditions	5.9	0.2	−0.4	0.8	0.600	3.4
Any emergency department visit						
All-cause	19.4	0.9	−0.1	1.9	0.130	4.7
Potentially avoidable	10.3	0.6	−0.1	1.3	0.153	5.9
Six qualifying conditions	2.6	−0.2	−0.5	0.2	0.401	−6.8
Any acute care transition						
All-cause	37.5	−0.4	−1.6	0.9	0.624	−1.0
Potentially avoidable	19.4	0.5	−0.6	1.6	0.446	2.6
Six qualifying conditions	8.2	−0.1	−0.8	0.6	0.781	−1.5
Payment-Only						
Any hospitalization						
All-cause	25.8	−0.5	−1.3	0.3	0.282	−2.0
Potentially avoidable	11.5	0.2	−0.4	0.7	0.642	1.4
Six qualifying conditions	6.6	−0.2	−0.6	0.3	0.575	−2.4
Any emergency department visit						
All-cause	24.0	−0.2	−1.2	0.7	0.684	−1.0
Potentially avoidable	13.6	−0.4	−1.1	0.4	0.427	−2.7
Six qualifying conditions	4.0	−0.1	−0.5	0.3	0.590	−3.1
Any acute care transition						
All-cause	39.4	−0.6	−1.6	0.3	0.279	−1.6
Potentially avoidable	22.0	−0.3	−1.2	0.5	0.549	−1.4
Six qualifying conditions	9.8	−0.3	−0.9	0.3	0.343	−3.5

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a national comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table W-7. All ECCPs: Initiative effect on Medicare expenditures—sensitivity analysis using FY 2016 as the baseline year, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	32,771	657	−226	1,540	0.221	2.0
Hospitalization expenditures						
All-cause	10,324	−89	−587	410	0.770	−0.9
Potentially avoidable	2,398	181	−36	398	0.171	7.5
Six qualifying conditions	**1,098**	**147**	**7**	**288**	**0.085**	**13.4**
Emergency department visit expenditures						
All-cause	276	−3	−22	16	0.800	−1.1
Potentially avoidable	108	1	−9	10	0.870	0.9
Six qualifying conditions	28	−2	−7	3	0.582	−5.8
Acute care transition expenditures						
All-cause	10,954	−266	−817	285	0.427	−2.4
Potentially avoidable	2,545	167	−42	376	0.189	6.6
Six qualifying conditions	**1,128**	**138**	**1**	**275**	**0.098**	**12.2**
Payment-Only						
Total Medicare Expenditures	**27,899**	**732**	**49**	**1,416**	**0.078**	**2.6**
Hospitalization Expenditures						
All-cause	7,893	−14	−335	307	0.943	−0.2
Potentially avoidable	2,169	32	−106	169	0.704	1.5
Six qualifying conditions	1,097	−2	−101	97	0.971	−0.2
Emergency department visit expenditures						
All-cause	323	−1	−23	20	0.935	−0.3
Potentially avoidable	137	−1	−11	8	0.827	−0.9
Six qualifying conditions	46	−3	−8	3	0.440	−5.7
Acute care transition expenditures						
All-cause	8,358	−67	−393	260	0.738	−0.8
Potentially avoidable	2,355	−5	−155	144	0.955	−0.2
Six qualifying conditions	1,163	−27	−124	70	0.648	−2.3

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the residents in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). *The Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table W-8.   All ECCPs: Initiative effect on hospital-related utilization—sensitivity analysis using the average of FY 2014–FY 2016 as the baseline, FY 2017–FY 2019

(probability of any utilization, per resident)

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Any hospitalization						
All-cause	**27.6**	**−1.7**	**−2.6**	**−0.8**	**0.002**	**−6.1**
Potentially avoidable	11.8	−0.1	−0.8	0.5	0.725	−1.2
Six qualifying conditions	6.3	−0.2	−0.7	0.3	0.562	−2.9
Any emergency department visit						
All-cause	20.5	−0.3	−1.2	0.7	0.637	−1.3
Potentially avoidable	10.7	0.2	−0.4	0.9	0.572	2.1
Six qualifying conditions	2.6	−0.1	−0.4	0.2	0.535	−4.2
Any acute care transition						
All-cause	**38.7**	**−1.5**	**−2.6**	**−0.4**	**0.023**	**−4.0**
Potentially avoidable	20.2	−0.3	−1.2	0.6	0.631	−1.3
Six qualifying conditions	8.4	−0.4	−1.0	0.2	0.317	−4.4
Payment-Only						
Any hospitalization						
All-cause	**26.4**	**−1.1**	**−1.8**	**−0.5**	**0.005**	**−4.2**
Potentially avoidable	12.1	−0.4	−1.0	0.1	0.190	−3.6
Six qualifying conditions	**7.0**	**−0.6**	**−1.0**	**−0.2**	**0.021**	**−8.3**
Any emergency department visit						
All-cause	**24.8**	**−1.0**	**−1.9**	**−0.1**	**0.055**	**−4.1**
Potentially avoidable	13.8	−0.6	−1.3	0.0	0.121	−4.5
Six qualifying conditions	4.1	−0.3	−0.6	0.0	0.162	−6.2
Any acute care transition						
All-cause	**40.2**	**−1.5**	**−2.3**	**−0.6**	**0.006**	**−3.6**
Potentially avoidable	**22.7**	**−1.0**	**−1.8**	**−0.2**	**0.036**	**−4.4**
Six qualifying conditions	**10.3**	**−0.9**	**−1.4**	**−0.4**	**0.003**	**−8.7**

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *predicted probability absent the Initiative* is the mean of the predicted probabilities of experiencing the event during their respective exposure period, for the residents in the intervention group, under the scenario that the intervention did not occur. The *Initiative effect* is calculated based on a difference-in-differences regression model with a NCG and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted probabilities of the event with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table W-9. All ECCPs: Initiative effect on Medicare expenditures—sensitivity analysis using the average of FY 2014–FY 2016 as the baseline, FY 2017–FY 2019

(dollars, per resident-year)

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Clinical + Payment						
Total Medicare expenditures	33,055	373	−460	1,205	0.461	1.1
Hospitalization expenditures						
All-cause	10,544	−298	−711	115	0.235	−2.8
Potentially avoidable	2,509	74	−99	248	0.481	3.0
Six qualifying conditions	1,190	58	−61	177	0.423	4.9
Emergency department visit expenditures						
All-cause	286	−13	−30	4	0.202	−4.6
Potentially avoidable	112	−3	−11	5	0.562	−2.6
Six qualifying conditions	28	−2	−6	2	0.379	−7.1
Acute care transition expenditures						
All-cause	**11,161**	**−465**	**−888**	**−41**	**0.071**	**−4.2**
Potentially avoidable	2,662	54	−114	222	0.596	2.0
Six qualifying conditions	1,223	47	−71	164	0.513	3.8
Payment-Only						
Total Medicare Expenditures	28,544	90	−568	747	0.822	0.3
Hospitalization Expenditures						
All-cause	**8,348**	**−462**	**−729**	**−196**	**0.004**	**−5.5**
Potentially avoidable	2,281	−77	−200	46	0.303	−3.4
Six qualifying conditions	**1,195**	**−98**	**−183**	**−12**	**0.060**	**−8.2**
Emergency department visit expenditures						
All-cause	336	−14	−33	5	0.220	−4.2
Potentially avoidable	142	−6	−15	3	0.268	−4.2
Six qualifying conditions	45	−2	−6	2	0.478	−3.9
Acute care transition expenditures						
All-cause	**8,809**	**−510**	**−798**	**−222**	**0.004**	**−5.8**
Potentially avoidable	2,449	−96	−224	32	0.219	−3.9
Six qualifying conditions	**1,250**	**−111**	**−195**	**−26**	**0.032**	**−8.9**

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *predicted expenditure absent the Initiative* is the mean of the predicted expenditures, for the residents in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). *The Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, and observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

APPENDIX X
STRATEGY AND SUPPLEMENTAL RESULTS FOR ASSESSING THE COMBINED NFI 1 AND NFI 2 EFFECTS

X.1   Overview

As described in **Section III** of the report, we performed a difference-in-differences (DD) analysis with a FY 2012 baseline, designed to compare the NFI 1 Clinical-Only (C-O), NFI 2 Clinical + Payment (C+P), and NFI 2 Payment-Only (P-O) interventions. In this appendix, we provide details about the study sample, the regression equation, and additional results beyond what we presented in **Section III**.

- **Appendix Section X.2** describes the creation of our final study sample.

- **Appendix Section X.3** specifies the DD models used to perform multivariate regression analyses, the covariates used, and the outcome measures.

- **Appendix Section X.4** provides additional utilization and expenditure results for all ECCPs combined and each ECCP individually.

X.2   Study Sample

For this analysis, our study sample consisted of long-stay nursing facility residents from FY 2012–FY 2019. We followed a similar file construction process to add FY 2012 and FY 2013 residents to the FY 2014–FY 2019 file that we used for the NFI 2 evaluation based on a FY 2014–FY 2016 baseline period (**Section II**). A description of the data sources and the derivation of our study sample for FY 2014–FY 2019 is in **Appendix I**.

We applied NFI 2 study sample selection criteria to identify Initiative-eligible residents throughout FY 2012–FY 2019 for this analysis, despite the differences between NFI 1 and NFI 2 eligibility criteria and that this analysis included evaluating the NFI 1 C-O . For example, the 101-day requirement to define long-stay nursing facility residents was applied differently in NFI 2 than in NFI 1. In NFI 2, the Initiative defined eligible long-stay residents as individuals residing in a nursing facility for at least 101 days, while in NFI 1 the Initiative defined eligible long-stay nursing facility residents as any individuals residing in a nursing facility for at least 101 days **or** any individuals who had a target assessment with no discharge plan in place. Additionally, hospice use was considered an exclusion criterion for NFI 2 but was not in NFI 1. More details on the differences between the NFI 1 and NFI 2 criteria are described in **Table I-1** in **Appendix I**. We also included only those NFI 1 facilities that continued on to NFI 2 as part of the Initiative sample, and as a result we did not include any facilities that formally dropped from any of the ECCPs before NFI 2 despite participating in NFI 1 (many in Nevada) or any of the NFI 1 facilities in Nebraska.

In addition to these differences between the NFI 1 and NFI 2 study sample eligibility criteria, there were other methodological differences between the NFI 1 evaluation strategy (RTI International, 2017) and the approach we used in this analysis, based on the NFI 2 evaluation strategy. Most importantly, we used a national comparison group in NFI 2, while in NFI 1 we used within-state comparison groups. Our evaluation of NFI 1 used calendar year 2012 as the baseline, and in this analysis we used FY 2012 as the baseline. Other differences included how the expenditure outcome was defined (not annualized in the NFI 1 evaluation) and the statistical methods used for the probability outcomes (a generalized estimating equation approach for the NFI 1 evaluation). We chose to apply the NFI 2 criteria for consistency with our evaluation of NFI 2 (*Section II*), and because the primary goals of this analysis are to evaluate each intervention type over time and to compare them to each other, rather than to just evaluate the payment incentive alone as was done for NFI 2.

Table X-1 displays the counts of residents before and after Initiative-participation exclusion criteria were applied, and *Table X-2* details additional exclusions applied for each of the different types of analyses for FY 2012–FY 2013. These tables parallel *Tables I-2* and *I-3* presented in *Appendix I* for FY 2014–FY 2019.

Table X-1. Counts of eligible residents and residents excluded due to select exclusion criteria, FY 2012—FY 2013

Sample overview	2012			2013		
	C+P	**P-O**	**NCG**	**C+P**	**P-O**	**NCG**
Initial sample	25,329	25,256	1,474,829	23,974	24,194	1,400,749
Selected exclusion criteria (exclusions are not mutually exclusive)						
Enrolled in Medicare Advantage	4,143	3,229	163,395	4,185	3,362	164,574
Not enrolled in Medicare A and B	2,640	2,027	139,664	2,575	2,053	142,604
No overlapping exposure period	2,360	2,474	145,367	1,963	1,965	112,915
No matching Medicare data	1,496	1,134	85,111	1,486	1,179	91,923
Total number of excluded beneficiaries	10,726	9,368	639,695	10,085	8,898	589,680
Total number of eligible beneficiaries	**14,603**	**15,888**	**835,134**	**13,889**	**15,296**	**811,069**

C+P = Clinical + Payment; NCG = national comparison group; P-O = Payment-Only.

SOURCE: RTI analysis of Medicare claims data.

NOTES: This table shows only selected exclusions. Exclusions are not mutually exclusive.

Table X-2. Counts of residents used for specific analyses, FY 2012—FY 2013

Sample overview	2012			2013		
	C+P	P-O	NCG	C+P	P-O	NCG
Total number of eligible beneficiaries	14,603	15,888	835,134	13,889	15,296	811,069
Overall exclusions applied for analytic sample						
Excluded due to out-of-range propensity scores	—	—	11,465	—	—	844
Excluded due to missing covariate	1,200	765	51,473	799	590	40,347
Total number used for utilization analyses	**13,403**	**15,123**	**772,196**	**13,090**	**14,706**	**769,878**
Exclusions applied for expenditure analyses						
Excluded due to outlier expenditures	58	45	2,068	55	42	2,169
Excluded due to negative expenditures	—	—	4	1	—	10
Total number used for expenditure analyses	**13,345**	**15,078**	**770,124**	**13,034**	**14,664**	**767,699**
Exclusions applied for QM analyses						
Excluded due to missing QM outcome data	329	175	13,002	174	176	9,762
Total number used for QMs	**13,074**	**14,948**	**759,194**	**12,916**	**14,530**	**760,116**

C+P = Clinical + Payment; NCG = national comparison group; P-O = Payment-Only; QM = quality measure.

— = data not available.

SOURCE: RTI analysis of Medicare claims data.

NOTE: The total number used for each individual QM varies. The "Total number used for QMs" in this table includes those not missing any of the QMs.

X.3 Statistical Methods

Our FY 2012 baseline analysis used similar methods as in the NFI 2 evaluation with a FY 2014–FY 2016 baseline period. Our methods for the NFI 2 evaluation are described in **Appendix I.** Our general regression equation for this analysis was as follows:

$$
\begin{aligned}
Y_{ijt} = \beta_0 &+ \beta_x \times X_{ijt} + \beta_z \times Z_{jt} + \beta_{WSRG} \times WSRG + \beta_{C+P} \times IG_{C+P} + \beta_{PO} \times IG_{PO} \\
&+ \beta_{p,2013} \times Post_{2013} + \beta_{WSRG,2013} \times (WSRG \times Post_{2013}) \\
&+ \beta_{C+P,2013} \times (IG_{C+P} \times Post_{2013}) + \beta_{PO,2013} \times (IG_{PO} \times Post_{2013}) \\
&+ \beta_{p,2014-2016} \times Post_{2014-2016} + \beta_{WSRG,2014-2016} \times (WSRG \times Post_{2014-2016}) \\
&+ \beta_{C+P,2014-2016} \times (IG_{C+P} \times Post_{2014-2016}) \\
&+ \beta_{PO,2014-2016} \times (IG_{PO} \times Post_{2014-2016}) + \beta_{p,2017-2019} \times Post_{2017-2019} \\
&+ \beta_{WSRG,2017-2019} \times (WSRG \times Post_{2017-2019}) \\
&+ \beta_{C+P,2017-2019} \times (IG_{C+P} \times Post_{2017-2019}) \\
&+ \beta_{PO,2017-2019} \times (IG_{PO} \times Post_{2017-2019}) + State_{ij} + \varepsilon_{ijt}
\end{aligned}
$$

The specific meaning of these terms is analogous to what we described in **Appendix I**. In this case, the DD terms that represent the Initiative effects of the different interventions are defined below:

- $\beta_{C+P, 2014-2016} \times (IG_{C+P} \times Post_{2014-2016})$ represents the NFI 1 C-O intervention effect
- $\beta_{C+P, 2017-2019} \times (IG_{C+P} \times Post_{2017-2019})$ represents the NFI 2 C+P intervention effect

- $\beta_{PO, 2017\text{-}2019} \times (IG_{PO} \times Post_{2017\text{-}2019})$ represents the NFI 2 P-O intervention effect

- $\beta_{PO, 2014\text{-}2016} \times (IG_{PO} \times Post_{2014\text{-}2016})$ measures the difference in the P-O facilities over the period FY 2014–FY 2016 compared to the baseline, relative to the national comparison group. As there was no intervention in these facilities during this period of time, our hypothesis is that this term is zero.

In this regression analysis, we used the same set of covariates as described in **Appendix I** in **Appendix Section I.9** with the addition of version 12 hierarchical condition categories (HCCs). We present descriptive statistics on the final set of model covariates for FY 2012–FY 2019 in **Appendix T**. We conducted this analysis for the same probability of hospital-related utilization outcomes and Medicare expenditure outcomes as for the evaluation of NFI 2 (**Section II**). For FY 2012–FY 2013, we used the same outcome measure definitions as for FY 2014–FY 2019 (**Appendix I, Appendix Section I.7**). We used the same set of ICD-9-CM codes to define potentially avoidable hospitalization conditions as for FY 2014 and FY 2015 (**Appendix I, Appendix Section I.8**). We also conducted this analysis for the mortality outcome (**Appendix S**). More information on the exact model types used for each of these outcomes is presented in **Appendix I, Appendix Section I.10**.

In **Chapter III.1** and **Appendix Y** we present statistical comparisons between the different interventions (e.g., we compare C+P from NFI 2 to C-O from NFI 1). To make these comparisons, we subtracted the effect estimates from each other. We calculated the standard error of the difference by assuming independence among the underlying resident populations and analysis periods, and then performed t-tests.

X.4 Supplemental Results

Next, we report the NFI 1 and NFI 2 effect estimates on hospital-related utilization and expenditure measures using a FY 2012 baseline for all ECCPs combined and for each of the six ECCPs individually. These results supplement the results presented in **Section III**. We present the probability of hospital utilization and expenditure results for the NFI 1 C-O group based on FY 2014–FY 2016, and the NFI 2 C+P group and the NFI 2 P-O group, both based on FY 2017–FY 2019. We do not report results for the P-O group based on FY 2014–FY 2016 because no intervention took place during this time, although we do include them for comparison purposes in the figures in **Section III**.

- All ECCPs: *Tables X-3* (C-O), *X-4* (C+P), and *X-5* (P-O)
- AQAF: *Tables X-6* (C-O), *X-7* (C+P), and *X-8* (P-O)
- ATOP2: *Tables X-9* (C-O), *X-10* (C+P), and *X-11* (P-O)
- MOQI: *Tables X-12* (C-O), *X-13* (C+P), and *X-14* (P-O)
- NY-RAH: *Tables X-15* (C-O), *X-16* (C+P), and *X-17* (P-O)
- OPTIMISTIC: *Tables X-18* (C-O), *X-19* (C+P), and *X-20* (P-O)
- RAVEN: *Tables X-21* (C-O), *X-22* (C+P), and *X-23* (P-O)

Table X-3.   All ECCPs: NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**30.3**	**−3.2**	**−4.2**	**−2.1**	**0.000**	**−10.4**
Potentially avoidable	**14.6**	**−2.3**	**−3.1**	**−1.5**	**0.000**	**−15.9**
Six qualifying conditions	**8.6**	**−1.8**	**−2.4**	**−1.1**	**0.000**	**−20.8**
Any emergency department visit						
All-cause	**23.0**	**−2.9**	**−4.1**	**−1.7**	**0.000**	**−12.5**
Potentially avoidable	**12.8**	**−2.1**	**−2.9**	**−1.2**	**0.000**	**−16.1**
Six qualifying conditions	**3.2**	**−0.6**	**−1.0**	**−0.2**	**0.020**	**−19.0**
Any acute care transition						
All-cause	**42.6**	**−4.5**	**−5.9**	**−3.1**	**0.000**	**−10.5**
Potentially avoidable	**24.4**	**−3.8**	**−5.0**	**−2.7**	**0.000**	**−15.8**
Six qualifying conditions	**11.2**	**−2.4**	**−3.2**	**−1.7**	**0.000**	**−21.6**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	**30,094**	**−1,272**	**−2,234**	**−310**	**0.030**	**−4.2**
Hospitalization expenditures						
All-cause	**10,691**	**−1,294**	**−1,777**	**−812**	**0.000**	**−12.1**
Potentially avoidable	**2,900**	**−444**	**−640**	**−248**	**0.000**	**−15.3**
Six qualifying conditions	**1,508**	**−306**	**−444**	**−169**	**0.000**	**−20.3**
Emergency department visit expenditures						
All-cause	**263**	**−28**	**−47**	**−10**	**0.012**	**−10.8**
Potentially avoidable	**109**	**−13**	**−22**	**−4**	**0.018**	**−11.9**
Six qualifying conditions	27	−3	−8	2	0.287	−11.2
Acute care transition expenditures						
All-cause	**11,235**	**−1,357**	**−1,874**	**−839**	**0.000**	**−12.1**
Potentially avoidable	**3,066**	**−480**	**−683**	**−277**	**0.000**	**−15.6**
Six qualifying conditions	**1,551**	**−325**	**−462**	**−189**	**0.000**	**−21.0**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, emergency department (ED) visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, skilled nursing facility (SNF), home health, durable medical equipment (DME), lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-4.   All ECCPs: NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**30.7**	**−4.8**	**−5.9**	**−3.7**	**0.000**	**−15.5**
Potentially avoidable	**14.0**	**−2.3**	**−3.2**	**−1.5**	**0.000**	**−16.8**
Six qualifying conditions	**7.9**	**−1.8**	**−2.4**	**−1.2**	**0.000**	**−23.0**
Any emergency department visit						
All-cause	**23.4**	**−3.2**	**−4.6**	**−1.7**	**0.001**	**−13.5**
Potentially avoidable	**12.8**	**−1.8**	**−2.8**	**−0.8**	**0.002**	**−14.3**
Six qualifying conditions	**3.2**	**−0.7**	**−1.1**	**−0.3**	**0.005**	**−22.4**
Any acute care transition						
All-cause	**43.1**	**−5.9**	**−7.5**	**−4.4**	**0.000**	**−13.7**
Potentially avoidable	**23.9**	**−4.0**	**−5.4**	**−2.6**	**0.000**	**−16.8**
Six qualifying conditions	**10.7**	**−2.7**	**−3.4**	**−1.9**	**0.000**	**−25.0**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	34,542	−1,087	−2,178	3	0.101	−3.1
Hospitalization expenditures						
All-cause	**11,965**	**−1,711**	**−2,265**	**−1,157**	**0.000**	**−14.3**
Potentially avoidable	**2,964**	**−380**	**−605**	**−155**	**0.006**	**−12.8**
Six qualifying conditions	**1,493**	**−245**	**−387**	**−103**	**0.005**	**−16.4**
Emergency department visit expenditures						
All-cause	**318**	**−47**	**−71**	**−22**	**0.002**	**−14.6**
Potentially avoidable	**127**	**−18**	**−30**	**−6**	**0.013**	**−14.1**
Six qualifying conditions	32	−6	−11	0	0.073	−17.6
Acute care transition expenditures						
All-cause	**12,653**	**−1,950**	**−2,574**	**−1,326**	**0.000**	**−15.4**
Potentially avoidable	**3,157**	**−440**	**−676**	**−204**	**0.002**	**−13.9**
Six qualifying conditions	**1,549**	**−279**	**−422**	**−135**	**0.001**	**−18.0**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-5. All ECCPs: NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**27.2**	**−1.9**	−2.9	−0.9	**0.002**	−7.0
Potentially avoidable	**12.5**	**−0.8**	−1.6	−0.1	**0.069**	−6.7
Six qualifying conditions	**7.6**	**−1.2**	−1.8	−0.5	**0.002**	−15.1
Any emergency department visit						
All-cause	**26.6**	**−2.8**	−4.2	−1.4	**0.001**	−10.5
Potentially avoidable	**15.1**	**−1.9**	−2.9	−0.9	**0.002**	−12.3
Six qualifying conditions	**4.5**	**−0.7**	−1.1	−0.2	**0.031**	−14.4
Any acute care transition						
All-cause	**41.9**	**−3.2**	−4.6	−1.8	**0.000**	−7.6
Potentially avoidable	**23.9**	**−2.1**	−3.3	−0.9	**0.003**	−8.9
Six qualifying conditions	**11.0**	**−1.6**	−2.3	−0.8	**0.001**	−14.1

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	28,526	136	−1,020	1,291	0.847	0.5
Hospitalization expenditures						
All-cause	**8,523**	**−596**	−1,071	−122	**0.039**	−7.0
Potentially avoidable	2,267	−58	−234	118	0.586	−2.6
Six qualifying conditions	**1,244**	**−145**	−261	−28	**0.041**	−11.6
Emergency department visit expenditures						
All-cause	352	**−31**	−56	−5	**0.050**	−8.7
Potentially avoidable	154	**−18**	−30	−5	**0.021**	−11.6
Six qualifying conditions	49	−6	−13	1	0.188	−11.7
Acute care transition expenditures						
All-cause	**9,030**	**−681**	−1,192	−170	**0.028**	−7.5
Potentially avoidable	2,450	−88	−264	88	0.411	−3.6
Six qualifying conditions	**1,312**	**−169**	−286	−52	**0.017**	−12.9

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-6. AQAF (AL): NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	31.2	−2.0	−4.4	0.3	0.157	−6.5
Potentially avoidable	16.0	−1.3	−3.2	0.5	0.237	−8.3
Six qualifying conditions	9.8	−1.5	−3.1	0.2	0.144	−15.1
Any emergency department visit						
All-cause	**30.5**	**−5.8**	**−8.8**	**−2.8**	**0.001**	**−19.0**
Potentially avoidable	**18.0**	**−4.1**	**−6.3**	**−1.9**	**0.002**	**−22.9**
Six qualifying conditions	**5.3**	**−1.4**	**−2.7**	**−0.1**	**0.082**	**−26.2**
Any acute care transition						
All-cause	**47.4**	**−5.0**	**−7.8**	**−2.2**	**0.004**	**−10.6**
Potentially avoidable	**29.2**	**−4.3**	**−6.9**	**−1.6**	**0.009**	**−14.6**
Six qualifying conditions	**14.1**	**−2.6**	**−4.6**	**−0.7**	**0.029**	**−18.7**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	**25,572**	**−1,651**	**−2,796**	**−506**	**0.018**	**−6.5**
Hospitalization expenditures						
All-cause	**7,635**	**−1,240**	**−2,001**	**−480**	**0.007**	**−16.2**
Potentially avoidable	2,303	−263	−581	54	0.173	−11.4
Six qualifying conditions	**1,214**	**−279**	**−513**	**−44**	**0.051**	**−23.0**
Emergency department visit expenditures						
All-cause	**316**	**−89**	**−125**	**−53**	**0.000**	**−28.3**
Potentially avoidable	**142**	**−43**	**−61**	**−24**	**0.000**	**−30.0**
Six qualifying conditions	**43**	**−16**	**−28**	**−3**	**0.040**	**−36.1**
Acute care transition expenditures						
All-cause	**8,045**	**−1,246**	**−1,945**	**−547**	**0.003**	**−15.5**
Potentially avoidable	**2,471**	**−295**	**−584**	**−5**	**0.094**	**−11.9**
Six qualifying conditions	**1,259**	**−299**	**−525**	**−73**	**0.029**	**−23.8**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-7.   AQAF (AL): NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	31.8	−2.4	−4.8	0.1	0.109	−7.5
Potentially avoidable	15.3	−1.0	−2.9	1.0	0.408	−6.4
Six qualifying conditions	**9.0**	**−1.7**	**−2.9**	**−0.5**	**0.015**	**−19.0**
Any emergency department visit						
All-cause	**30.7**	**−6.5**	**−9.6**	**−3.3**	**0.001**	**−21.0**
Potentially avoidable	**17.7**	**−3.3**	**−5.6**	**−1.0**	**0.019**	**−18.5**
Six qualifying conditions	**5.1**	**−1.7**	**−2.9**	**−0.5**	**0.021**	**−32.7**
Any acute care transition						
All-cause	**47.8**	**−5.8**	**−9.1**	**−2.5**	**0.004**	**−12.1**
Potentially avoidable	**28.5**	**−3.9**	**−6.9**	**−1.0**	**0.029**	**−13.8**
Six qualifying conditions	**13.2**	**−3.2**	**−4.7**	**−1.7**	**0.001**	**−24.3**
Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	29,214	−445	−2,419	1,529	0.711	−1.5
Hospitalization expenditures						
All-cause	**8,833**	**−956**	**−1,805**	**−107**	**0.064**	**−10.8**
Potentially avoidable	2,399	−76	−480	327	0.756	−3.2
Six qualifying conditions	1,215	−189	−384	6	0.110	−15.6
Emergency department visit expenditures						
All-cause	**386**	**−123**	**−169**	**−77**	**0.000**	**−31.9**
Potentially avoidable	**164**	**−53**	**−76**	**−31**	**0.000**	**−32.5**
Six qualifying conditions	**49**	**−21**	**−35**	**−7**	**0.015**	**−41.9**
Acute care transition expenditures						
All-cause	**9,391**	**−1,057**	**−1,900**	**−213**	**0.039**	**−11.3**
Potentially avoidable	2,607	−131	−519	258	0.580	−5.0
Six qualifying conditions	**1,272**	**−224**	**−414**	**−35**	**0.051**	**−17.6**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-8. AQAF (AL): NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	29.5	−1.1	−3.6	1.4	0.467	−3.7
Potentially avoidable	14.0	0.5	−1.0	2.0	0.585	3.5
Six qualifying conditions	9.0	−0.8	−2.2	0.5	0.307	−9.4
Any emergency department visit						
All-cause	29.1	−2.4	−5.2	0.4	0.152	−8.4
Potentially avoidable	**17.3**	**−2.4**	**−4.3**	**−0.6**	**0.030**	**−14.1**
Six qualifying conditions	5.2	−0.8	−2.3	0.6	0.350	−15.9
Any acute care transition						
All-cause	45.5	−2.9	−6.1	0.3	0.142	−6.3
Potentially avoidable	26.8	−1.6	−3.8	0.6	0.228	−6.0
Six qualifying conditions	13.0	−1.5	−3.5	0.6	0.248	−11.2

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	27,201	−480	−1,900	941	0.579	−1.8
Hospitalization expenditures						
All-cause	7,237	−750	−1,541	40	0.118	−10.4
Potentially avoidable	2,151	−185	−451	80	0.251	−8.6
Six qualifying conditions	1,184	−160	−360	41	0.191	−13.5
Emergency department visit expenditures						
All-cause	**338**	**−85**	**−126**	**−43**	**0.001**	**−25.1**
Potentially avoidable	**148**	**−32**	**−50**	**−15**	**0.003**	**−21.9**
Six qualifying conditions	49	−14	−28	1	0.115	−28.1
Acute care transition expenditures						
All-cause	**7,761**	**−909**	**−1,751**	**−67**	**0.076**	**−11.7**
Potentially avoidable	2,315	−198	−450	54	0.197	−8.5
Six qualifying conditions	1,246	−190	−416	37	0.168	−15.2

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-9. ATOP2 (NV): NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	27.2	1.0	−1.6	3.6	0.524	3.7
Potentially avoidable	12.6	−0.6	−2.4	1.3	0.622	−4.4
Six qualifying conditions	6.7	−0.4	−1.6	0.7	0.521	−6.5
Any emergency department visit						
All-cause	18.3	2.0	−0.9	4.8	0.257	10.7
Potentially avoidable	9.5	1.6	−1.3	4.6	0.355	17.3
Six qualifying conditions	1.4	1.1	−0.4	2.5	0.236	74.3
Any acute care transition						
All-cause	37.8	2.0	−0.9	5.0	0.259	5.4
Potentially avoidable	20.0	0.8	−1.5	3.0	0.578	3.8
Six qualifying conditions	8.0	0.3	−1.4	2.0	0.762	3.9

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	30,340	−557	−3,528	2,414	0.758	−1.8
Hospitalization expenditures						
All-cause	13,053	−976	−3,403	1,451	0.508	−7.5
Potentially avoidable	2,827	−374	−970	221	0.301	−13.2
Six qualifying conditions	1,197	−35	−300	230	0.827	−3.0
Emergency department visit expenditures						
All-cause	**249**	**117**	**45**	**189**	**0.008**	**47.0**
Potentially avoidable	**81**	**52**	**14**	**91**	**0.026**	**64.0**
Six qualifying conditions	14	14	−4	31	0.213	96.8
Acute care transition expenditures						
All-cause	13,811	−952	−3,585	1,682	0.552	−6.9
Potentially avoidable	3,064	−402	−1,128	324	0.362	−13.1
Six qualifying conditions	1,242	−24	−353	305	0.904	−1.9

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-10. ATOP2 (NV): NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	26.7	−0.2	−2.3	2.0	0.904	−0.6
Potentially avoidable	11.6	−0.2	−1.4	1.0	0.766	−1.8
Six qualifying conditions	6.0	−0.1	−0.9	0.6	0.753	−2.3
Any emergency department visit						
All-cause	18.4	3.1	−0.2	6.3	0.122	16.7
Potentially avoidable	9.5	1.8	−0.8	4.5	0.253	19.4
Six qualifying conditions	**1.5**	**1.1**	**0.3**	**1.9**	**0.028**	**72.8**
Any acute care transition						
All-cause	37.3	1.3	−1.5	4.1	0.443	3.5
Potentially avoidable	19.1	0.8	−1.5	3.0	0.576	3.9
Six qualifying conditions	7.5	0.4	−0.7	1.4	0.580	4.8

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	32,922	1,268	−1,670	4,207	0.478	3.9
Hospitalization expenditures						
All-cause	13,440	−1,030	−3,398	1,338	0.474	−7.7
Potentially avoidable	2,621	−1	−532	529	0.997	0.0
Six qualifying conditions	1,082	221	−132	574	0.303	20.4
Emergency department visit expenditures						
All-cause	287	75	−5	156	0.122	26.3
Potentially avoidable	**92**	**36**	**1**	**71**	**0.091**	**38.9**
Six qualifying conditions	**16**	**15**	**1**	**29**	**0.070**	**93.8**
Acute care transition expenditures						
All-cause	14,321	−1,279	−3,694	1,137	0.384	−8.9
Potentially avoidable	2,872	−52	−709	605	0.897	−1.8
Six qualifying conditions	1,136	220	−195	635	0.383	19.4

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-11.   ATOP2 (CO): NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	20.9	−1.3	−3.9	1.2	0.393	−6.4
Potentially avoidable	9.0	−1.0	−2.8	0.8	0.374	−11.1
Six qualifying conditions	4.8	−0.6	−1.9	0.8	0.481	−12.0
Any emergency department visit						
All-cause	23.6	0.2	−2.6	2.9	0.921	0.7
Potentially avoidable	14.0	−0.9	−2.8	1.0	0.435	−6.3
Six qualifying conditions	5.8	−1.0	−2.5	0.5	0.252	−17.9
Any acute care transition						
All-cause	34.8	−0.1	−3.4	3.2	0.968	−0.2
Potentially avoidable	19.1	−0.4	−2.8	2.1	0.806	−1.9
Six qualifying conditions	8.7	−0.7	−2.5	1.2	0.553	−7.5

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	22,716	−316	−2,027	1,395	0.761	−1.4
Hospitalization expenditures						
All-cause	5,780	−675	−1,444	94	0.149	−11.7
Potentially avoidable	1,540	−70	−462	321	0.768	−4.6
Six qualifying conditions	750	−78	−319	163	0.595	−10.4
Emergency department visit expenditures						
All-cause	329	43	−26	112	0.301	13.2
Potentially avoidable	164	−7	−38	25	0.736	−4.0
Six qualifying conditions	70	−10	−32	12	0.445	−14.6
Acute care transition expenditures						
All-cause	**6,169**	**−685**	**−1,325**	**−46**	**0.078**	**−11.1**
Potentially avoidable	1,730	−99	−431	232	0.623	−5.7
Six qualifying conditions	833	−100	−328	127	0.468	−12.1

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-12.   MOQI (MO): NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**33.9**	**−6.8**	**−9.1**	**−4.6**	**0.000**	**−20.1**
Potentially avoidable	**18.2**	**−5.4**	**−7.2**	**−3.7**	**0.000**	**−29.9**
Six qualifying conditions	**12.4**	**−5.2**	**−6.8**	**−3.5**	**0.000**	**−41.5**
Any emergency department visit						
All-cause	**27.5**	**−7.5**	**−9.9**	**−5.1**	**0.000**	**−27.2**
Potentially avoidable	**14.8**	**−4.5**	**−6.3**	**−2.7**	**0.000**	**−30.3**
Six qualifying conditions	**4.3**	**−2.3**	**−3.3**	**−1.3**	**0.000**	**−54.0**
Any acute care transition						
All-cause	**48.3**	**−9.8**	**−13.1**	**−6.5**	**0.000**	**−20.3**
Potentially avoidable	**29.2**	**−8.5**	**−10.9**	**−6.1**	**0.000**	**−29.1**
Six qualifying conditions	**15.8**	**−7.1**	**−8.9**	**−5.3**	**0.000**	**−45.2**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	25,354	−580	−1,712	552	0.399	−2.3
Hospitalization expenditures						
All-cause	**7,383**	**−1,106**	**−1,783**	**−428**	**0.007**	**−15.0**
Potentially avoidable	**2,498**	**−419**	**−733**	**−105**	**0.028**	**−16.8**
Six qualifying conditions	**1,589**	**−519**	**−792**	**−246**	**0.002**	**−32.7**
Emergency department visit expenditures						
All-cause	**295**	**−82**	**−114**	**−50**	**0.000**	**−27.9**
Potentially avoidable	**119**	**−37**	**−56**	**−19**	**0.001**	**−31.3**
Six qualifying conditions	**34**	**−15**	**−25**	**−6**	**0.007**	**−45.0**
Acute care transition expenditures						
All-cause	**7,672**	**−1,067**	**−1,890**	**−244**	**0.033**	**−13.9**
Potentially avoidable	**2,616**	**−471**	**−834**	**−107**	**0.033**	**−18.0**
Six qualifying conditions	**1,635**	**−548**	**−809**	**−287**	**0.001**	**−33.5**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-13. MOQI (MO): NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**33.7**	**−8.3**	**−11.9**	**−4.7**	**0.000**	**−24.7**
Potentially avoidable	**17.0**	**−5.9**	**−8.6**	**−3.3**	**0.000**	**−34.9**
Six qualifying conditions	**11.1**	**−4.6**	**−6.4**	**−2.8**	**0.000**	**−41.5**
Any emergency department visit						
All-cause	**27.7**	**−8.4**	**−11.7**	**−5.0**	**0.000**	**−30.3**
Potentially avoidable	**14.7**	**−4.6**	**−6.8**	**−2.3**	**0.001**	**−31.2**
Six qualifying conditions	**4.3**	**−1.8**	**−2.8**	**−0.9**	**0.002**	**−42.7**
Any acute care transition						
All-cause	**48.3**	**−11.8**	**−16.3**	**−7.2**	**0.000**	**−24.4**
Potentially avoidable	**28.3**	**−9.5**	**−12.5**	**−6.5**	**0.000**	**−33.5**
Six qualifying conditions	**14.9**	**−6.3**	**−8.2**	**−4.4**	**0.000**	**−42.6**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	27,747	−35	−1,479	1,409	0.968	−0.1
Hospitalization expenditures						
All-cause	**7,722**	**−1,295**	**−2,291**	**−298**	**0.033**	**−16.8**
Potentially avoidable	**2,377**	**−679**	**−1,085**	**−273**	**0.006**	**−28.6**
Six qualifying conditions	**1,427**	**−558**	**−839**	**−277**	**0.001**	**−39.1**
Emergency department visit expenditures						
All-cause	**342**	**−97**	**−147**	**−47**	**0.002**	**−28.3**
Potentially avoidable	**133**	**−40**	**−69**	**−11**	**0.023**	**−30.2**
Six qualifying conditions	**39**	**−14**	**−25**	**−4**	**0.025**	**−37.2**
Acute care transition expenditures						
All-cause	**8,083**	**−1,233**	**−2,296**	**−170**	**0.056**	**−15.3**
Potentially avoidable	**2,510**	**−696**	**−1,087**	**−305**	**0.003**	**−27.7**
Six qualifying conditions	**1,482**	**−587**	**−831**	**−343**	**0.000**	**−39.6**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-14.   MOQI (MO): NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	29.2	−0.3	−3.0	2.4	0.859	−1.0
Potentially avoidable	14.9	−0.2	−2.1	1.8	0.873	−1.3
Six qualifying conditions	9.4	−0.9	−2.3	0.5	0.307	−9.3
Any emergency department visit						
All-cause	30.2	−0.1	−3.4	3.2	0.959	−0.3
Potentially avoidable	18.7	−0.6	−3.0	1.8	0.674	−3.3
Six qualifying conditions	5.9	0.7	−0.2	1.5	0.191	11.4
Any acute care transition						
All-cause	45.4	0.3	−2.8	3.4	0.856	0.7
Potentially avoidable	28.1	−0.2	−2.7	2.4	0.920	−0.6
Six qualifying conditions	13.1	0.0	−1.5	1.4	0.964	−0.3

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	26,278	−293	−1,994	1,408	0.777	−1.1
Hospitalization expenditures						
All-cause	6,994	−185	−1,014	643	0.713	−2.6
Potentially avoidable	2,207	162	−192	517	0.451	7.4
Six qualifying conditions	1,278	−99	−329	131	0.479	−7.7
Emergency department visit expenditures						
All-cause	427	−13	−83	58	0.768	−3.0
Potentially avoidable	199	−16	−48	16	0.420	−7.9
Six qualifying conditions	64	5	−11	21	0.623	7.4
Acute care transition expenditures						
All-cause	7,504	−198	−1,177	782	0.740	−2.6
Potentially avoidable	2,432	117	−256	489	0.606	4.8
Six qualifying conditions	1,350	−110	−348	128	0.448	−8.2

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-15. NY-RAH (NY): NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**31.7**	**−2.5**	**−4.5**	**−0.5**	**0.042**	**−7.8**
Potentially avoidable	**14.0**	**−1.7**	**−3.3**	**−0.1**	**0.075**	**−12.2**
Six qualifying conditions	7.4	−0.3	−1.4	0.8	0.634	−4.3
Any emergency department visit						
All-cause	17.7	−0.2	−2.1	1.7	0.882	−1.0
Potentially avoidable	9.0	−0.5	−1.7	0.6	0.461	−5.9
Six qualifying conditions	1.7	−0.1	−0.4	0.3	0.697	−4.8
Any acute care transition						
All-cause	40.3	−2.0	−4.6	0.5	0.194	−5.0
Potentially avoidable	21.0	−1.9	−4.0	0.2	0.142	−9.0
Six qualifying conditions	8.9	−0.6	−1.8	0.6	0.401	−7.0

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	34,898	647	−1,869	3,163	0.672	1.9
Hospitalization expenditures						
All-cause	16,383	−945	−2,135	244	0.191	−5.8
Potentially avoidable	4,082	−475	−986	36	0.126	−11.6
Six qualifying conditions	1,993	−28	−375	319	0.894	−1.4
Emergency department visit expenditures						
All-cause	**185**	**35**	**4**	**67**	**0.067**	**18.9**
Potentially avoidable	75	13	−1	27	0.139	17.2
Six qualifying conditions	12	4	0	9	0.111	34.3
Acute care transition expenditures						
All-cause	17,418	−1,193	−2,427	40	0.111	−6.9
Potentially avoidable	**4,270**	**−533**	**−1,037**	**−29**	**0.082**	**−12.5**
Six qualifying conditions	2,043	−37	−370	296	0.855	−1.8

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-16. NY-RAH (NY): NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**33.7**	**−6.2**	**−7.8**	**−4.5**	**0.000**	**−18.4**
Potentially avoidable	**14.4**	**−3.0**	**−4.7**	**−1.4**	**0.003**	**−21.0**
Six qualifying conditions	**7.5**	**−1.4**	**−2.6**	**−0.3**	**0.039**	**−19.2**
Any emergency department visit						
All-cause	18.9	0.1	−2.7	2.9	0.945	0.6
Potentially avoidable	9.5	0.1	−1.6	1.8	0.940	0.8
Six qualifying conditions	1.9	−0.2	−0.7	0.3	0.450	−12.4
Any acute care transition						
All-cause	**42.4**	**−4.8**	**−7.4**	**−2.1**	**0.003**	**−11.2**
Potentially avoidable	**21.8**	**−3.0**	**−5.8**	**−0.3**	**0.072**	**−13.9**
Six qualifying conditions	**9.3**	**−2.0**	**−3.3**	**−0.6**	**0.016**	**−21.5**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	41,360	669	−1,413	2,752	0.597	1.6
Hospitalization expenditures						
All-cause	**18,449**	**−2,789**	**−3,939**	**−1,639**	**0.000**	**−15.1**
Potentially avoidable	**4,314**	**−736**	**−1,331**	**−141**	**0.042**	**−17.1**
Six qualifying conditions	2,057	−215	−597	166	0.354	−10.5
Emergency department visit expenditures						
All-cause	**232**	**50**	**5**	**94**	**0.065**	**21.5**
Potentially avoidable	**90**	**26**	**4**	**47**	**0.047**	**28.6**
Six qualifying conditions	15	2	−3	8	0.472	15.9
Acute care transition expenditures						
All-cause	**19,775**	**−3,386**	**−4,821**	**−1,950**	**0.000**	**−17.1**
Potentially avoidable	**4,538**	**−802**	**−1,421**	**−183**	**0.033**	**−17.7**
Six qualifying conditions	2,125	−246	−642	151	0.309	−11.6

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-17.   NY-RAH (NY): NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**28.4**	**−3.9**	**−5.9**	**−2.0**	**0.001**	**−13.9**
Potentially avoidable	**11.9**	**−1.8**	**−3.3**	**−0.2**	**0.058**	**−14.7**
Six qualifying conditions	**7.0**	**−1.5**	**−2.8**	**−0.2**	**0.056**	**−21.8**
Any emergency department visit						
All-cause	**24.2**	**−4.1**	**−7.2**	**−0.9**	**0.033**	**−16.8**
Potentially avoidable	12.7	−1.9	−3.9	0.2	0.142	−14.6
Six qualifying conditions	2.6	−0.2	−0.9	0.5	0.698	−6.3
Any acute care transition						
All-cause	**41.7**	**−5.6**	**−8.5**	**−2.8**	**0.001**	**−13.5**
Potentially avoidable	**22.3**	**−3.5**	**−5.9**	**−1.0**	**0.019**	**−15.5**
Six qualifying conditions	**9.4**	**−1.9**	**−3.4**	**−0.4**	**0.044**	**−20.3**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	31,127	1,987	−1,636	5,611	0.367	6.4
Hospitalization expenditures						
All-cause	12,239	−1,616	−3,237	6	0.101	−13.2
Potentially avoidable	2,704	−227	−686	231	0.415	−8.4
Six qualifying conditions	1,435	−163	−488	162	0.409	−11.4
Emergency department visit expenditures						
All-cause	286	−2	−45	42	0.944	−0.7
Potentially avoidable	117	−4	−25	18	0.788	−3.0
Six qualifying conditions	**21**	**7**	**0**	**15**	**0.086**	**35.2**
Acute care transition expenditures						
All-cause	**12,925**	**−1,962**	**−3,796**	**−128**	**0.078**	**−15.2**
Potentially avoidable	2,897	−297	−750	155	0.280	−10.3
Six qualifying conditions	1,509	−195	−506	116	0.302	−12.9

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

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Table X-18. OPTIMISTIC (IN): NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	24.2	−0.2	−2.9	2.4	0.882	−1.0
Potentially avoidable	11.6	−0.9	−3.0	1.3	0.508	−7.4
Six qualifying conditions	**6.5**	**−1.4**	**−2.7**	**−0.1**	**0.087**	**−21.6**
Any emergency department visit						
All-cause	21.2	−0.6	−3.4	2.1	0.707	−3.0
Potentially avoidable	13.5	−1.7	−3.7	0.4	0.185	−12.4
Six qualifying conditions	2.9	0.0	−1.0	1.0	0.977	0.7
Any acute care transition						
All-cause	37.3	−1.3	−4.5	2.0	0.517	−3.4
Potentially avoidable	22.4	−2.5	−5.8	0.9	0.228	−11.0
Six qualifying conditions	**9.3**	**−1.8**	**−3.5**	**0.0**	**0.096**	**−19.2**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	29,784	126	−1,740	1,992	0.912	0.4
Hospitalization expenditures						
All−cause	7,864	−227	−1,300	846	0.728	−2.9
Potentially avoidable	2,464	−221	−711	269	0.458	−9.0
Six qualifying conditions	**1,211**	**−318**	**−594**	**−42**	**0.058**	**−26.3**
Emergency department visit expenditures						
All-cause	270	−21	−69	28	0.477	−7.8
Potentially avoidable	125	−16	−42	10	0.325	−12.5
Six qualifying conditions	26	3	−7	13	0.610	12.3
Acute care transition expenditures						
All-cause	8,309	−216	−1,316	885	0.747	−2.6
Potentially avoidable	2,621	−209	−722	305	0.504	−8.0
Six qualifying conditions	**1,249**	**−318**	**−631**	**−5**	**0.094**	**−25.5**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

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Table X-19. OPTIMISTIC (IN): NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	25.6	−0.7	−3.4	2.0	0.655	−2.9
Potentially avoidable	11.6	0.1	−1.8	2.0	0.922	1.0
Six qualifying conditions	6.4	−0.6	−2.0	0.8	0.472	−9.7
Any emergency department visit						
All-cause	22.9	−2.8	−6.0	0.3	0.140	−12.4
Potentially avoidable	14.1	−2.7	−5.5	0.2	0.121	−18.9
Six qualifying conditions	3.2	−0.6	−1.8	0.7	0.476	−17.3
Any acute care transition						
All-cause	39.2	−2.9	−6.3	0.6	0.170	−7.3
Potentially avoidable	22.9	−2.1	−5.7	1.5	0.346	−9.0
Six qualifying conditions	9.5	−1.5	−3.6	0.6	0.234	−16.0

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	34,759	−1,615	−3,869	640	0.239	−4.6
Hospitalization expenditures						
All-cause	8,725	−607	−1,792	579	0.400	−7.0
Potentially avoidable	2,522	52	−436	540	0.861	2.1
Six qualifying conditions	1,215	−65	−384	253	0.736	−5.4
Emergency department visit expenditures						
All-cause	**342**	**−77**	**−131**	**−23**	**0.018**	**−22.7**
Potentially avoidable	**151**	**−37**	**−70**	**−4**	**0.067**	**−24.7**
Six qualifying conditions	32	1	−14	15	0.933	2.3
Acute care transition expenditures						
All-cause	9,285	−782	−1,980	416	0.283	−8.4
Potentially avoidable	2,714	5	−561	571	0.988	0.2
Six qualifying conditions	1,266	−100	−461	262	0.650	−7.9

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. *Acute care transitions* include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

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Table X-20. OPTIMISTIC (IN): NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	24.8	0.2	−1.9	2.4	0.870	0.8
Potentially avoidable	11.7	0.5	−1.0	2.0	0.596	4.1
Six qualifying conditions	7.1	−0.6	−2.1	0.8	0.466	−8.9
Any emergency department visit						
All-cause	**30.2**	**−4.4**	**−7.8**	**−1.0**	**0.034**	**−14.6**
Potentially avoidable	17.1	−2.3	−4.8	0.3	0.155	−13.2
Six qualifying conditions	**5.6**	**−1.7**	**−3.5**	**0.0**	**0.093**	**−31.2**
Any acute care transition						
All-cause	41.8	−2.4	−6.0	1.1	0.260	−5.8
Potentially avoidable	23.8	−0.7	−3.4	2.1	0.692	−2.8
Six qualifying conditions	10.7	−1.4	−3.2	0.4	0.207	−13.1

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	27,875	376	−1,298	2,050	0.712	1.3
Hospitalization expenditures						
All-cause	6,431	459	−268	1,186	0.299	7.1
Potentially avoidable	**1,948**	**377**	**39**	**716**	**0.067**	**19.4**
Six qualifying conditions	1,038	11	−235	258	0.940	1.1
Emergency department visit expenditures						
All-cause	415	−39	−104	26	0.327	−9.4
Potentially avoidable	171	−2	−36	32	0.925	−1.1
Six qualifying conditions	62	−15	−36	6	0.229	−24.6
Acute care transition expenditures						
All-cause	6,878	527	−231	1,286	0.253	7.7
Potentially avoidable	2,174	383	−44	810	0.140	17.6
Six qualifying conditions	1,112	−11	−268	245	0.941	−1.0

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-21. RAVEN (PA): NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**28.9**	**−6.7**	**−8.8**	**−4.6**	**0.000**	**−23.2**
Potentially avoidable	**13.8**	**−3.8**	**−5.3**	**−2.3**	**0.000**	**−27.7**
Six qualifying conditions	**9.0**	**−3.3**	**−4.9**	**−1.8**	**0.000**	**−37.0**
Any emergency department visit						
All-cause	**24.4**	**−6.2**	**−8.7**	**−3.7**	**0.000**	**−25.4**
Potentially avoidable	**12.9**	**−3.3**	**−4.6**	**−2.0**	**0.000**	**−25.6**
Six qualifying conditions	3.3	−0.6	−1.6	0.4	0.293	−19.4
Any acute care transition						
All-cause	**42.9**	**−10.7**	**−13.3**	**−8.1**	**0.000**	**−25.0**
Potentially avoidable	**24.3**	**−7.1**	**−9.2**	**−5.0**	**0.000**	**−29.3**
Six qualifying conditions	**11.7**	**−3.9**	**−5.8**	**−2.0**	**0.001**	**−33.7**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	**29,377**	**−4,284**	**−6,248**	**−2,321**	**0.000**	**−14.6**
Hospitalization expenditures						
All-cause	**7,430**	**−1,507**	**−2,391**	**−624**	**0.005**	**−20.3**
Potentially avoidable	**2,136**	**−546**	**−895**	**−198**	**0.010**	**−25.6**
Six qualifying conditions	**1,262**	**−431**	**−727**	**−136**	**0.016**	**−34.2**
Emergency department visit expenditures						
All-cause	**269**	**−77**	**−114**	**−39**	**0.001**	**−28.5**
Potentially avoidable	**108**	**−24**	**−44**	**−5**	**0.041**	**−22.4**
Six qualifying conditions	28	1	−11	13	0.882	3.8
Acute care transition expenditures						
All-cause	**7,690**	**−1,511**	**−2,442**	**−580**	**0.008**	**−19.6**
Potentially avoidable	**2,248**	**−552**	**−880**	**−224**	**0.006**	**−24.6**
Six qualifying conditions	**1,301**	**−434**	**−722**	**−146**	**0.013**	**−33.4**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-22.   RAVEN (PA): NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**27.7**	**−7.0**	**−9.9**	**−4.0**	**0.000**	**−25.1**
Potentially avoidable	**12.7**	**−2.7**	**−4.6**	**−0.8**	**0.020**	**−21.5**
Six qualifying conditions	7.9	**−2.6**	**−4.4**	**−0.9**	**0.011**	**−33.2**
Any emergency department visit						
All-cause	**24.4**	**−5.5**	**−9.3**	**−1.6**	**0.020**	**−22.5**
Potentially avoidable	**12.9**	**−3.0**	**−5.5**	**−0.5**	**0.047**	**−23.5**
Six qualifying conditions	3.2	−0.4	−1.7	0.8	0.568	−13.3
Any acute care transition						
All-cause	**41.9**	**−10.3**	**−14.6**	**−6.1**	**0.000**	**−24.6**
Potentially avoidable	**23.4**	**−6.1**	**−9.7**	**−2.5**	**0.005**	**−26.1**
Six qualifying conditions	**10.7**	**−3.4**	**−5.7**	**−1.0**	**0.017**	**−31.4**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	**31,006**	**−3,995**	**−7,450**	**−539**	**0.057**	**−12.9**
Hospitalization expenditures						
All-cause	**7,474**	**−1,348**	**−2,552**	**−144**	**0.066**	**−18.0**
Potentially avoidable	2,026	−303	−656	49	0.157	−15.0
Six qualifying conditions	**1,140**	**−319**	**−621**	**−17**	**0.083**	**−28.0**
Emergency department visit expenditures						
All-cause	**310**	**−85**	**−138**	**−32**	**0.009**	**−27.4**
Potentially avoidable	**124**	**−35**	**−62**	**−8**	**0.036**	**−28.1**
Six qualifying conditions	33	−2	−16	13	0.840	−5.4
Acute care transition expenditures						
All-cause	**7,810**	**−1,558**	**−2,822**	**−294**	**0.043**	**−19.9**
Potentially avoidable	2,164	−364	−744	16	0.115	−16.8
Six qualifying conditions	**1,189**	**−339**	**−644**	**−33**	**0.068**	**−28.5**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table X-23. RAVEN (PA): NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	28.6	−2.9	−5.2	−0.6	0.038	−10.2
Potentially avoidable	14.4	−2.4	−4.7	−0.1	0.081	−16.9
Six qualifying conditions	8.9	−2.1	−3.5	−0.6	0.017	−23.2
Any emergency department visit						
All-cause	23.7	−3.7	−6.8	−0.7	0.046	−15.7
Potentially avoidable	12.9	−3.0	−5.6	−0.4	0.061	−23.3
Six qualifying conditions	4.4	−1.4	−2.6	−0.3	0.047	−32.5
Any acute care transition						
All-cause	41.7	−5.1	−8.4	−1.9	0.010	−12.2
Potentially avoidable	24.3	−5.2	−8.7	−1.7	0.015	−21.3
Six qualifying conditions	12.8	−3.5	−5.7	−1.4	0.007	−27.6

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	30,591	−1,583	−3,356	190	0.142	−5.2
Hospitalization expenditures						
All-cause	7,459	−404	−1,147	338	0.370	−5.4
Potentially avoidable	2,379	−427	−917	62	0.151	−18.0
Six qualifying conditions	1,349	−335	−587	−84	0.028	−24.9
Emergency department visit expenditures						
All-cause	339	−82	−148	−16	0.042	−24.1
Potentially avoidable	145	−52	−93	−12	0.034	−36.1
Six qualifying conditions	53	−21	−46	4	0.166	−39.9
Acute care transition expenditures						
All-cause	7,869	−419	−1,131	294	0.334	−5.3
Potentially avoidable	2,526	−476	−932	−20	0.086	−18.8
Six qualifying conditions	1,413	−373	−635	−111	0.019	−26.4

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted probability or expenditure absent the Initiative* is the mean of the predicted probabilities or expenditures, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a nationally selected comparison group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted probability or expenditure absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, ED visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, SNF, home health, DME, lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

APPENDIX Y
SENSITIVITY ANALYSES FOR ASSESSING COMBINED NFI 1 AND NFI 2 EFFECTS ON UTILIZATION AND EXPENDITURE OUTCOMES, FY 2014–FY 2016 AND FY 2017–FY 2019

Y.1   Overview

In **Section III** and in **Appendix X** we presented the results of a difference-in-differences (DD) analysis that used a common baseline of FY 2012 to compare the estimated effects of three intervention groups (NFI 1 Clinical-Only [C-O] group during FY 2014–FY 2016, NFI 2 Clinical + Payment [C+P] group during FY 2017–FY 2019, and NFI 2 Payment-Only [P-O] group during FY 2017–FY 2019) on utilization and expenditure outcomes. In this appendix we present results from one sensitivity analysis to confirm the robustness of our results. In the main analysis, we used a national comparison group; in the sensitivity analysis we used a within-state reference group (WSRG). There were no other differences between the main models and the sensitivity models. We describe why we used a national comparison group in our main analysis instead of a WSRG in **Chapter II.5** and **Appendix I**.

Y.2   Results

We first present the complete hospital-related utilization and expenditure results of the WSRG sensitivity analysis for each of the three Initiative groups in **Table Y-1** (NFI 1 C-O group), **Table Y-2** (NFI 2 C+P group), and **Table Y-3** (NFI 2 P-O group) and then for the Payment-Only group during Phase 1, where no intervention took place, in **Table Y-4**.

For the NFI 1 C-O and the NFI 2 C+P groups, the sensitivity analysis results were very similar to the main analysis results. For the NFI 2 P-O group, the sensitivity analysis results were favorable but not as strongly favorable as the main analysis results. Lastly, for the P-O group during Phase 1, when no intervention took place, the sensitivity analysis showed little impact on the measures evaluated, while the main analysis results were more favorable.

After estimating the individual effects for each of the three Initiative groups, we then present the results of our analysis comparing the estimated effects of each Initiative group to the others. (**Tables Y-5** through **Y-10**). The results of this comparison analysis are very similar to that of the main comparison analysis. We found no meaningful differences between the NFI 1 C-O group and the NFI 2 C+P group or between the NFI 2 P-O group and the P-O group during FY 2014–FY 2016. This confirms our main findings that the payment interventions employed in NFI 2 had little to no effect on reducing hospital-related utilization and expenditures.

Table Y-1. All ECCPs: NFI 1 Clinical-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, WSRG sensitivity analysis, FY 2014–FY 2016

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**29.3**	**−2.2**	**−3.3**	**−1.1**	**0.001**	**−7.4**
Potentially avoidable	**14.0**	**−1.8**	**−2.6**	**−0.9**	**0.000**	**−12.6**
Six qualifying conditions	**8.0**	**−1.2**	**−1.9**	**−0.6**	**0.002**	**−15.2**
Any emergency department visit						
All-cause	**22.6**	**−2.5**	**−3.7**	**−1.3**	**0.001**	**−11.1**
Potentially avoidable	**12.7**	**−2.0**	**−2.8**	**−1.1**	**0.000**	**−15.5**
Six qualifying conditions	**3.2**	**−0.6**	**−1.0**	**−0.2**	**0.021**	**−19.1**
Any acute care transition						
All-cause	**41.7**	**−3.6**	**−5.0**	**−2.2**	**0.000**	**−8.6**
Potentially avoidable	**23.7**	**−3.2**	**−4.4**	**−2.0**	**0.000**	**−13.5**
Six qualifying conditions	**10.7**	**−1.9**	**−2.7**	**−1.1**	**0.000**	**−17.6**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	**30,218**	**−1,396**	**−2,387**	**−405**	**0.021**	**−4.6**
Hospitalization expenditures						
All-cause	**10,536**	**−1,139**	**−1,634**	**−645**	**0.000**	**−10.8**
Potentially avoidable	**2,831**	**−375**	**−574**	**−177**	**0.002**	**−13.3**
Six qualifying conditions	**1,426**	**−224**	**−361**	**−88**	**0.007**	**−15.7**
Emergency department visit expenditures						
All-cause	**260**	**−25**	**−44**	**−6**	**0.028**	**−9.8**
Potentially avoidable	**109**	**−13**	**−22**	**−3**	**0.026**	**−11.6**
Six qualifying conditions	28	−4	−8	1	0.233	−12.7
Acute care transition expenditures						
All-cause	**11,011**	**−1,133**	**−1,659**	**−606**	**0.000**	**−10.3**
Potentially avoidable	**2,984**	**−397**	**−603**	**−192**	**0.001**	**−13.3**
Six qualifying conditions	**1,465**	**−239**	**−374**	**−103**	**0.004**	**−16.3**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure or probability absent the Initiative* is the mean of the predicted expenditures or probabilities, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a within-state reference group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure or probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, skilled nursing (SNF), home health, durable medical equipment (DME), lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-2. All ECCPs: NFI 2 Clinical + Payment effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, WSRG sensitivity analysis, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	**29.4**	**−3.4**	**−4.5**	**−2.3**	**0.000**	**−11.6**
Potentially avoidable	**13.4**	**−1.7**	**−2.6**	**−0.9**	**0.001**	**−13.1**
Six qualifying conditions	**7.3**	**−1.2**	**−1.8**	**−0.6**	**0.001**	**−16.6**
Any emergency department visit						
All-cause	**22.8**	**−2.6**	**−4.1**	**−1.0**	**0.005**	**−11.2**
Potentially avoidable	**12.6**	**−1.7**	**−2.7**	**−0.7**	**0.005**	**−13.6**
Six qualifying conditions	**3.1**	**−0.7**	**−1.1**	**−0.3**	**0.007**	**−21.8**
Any acute care transition						
All-cause	**41.6**	**−4.5**	**−6.1**	**−2.9**	**0.000**	**−10.8**
Potentially avoidable	**23.2**	**−3.3**	**−4.7**	**−1.9**	**0.000**	**−14.1**
Six qualifying conditions	**10.0**	**−2.0**	**−2.8**	**−1.2**	**0.000**	**−19.9**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	**34,826**	**−1,371**	**−2,507**	**−235**	**0.047**	**−3.9**
Hospitalization expenditures						
All-cause	**11,865**	**−1,611**	**−2,184**	**−1,038**	**0.000**	**−13.6**
Potentially avoidable	**2,970**	**−386**	**−619**	**−153**	**0.006**	**−13.0**
Six qualifying conditions	**1,432**	**−184**	**−328**	**−41**	**0.034**	**−12.9**
Emergency department visit expenditures						
All-cause	**312**	**−40**	**−65**	**−16**	**0.007**	**−12.9**
Potentially avoidable	**127**	**−18**	**−30**	**−6**	**0.015**	**−14.2**
Six qualifying conditions	**32**	**−6**	**−11**	**−1**	0.070	**−18.2**
Acute care transition expenditures						
All-cause	**12,430**	**−1,727**	**−2,365**	**−1,089**	**0.000**	**−13.9**
Potentially avoidable	**3,142**	**−425**	**−668**	**−182**	**0.004**	**−13.5**
Six qualifying conditions	**1,476**	**−207**	**−351**	**−62**	**0.018**	**−14.0**

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure or probability absent the Initiative* is the mean of the predicted expenditures or probabilities, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a within-state reference group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure or probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, skilled nursing (SNF), home health, durable medical equipment (DME), lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-3. All ECCPs: NFI 2 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, WSRG sensitivity analysis, FY 2017–FY 2019

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	25.9	−0.6	−1.7	0.4	0.316	−2.4
Potentially avoidable	12.0	−0.3	−1.1	0.5	0.526	−2.4
Six qualifying conditions	7.0	−0.6	−1.2	0.0	0.118	−8.0
Any emergency department visit						
All-cause	**25.9**	**−2.2**	**−3.6**	**−0.7**	**0.015**	**−8.3**
Potentially avoidable	**15.0**	**−1.7**	**−2.8**	**−0.7**	**0.005**	**−11.6**
Six qualifying conditions	**4.5**	**−0.6**	**−1.1**	**−0.1**	**0.046**	**−13.8**
Any acute care transition						
All-cause	**40.5**	**−1.7**	**−3.2**	**−0.3**	**0.049**	**−4.3**
Potentially avoidable	**23.1**	**−1.4**	**−2.6**	**−0.2**	**0.057**	**−6.0**
Six qualifying conditions	**10.3**	**−0.8**	**−1.6**	**−0.1**	**0.068**	**−8.3**

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	28,760	−99	−1,282	1,084	0.891	−0.3
Hospitalization expenditures						
All-cause	**8,425**	**−498**	**−984**	**−12**	**0.092**	**−5.9**
Potentially avoidable	2,270	−61	−243	121	0.583	−2.7
Six qualifying conditions	1,193	−93	−211	24	0.189	−7.8
Emergency department visit expenditures						
All-cause	346	−24	−50	2	0.129	−7.0
Potentially avoidable	**154**	**−18**	**−31**	**−5**	**0.025**	**−11.7**
Six qualifying conditions	49	−6	−14	1	0.178	−12.3
Acute care transition expenditures						
All-cause	8,858	−508	−1,028	11	0.108	−5.7
Potentially avoidable	2,437	−76	−258	106	0.494	−3.1
Six qualifying conditions	1,251	−108	−226	9	0.130	−8.7

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure or probability absent the Initiative* is the mean of the predicted expenditures or probabilities, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a within-state reference group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure or probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, skilled nursing (SNF), home health, durable medical equipment (DME), lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-4. **All ECCPs: Phase 1 Payment-Only effect on hospital-related utilization and Medicare expenditures using a FY 2012 baseline, WSRG sensitivity analysis, FY 2014–FY 2016**

Measure	Predicted probability absent the Initiative (percent)	Initiative effect (percentage points)	90% CI		p-value	Relative effect (percent)
Any hospitalization						
All-cause	26.2	0.1	-0.8	0.9	0.903	0.2
Potentially avoidable	12.7	0.0	-0.7	0.7	0.922	0.3
Six qualifying conditions	7.8	-0.1	-0.6	0.5	0.777	-1.2
Any emergency department visit						
All-cause	**25.4**	**-1.4**	**-2.6**	**-0.2**	**0.062**	**-5.5**
Potentially avoidable	**14.7**	**-1.1**	**-2.0**	**-0.3**	**0.030**	**-7.6**
Six qualifying conditions	4.4	-0.4	-0.9	0.1	0.158	-8.9
Any acute care transition						
All-cause	40.7	-0.9	-2.1	0.3	0.209	-2.2
Potentially avoidable	23.6	-0.5	-1.6	0.5	0.383	-2.3
Six qualifying conditions	11.0	-0.2	-0.9	0.5	0.715	-1.4

Measure	Predicted expenditure absent the Initiative (dollars)	Initiative effect (dollars)	90% CI		p-value	Relative effect (percent)
Total Medicare expenditures	25,256	-46	-797	706	0.920	-0.2
Hospitalization expenditures						
All-cause	7,647	-10	-384	363	0.964	-0.1
Potentially avoidable	2,195	69	-82	221	0.452	3.2
Six qualifying conditions	1,218	19	-84	122	0.758	1.6
Emergency department visit expenditures						
All-cause	286	-11	-29	7	0.324	-3.8
Potentially avoidable	131	-9	-19	0	0.118	-7.1
Six qualifying conditions	42	-4	-9	2	0.240	-9.4
Acute care transition expenditures						
All-cause	8,009	-4	-403	395	0.987	0.0
Potentially avoidable	2,337	70	-84	223	0.455	3.0
Six qualifying conditions	1,269	13	-96	121	0.846	1.0

SOURCE: RTI analysis of Medicare claims data.

NOTE: The *predicted expenditure or probability absent the Initiative* is the mean of the predicted expenditures or probabilities, for the resident in the intervention group, under the scenario that the intervention did not occur. Predicted expenditures are based on a resident being eligible for the Initiative for the entire year (365 days). The *Initiative effect* is calculated based on a difference-in-differences regression model with a within-state reference group and adjusted for resident-level and facility-level characteristics. It is the difference between the predicted expenditures or probabilities with and without the intervention. The *relative effect* = (Initiative effect) / (predicted expenditure or probability absent the Initiative) calculated using unrounded values; calculating the relative Initiative effect using the rounded values in this table will yield different values than those reported here. The magnitude of a relative Initiative effect could be large when the underlying denominator—the predicted level of the measure—is small. In such cases, the relative Initiative effect should be interpreted with caution. Acute care transitions include hospitalizations, emergency department visits, or observation stays. Total expenditures cover all categories of Medicare spending: hospital, physician, skilled nursing (SNF), home health, durable medical equipment (DME), lab and other providers and suppliers, hospice, and Part D drugs.

Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-5. All ECCPs: Comparing the NFI intervention groups' effects on inpatient hospital utilization, WSRG sensitivity analysis, FY 2014–FY 2016 and FY 2017–FY 2019

Comparison	Difference in effect estimates (percentage points)	p-value
Any all-cause hospitalization		
[Phase 2 C+P] – [Phase 1 C-O]	−1.2	0.193
[Phase 2 P-O] – [Phase 1 C-O]	**1.5**	**0.091**
[Phase 2 C+P] – [Phase 2 P-O]	**−2.8**	**0.003**
[Phase 2 P-O] – [Phase 1 P-O]	−0.7	0.400
Any potentially avoidable hospitalization		
[Phase 2 C+P] – [Phase 1 C-O]	0.0	0.983
[Phase 2 P-O] – [Phase 1 C-O]	**1.5**	**0.031**
[Phase 2 C+P] – [Phase 2 P-O]	**−1.5**	**0.039**
[Phase 2 P-O] – [Phase 1 P-O]	−0.3	0.595
Any hospitalization due to the six qualifying conditions		
[Phase 2 C+P] – [Phase 1 C-O]	0.0	0.991
[Phase 2 P-O] – [Phase 1 C-O]	0.7	0.219
[Phase 2 C+P] – [Phase 2 P-O]	−0.6	0.204
[Phase 2 P-O] – [Phase 1 P-O]	−0.5	0.337

Phase 2 C+P = the Clinical + Payment group during FY 2017–FY 2019; Phase 1 C-O = the Clinical-Only group during FY 2014–FY 2016; Phase 2 P-O = the Payment-Only group during FY 2017–FY 2019; Phase 1 P-O = Residents in Payment-Only facilities during FY 2014–FY 2016 (no interventions took place in these facilities during this time)

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *difference in effect estimates* is the *Initiative effect* of the first group listed minus the *Initiative effect* of the second group listed. The Initiative effects of the different groups are displayed in ***Tables Y-1*** through ***Y-3***. The differences were calculated before any of the Initiative effects were rounded, so there may be slight differences between the differences listed in this table and the differences you would expect given the rounded values in ***Tables Y-1*** through ***Y-3***. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-6. All ECCPs: Comparing the NFI intervention groups' effects on ED utilization, WSRG sensitivity analysis, FY 2014–FY 2016 and FY 2017–FY 2019

Comparison	Difference in effect estimates (percentage points)	p-value
Any all-cause ED visit		
[Phase 2 C+P] – [Phase 1 C-O]	−0.0	0.970
[Phase 2 P-O] – [Phase 1 C-O]	0.4	0.760
[Phase 2 C+P] – [Phase 2 P-O]	−0.4	0.755
[Phase 2 P-O] – [Phase 1 P-O]	−0.8	0.513
Any potentially avoidable ED visit		
[Phase 2 C+P] – [Phase 1 C-O]	0.2	0.970
[Phase 2 P-O] – [Phase 1 C-O]	0.2	0.782
[Phase 2 C+P] – [Phase 2 P-O]	0.0	0.982
[Phase 2 P-O] – [Phase 1 P-O]	−0.6	0.446
Any ED visit due to the six qualifying conditions		
[Phase 2 C+P] – [Phase 1 C-O]	−0.1	0.825
[Phase 2 P-O] – [Phase 1 C-O]	−0.0	0.979
[Phase 2 C+P] – [Phase 2 P-O]	−0.1	0.982
[Phase 2 P-O] – [Phase 1 P-O]	−0.2	0.594

ED = emergency department; Phase 2 C+P = the Clinical + Payment group during FY 2017–FY 2019; Phase 1 C-O = the Clinical-Only group during FY 2014–FY 2016; Phase 2 P-O = the Payment-Only group during FY 2017–FY 2019; Phase 1 P-O = Residents in Payment-Only facilities during FY 2014–FY 2016 (no interventions took place in these facilities during this time)

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *difference in effect estimates* is the *Initiative effect* of the first group listed minus the *Initiative effect* of the second group listed. The Initiative effects of the different groups are displayed in ***Tables Y-1*** through ***Y-3***. The differences were calculated before any of the Initiative effects were rounded, so there may be slight differences between the differences listed in this table and the differences you would expect given the rounded values in ***Tables Y-1*** through ***Y-3***. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-7. All ECCPs: Comparing the NFI intervention groups' effects on acute care transition utilization, WSRG sensitivity analysis, FY 2014–FY 2016 and FY 2017–FY 2019

Comparison	Difference in effect estimates (percentage points)	p-value
Any all-cause ACT		
[Phase 2 C+P] – [Phase 1 C-O]	−0.9	0.491
[Phase 2 P-O] – [Phase 1 C-O]	1.9	0.133
[Phase 2 C+P] – [Phase 2 P-O]	**−2.7**	**0.035**
[Phase 2 P-O] – [Phase 1 P-O]	−0.8	0.469
Any potentially avoidable ACT		
[Phase 2 C+P] – [Phase 1 C-O]	−0.1	0.958
[Phase 2 P-O] – [Phase 1 C-O]	**1.8**	**0.073**
[Phase 2 C+P] – [Phase 2 P-O]	**−1.9**	**0.091**
[Phase 2 P-O] – [Phase 1 P-O]	−0.8	0.377
Any ACT due to the six qualifying conditions		
[Phase 2 C+P] – [Phase 1 C-O]	−0.1	0.864
[Phase 2 P-O] – [Phase 1 C-O]	1.0	0.118
[Phase 2 C+P] – [Phase 2 P-O]	**−1.1**	**0.078**
[Phase 2 P-O] – [Phase 1 P-O]	−0.7	0.273

ACT = acute care transition; Phase 2 C+P = the Clinical + Payment group during FY 2017–FY 2019; Phase 1 C-O = the Clinical-Only group during FY 2014–FY 2016; Phase 2 P-O = the Payment-Only group during FY 2017–FY 2019; Phase 1 P-O = Residents in Payment-Only facilities during FY 2014–FY 2016 (no interventions took place in these facilities during this time)

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *difference in effect estimates* is the *Initiative effect* of the first group listed minus the *Initiative effect* of the second group listed. The Initiative effects of the different groups are displayed in **Tables Y-1** through **Y-3**. The differences were calculated before any of the Initiative effects were rounded, so there may be slight differences between the differences listed in this table and the differences you would expect given the rounded values in **Tables Y-1** through **Y-3**. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-8. All ECCPs: Comparing the NFI intervention groups' effects on total Medicare and inpatient hospitalization expenditures, WSRG sensitivity analysis, FY 2014–FY 2016 and FY 2017–FY 2019

Comparison	Difference in effect estimates (dollars)	p-value
Total Medicare expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	25	0.978
[Phase 2 P-O] – [Phase 1 C-O]	1,297	0.167
[Phase 2 C+P] – [Phase 2 P-O]	−1,272	0.202
[Phase 2 P-O] – [Phase 1 P-O]	−53	0.950
All-cause hospitalization expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	−472	0.306
[Phase 2 P-O] – [Phase 1 C-O]	641	0.128
[Phase 2 C+P] – [Phase 2 P-O]	**−1,113**	**0.015**
[Phase 2 P-O] – [Phase 1 P-O]	−488	0.190
Potentially avoidable hospitalization expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	−11	0.954
[Phase 2 P-O] – [Phase 1 C-O]	**315**	**0.055**
[Phase 2 C+P] – [Phase 2 P-O]	**−325**	**0.070**
[Phase 2 P-O] – [Phase 1 P-O]	−130	0.366
Six conditions hospitalization expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	40	0.740
[Phase 2 P-O] – [Phase 1 C-O]	131	0.232
[Phase 2 C+P] – [Phase 2 P-O]	−91	0.420
[Phase 2 P-O] – [Phase 1 P-O]	−113	0.234

Phase 2 C+P = the Clinical + Payment group during FY 2017–FY 2019; Phase 1 C-O = the Clinical-Only group during FY 2014–FY 2016; Phase 2 P-O = the Payment-Only group during FY 2017–FY 2019; Phase 1 P-O = Residents in Payment-Only facilities during FY 2014–FY 2016 (no interventions took place in these facilities during this time)

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *difference in effect estimates* is the *Initiative effect* of the first group listed minus the *Initiative effect* of the second group listed. The Initiative effects of the different groups are displayed in *Tables Y-1* through *Y-3*. The differences were calculated before any of the Initiative effects were rounded, so there may be slight differences between the differences listed in this table and the differences you would expect given the rounded values in *Tables Y-1* through *Y-3*. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-9. All ECCPs: Comparing the NFI intervention groups' effects on ED visit expenditures, WSRG sensitivity analysis, FY 2014–FY 2016 and FY 2017–FY 2019

Comparison	Difference in effect estimates (dollars)	p-value
All-cause ED visit expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	−15	0.427
[Phase 2 P-O] – [Phase 1 C-O]	1	0.948
[Phase 2 C+P] – [Phase 2 P-O]	−16	0.455
[Phase 2 P-O] – [Phase 1 P-O]	−13	0.490
Potentially avoidable ED visit expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	−5	0.564
[Phase 2 P-O] – [Phase 1 C-O]	−5	0.584
[Phase 2 C+P] – [Phase 2 P-O]	0	0.999
[Phase 2 P-O] – [Phase 1 P-O]	−9	0.386
Six conditions ED visit expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	−2	0.595
[Phase 2 P-O] – [Phase 1 C-O]	−3	0.631
[Phase 2 C+P] – [Phase 2 P-O]	0	0.960
[Phase 2 P-O] – [Phase 1 P-O]	−2	0.701

ED = emergency department; Phase 2 C+P = the Clinical + Payment group during FY 2017–FY 2019; Phase 1 C-O = the Clinical-Only group during FY 2014–FY 2016; Phase 2 P-O = the Payment-Only group during FY 2017–FY 2019; Phase 1 P-O = Residents in Payment-Only facilities during FY 2014–FY 2016 (no interventions took place in these facilities during this time)

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *difference in effect estimates* is the *Initiative effect* of the first group listed minus the *Initiative effect* of the second group listed. The Initiative effects of the different groups are displayed in *Tables Y-1* through *Y-3*. The differences were calculated before any of the Initiative effects were rounded, so there may be slight differences between the differences listed in this table and the differences you would expect given the rounded values in *Tables Y-1* through *Y-3*. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

Table Y-10.   All ECCPs: Comparing the NFI intervention groups' effects on acute care transition expenditures, WSRG sensitivity analysis, FY 2014–FY 2016 and FY 2017–FY 2019

Comparison	Difference in effect estimates (dollars)	p-value
All-cause ACT expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	−595	0.237
[Phase 2 P-O] – [Phase 1 C-O]	624	0.165
[Phase 2 C+P] – [Phase 2 P-O]	**−1,219**	**0.015**
[Phase 2 P-O] – [Phase 1 P-O]	−505	0.205
Potentially avoidable ACT expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	−28	0.886
[Phase 2 P-O] – [Phase 1 C-O]	**322**	**0.054**
[Phase 2 C+P] – [Phase 2 P-O]	**−349**	**0.058**
[Phase 2 P-O] – [Phase 1 P-O]	−145	0.315
Six conditions ACT expenditures		
[Phase 2 C+P] – [Phase 1 C-O]	32	0.787
[Phase 2 P-O] – [Phase 1 C-O]	131	0.231
[Phase 2 C+P] – [Phase 2 P-O]	−98	0.385
[Phase 2 P-O] – [Phase 1 P-O]	−121	0.213

ACT = acute care transition; Phase 2 C+P = the Clinical + Payment group during FY 2017–FY 2019; Phase 1 C-O = the Clinical-Only group during FY 2014–FY 2016; Phase 2 P-O = the Payment-Only group during FY 2017–FY 2019; Phase 1 P-O = Residents in Payment-Only facilities during FY 2014–FY 2016 (no interventions took place in these facilities during this time)

SOURCE: RTI analysis of Medicare claims data.

NOTES: The *difference in effect estimates* is the *Initiative effect* of the first group listed minus the *Initiative effect* of the second group listed. The Initiative effects of the different groups are displayed in *Tables Y-1* through *Y-3*. The differences were calculated before any of the Initiative effects were rounded, so there may be slight differences between the differences listed in this table and the differences you would expect given the rounded values in *Tables Y-1* through *Y-3*. Bold text indicates values are significantly different from zero based on a p-value cutoff of 0.1.

APPENDIX Z
EXAMPLE OF COMPLETE MULTIVARIATE LOGISTIC REGRESSION RESULTS, POTENTIALLY AVOIDABLE HOSPITALIZATION, FY 2014–FY 2019

Table Z-1 shows coefficient estimates (β), robust standard errors (SE), and p-values (p) from the complete logistic regression model predicting the probability of any potentially avoidable hospitalization per resident using a FY 2012 baseline. For illustration, we use the results from the pooled model combining all ECCPs. The other probability models discussed in *Section III* of the main report followed the same format.

Table Z-1. **All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019**

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
Payment-Only group	−0.218	0.050	<0.001
Clinical + Payment group	−0.131	0.047	0.005
FY 2013	−0.068	0.006	<0.001
FY 2013 * Payment-Only group	0.000	0.044	0.999
FY 2013 * Clinical + Payment group	−0.090	0.049	0.069
FY 2014–FY 2016	−0.116	0.008	<0.001
FY 2014–FY 2016 * Payment-Only group	−0.044	0.040	0.267
FY 2014–FY 2016 * Clinical + Payment group	−0.212	0.045	<0.001
FY 2017–FY 2019	−0.167	0.010	<0.001
FY 2017–FY 2019 * Payment-Only group	−0.084	0.045	0.064
FY 2017–FY 2019 * Clinical + Payment group	−0.224	0.050	<0.001
Within-state reference group (WSRG)	−0.129	0.027	<0.001
FY 2013 * WSRG	0.001	0.013	0.925
FY 2014–FY 2016 * WSRG	−0.048	0.012	<0.001
FY 2017–FY 2019 * WSRG	−0.054	0.014	<0.001
Proportion of deaths due to flu/pneumonia	3.468	0.406	<0.001
HCC count = 3–4	0.231	0.005	<0.001
HCC count = 5–7	0.446	0.007	<0.001
HCC count >= 8	0.492	0.011	<0.001
% MA residents = 10–19.9	−0.092	0.007	<0.001
% MA residents = 20–29.9	−0.140	0.009	<0.001
% MA residents >= 30	−0.203	0.011	<0.001
Exposure days 1–89	−0.419	0.004	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
Exposure days 90–179	0.214	0.004	<0.001
Exposure days 180–269	0.379	0.004	<0.001
Exposure days 270–364	0.560	0.004	<0.001
Male, <65	−0.065	0.008	<0.001
Female, 65–69	0.072	0.009	<0.001
Male, 65–69	0.010	0.010	0.289
Female, 70–74	0.142	0.009	<0.001
Male, 70–74	0.085	0.009	<0.001
Female, 75–79	0.186	0.008	<0.001
Male, 75–79	0.162	0.009	<0.001
Female, 80–84	0.212	0.008	<0.001
Male, 80–84	0.220	0.009	<0.001
Female, 85–89	0.229	0.008	<0.001
Male, 85–89	0.280	0.010	<0.001
Female, 90–94	0.206	0.009	<0.001
Male, 90–94	0.292	0.011	<0.001
Female, 95+	0.112	0.010	<0.001
Male, 95+	0.248	0.016	<0.001
Black, non-Hispanic	0.034	0.006	<0.001
Asian	0.041	0.018	0.024
Hispanic	0.107	0.015	<0.001
Other race/ethnicity	−0.022	0.010	0.032
Dementia	0.005	0.003	0.124
Anemia	0.087	0.003	<0.001
BMI <18.5	−0.082	0.006	<0.001
BMI = 25–29.9	0.007	0.003	0.030
BMI ≥30	0.067	0.004	<0.001
ADL score = 8–14	0.077	0.005	<0.001
ADL score = 15–21	−0.007	0.005	0.193
ADL score = 22–28	−0.076	0.007	<0.001
CFS= 1 (Mildly impaired)	−0.031	0.004	<0.001
CFS= 2 (Moderately impaired)	−0.043	0.004	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
CFS= 3 (severely impaired)	−0.102	0.007	<0.001
Urban Non-Metropolitan	0.113	0.009	<0.001
Rural	0.282	0.023	<0.001
Resident's mood assessment (PHQ)	0.005	0.001	<0.001
Neurogenic Bladder	0.103	0.008	<0.001
Obstructive Uropathy	0.001	0.013	0.946
Community Based Care Transition Program (CCTP)	0.607	0.030	<0.001
Comprehensive ESRD Care (CEC)	−0.026	0.031	0.393
Comprehensive Primary Care Initiative (CPCI)	−0.230	0.034	<0.001
Comprehensive Primary Care Plus (CPC+), non-SSP Participants	−0.246	0.029	<0.001
Comprehensive Primary Care Plus (CPC+), SSP Participants	−0.270	0.031	<0.001
Financial Alignment Initiative	0.128	0.029	<0.001
Next Generation Accountable Care Organization (NGACO)	0.048	0.013	<0.001
Pioneer Accountable Care Organization	0.002	0.014	0.865
Medicare Shared Savings Program	−0.021	0.006	<0.001
Maryland Total Cost of Care, Primary Care Program	−0.367	0.213	0.085
Vermont All-Payer ACO Model	0.041	0.140	0.770
FY 2012–FY 2013 * HIV/AIDS (HCC 1)	−0.047	0.047	0.316
FY 2014–FY 2016 * HIV/AIDS (HCC 1)	−0.110	0.040	0.006
FY 2017–FY 2019 * HIV/AIDS (HCC 1)	0.034	0.036	0.338
FY 2012–FY 2013 * Septicemia/Shock (HCC 2)	0.024	0.008	0.004
FY 2014–FY 2016 * Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	0.011	0.007	0.139
FY 2017–FY 2019 * Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock (HCC 2)	−0.021	0.008	0.006
FY 2012–FY 2013 * Opportunistic Infection (HCC 5)	−0.013	0.028	0.641
FY 2014–FY 2016 * Opportunistic Infections (HCC 6)	0.050	0.024	0.039
FY 2017–FY 2019 * Opportunistic Infections (HCC 6)	0.030	0.030	0.315
FY 2012–FY 2013 * Metastatic Cancer and Acute Leukemia (HCC 7)	−0.044	0.023	0.053
FY 2014–FY 2016 * Metastatic Cancer and Acute Leukemia (HCC 8)	−0.015	0.021	0.496

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2017–FY 2019 * Metastatic Cancer and Acute Leukemia (HCC 8)	−0.054	0.022	0.013
FY 2012–FY 2013 * Lung, Upper Digestive Tract, and Other Severe Cancers (HCC 8)	−0.016	0.023	0.466
FY 2014–FY 2016 * Lung and Other Severe Cancers (HCC 9)	0.043	0.018	0.017
FY 2017–FY 2019 * Lung and Other Severe Cancers (HCC 9)	0.000	0.020	0.993
FY 2012–FY 2013 * Lymphatic, Head and Neck, Brain, and Other Major Cancers (HCC 9)	0.009	0.018	0.613
FY 2014–FY 2016 * Lymphoma and Other Cancers (HCC 10)	0.038	0.018	0.036
FY 2017–FY 2019 * Lymphoma and Other Cancers (HCC 10)	−0.002	0.020	0.928
FY 2012–FY 2013 * Breast, Prostate, Colorectal and Other Cancers and Tumors (HCC 10)	−0.041	0.010	<0.001
FY 2014–FY 2016 * Colorectal, Bladder, and Other Cancers (HCC 11)	−0.026	0.015	0.075
FY 2017–FY 2019 * Colorectal, Bladder, and Other Cancers (HCC 11)	−0.048	0.017	0.003
FY 2012–FY 2013 * Diabetes with Renal or Peripheral Circulatory Manifestation or with Neurologic or Other Specified Manifestation or with Ophthalmologic or Unspecified Manifestation (HCC 15, 16, or 18)	0.140	0.006	<0.001
FY 2014–FY 2016 * Breast, Prostate, and Other Cancers and Tumors (HCC 12)	−0.042	0.011	<0.001
FY 2017–FY 2019 * Breast, Prostate, and Other Cancers and Tumors (HCC 12)	−0.040	0.011	<0.001
FY 2012–FY 2013 * Diabetes with Acute Complications (HCC 17)	0.056	0.035	0.111
FY 2014–FY 2016 * Diabetes with Acute Complications (HCC 17)	0.160	0.018	<0.001
FY 2017–FY 2019 * Diabetes with Acute Complications (HCC 17)	0.302	0.017	<0.001
FY 2014–FY 2016 * Diabetes with Chronic Complications (HCC 18)	0.164	0.006	<0.001
FY 2017–FY 2019 * Diabetes with Chronic Complications (HCC 18)	0.153	0.005	<0.001
FY 2014–FY 2016 * Diabetes without Complication (HCC 19)	0.056	0.006	<0.001
FY 2017–FY 2019 * Diabetes without Complication (HCC 19)	0.013	0.008	0.079
FY 2012–FY 2013 * Diabetes without Complication (HCC 19)	0.056	0.006	<0.001
FY 2014–FY 2016 * Protein-Calorie Malnutrition (HCC 21)	−0.014	0.008	0.061
FY 2017–FY 2019 * Protein-Calorie Malnutrition (HCC 21)	0.023	0.008	0.004

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2012–FY 2013 * Protein-Calorie Malnutrition (HCC 21)	−0.011	0.008	0.203
FY 2014–FY 2016 * Other Significant Endocrine and Metabolic Disorders (HCC 23)	0.049	0.009	<0.001
FY 2017–FY 2019 * Other Significant Endocrine and Metabolic Disorders (HCC 23)	0.079	0.009	<0.001
FY 2012–FY 2013 * End-Stage Liver Disease (HCC 25)	0.014	0.028	0.613
FY 2014–FY 2016 * End-Stage Liver Disease (HCC 27)	0.040	0.023	0.087
FY 2017–FY 2019 * End-Stage Liver Disease (HCC 27)	0.076	0.025	0.003
FY 2012–FY 2013 * Cirrhosis of Liver (HCC 26)	0.014	0.026	0.577
FY 2014–FY 2016 * Cirrhosis of Liver (HCC 28)	0.008	0.023	0.740
FY 2017–FY 2019 * Cirrhosis of Liver (HCC 28)	0.052	0.021	0.014
FY 2012–FY 2013 * Chronic Hepatitis (HCC 27)	0.052	0.036	0.145
FY 2014–FY 2016 * Chronic Hepatitis (HCC 29)	0.058	0.029	0.046
FY 2017–FY 2019 * Chronic Hepatitis (HCC 29)	0.044	0.025	0.084
FY 2012–FY 2013 * Intestinal Obstruction/Perforation (HCC 31)	0.039	0.011	<0.001
FY 2014–FY 2016 * Intestinal Obstruction/Perforation (HCC 33)	0.047	0.010	<0.001
FY 2017–FY 2019 * Intestinal Obstruction/Perforation (HCC 33)	0.035	0.011	0.001
FY 2012–FY 2013 * Pancreatic Disease (HCC 32)	0.022	0.017	0.178
FY 2014–FY 2016 * Chronic Pancreatitis (HCC 34)	0.095	0.033	0.004
FY 2017–FY 2019 * Chronic Pancreatitis (HCC 34)	0.043	0.033	0.192
FY 2012–FY 2013 * Inflammatory Bowel Disease (HCC 33)	0.033	0.023	0.155
FY 2014–FY 2016 * Inflammatory Bowel Disease (HCC 35)	0.091	0.021	<0.001
FY 2017–FY 2019 * Inflammatory Bowel Disease (HCC 35)	0.038	0.021	0.072
FY 2012–FY 2013 * Bone/Joint/Muscle Infections/Necrosis (HCC 37)	0.030	0.013	0.027
FY 2014–FY 2016 * Bone/Joint/Muscle Infections/Necrosis (HCC 39)	−0.004	0.012	0.720
FY 2017–FY 2019 * Bone/Joint/Muscle Infections/Necrosis (HCC 39)	0.002	0.012	0.842
FY 2012–FY 2013 * Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 38)	0.042	0.010	<0.001
FY 2014–FY 2016 * Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	0.024	0.009	0.008
FY 2017–FY 2019 * Rheumatoid Arthritis and Inflammatory Connective Tissue Disease (HCC 40)	0.039	0.009	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2012–FY 2013 * Severe Hematological Disorders (HCC 44)	0.081	0.019	<0.001
FY 2014–FY 2016 * Severe Hematological Disorders (HCC 46)	0.146	0.020	<0.001
FY 2017–FY 2019 * Severe Hematological Disorders (HCC 46)	0.079	0.022	<0.001
FY 2012–FY 2013 * Disorders of Immunity (HCC 45)	0.116	0.019	<0.001
FY 2014–FY 2016 * Disorders of Immunity (HCC 47)	0.076	0.015	<0.001
FY 2017–FY 2019 * Disorders of Immunity (HCC 47)	0.101	0.015	<0.001
FY 2012–FY 2013 * Drug/Alcohol Psychosis (HCC 51)	−0.070	0.018	<0.001
FY 2014–FY 2016 * Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	0.017	0.007	0.021
FY 2017–FY 2019 * Coagulation Defects and Other Specified Hematological Disorders (HCC 48)	0.006	0.008	0.430
FY 2012–FY 2013 * Drug/Alcohol Dependence (HCC 52)	−0.014	0.019	0.442
FY 2014–FY 2016 * Drug/Alcohol Psychosis (HCC 54)	−0.102	0.017	<0.001
FY 2017–FY 2019 * Drug/Alcohol Psychosis (HCC 54)	−0.124	0.024	<0.001
FY 2012–FY 2013 * Schizophrenia (HCC 54)	0.003	0.011	0.747
FY 2014–FY 2016 * Drug/Alcohol Dependence (HCC 55)	−0.020	0.015	0.180
FY 2017–FY 2019 * Drug/Alcohol Dependence (HCC 55)	−0.034	0.012	0.004
FY 2012–FY 2013 * Major Depressive, Bipolar, and Paranoid Disorders (HCC 55)	0.043	0.007	<0.001
FY 2014–FY 2016 * Schizophrenia (HCC 57)	0.031	0.011	0.006
FY 2017–FY 2019 * Schizophrenia (HCC 57)	0.070	0.011	<0.001
FY 2012–FY 2013 * Quadriplegia, Other Extensive Paralysis (HCC 67)	0.170	0.019	<0.001
FY 2014–FY 2016 * Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	0.043	0.006	<0.001
FY 2017–FY 2019 * Major Depressive, Bipolar, and Paranoid Disorders (HCC 58)	0.045	0.006	<0.001
FY 2012–FY 2013 * Paraplegia (HCC 68)	0.159	0.021	<0.001
FY 2014–FY 2016 * Quadriplegia (HCC 70)	0.143	0.017	<0.001
FY 2017–FY 2019 * Quadriplegia (HCC 70)	0.184	0.015	<0.001
FY 2012–FY 2013 * Spinal Cord Disorders/Injuries (HCC 69)	−0.034	0.020	0.097
FY 2014–FY 2016 * Paraplegia (HCC 71)	0.141	0.019	<0.001
FY 2017–FY 2019 * Paraplegia (HCC 71)	0.137	0.019	<0.001
FY 2012–FY 2013 * Muscular Dystrophy (HCC 70)	−0.020	0.058	0.733

(continued)

Table Z-1.   All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2014–FY 2016 * Spinal Cord Disorders/Injuries (HCC 72)	−0.000	0.018	0.989
FY 2017–FY 2019 * Spinal Cord Disorders/Injuries (HCC 72)	−0.006	0.021	0.765
FY 2012–FY 2013 * Polyneuropathy (HCC 71)	0.021	0.008	0.005
FY 2014–FY 2016 * Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	−0.011	0.048	0.815
FY 2017–FY 2019 * Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease (HCC 73)	0.081	0.049	0.099
FY 2012–FY 2013 * Multiple Sclerosis (HCC 72)	0.143	0.018	<0.001
FY 2014–FY 2016 * Cerebral Palsy (HCC 74)	−0.101	0.022	<0.001
FY 2017–FY 2019 * Cerebral Palsy (HCC 74)	−0.089	0.021	<0.001
FY 2012–FY 2013 * Parkinson's and Huntington's Diseases (HCC 73)	0.029	0.008	0.001
FY 2014–FY 2016 * Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	−0.021	0.019	0.257
FY 2017–FY 2019 * Myasthenia Gravis/Myoneural Disorders and Guillain-Barre Syndrome/Inflammatory and Toxic Neuropathy (HCC 75)	−0.062	0.018	0.001
FY 2012–FY 2013 * Seizure Disorders and Convulsions (HCC 74)	0.179	0.007	<0.001
FY 2014–FY 2016 * Muscular Dystrophy (HCC 76)	−0.015	0.052	0.771
FY 2017–FY 2019 * Muscular Dystrophy (HCC 76)	0.059	0.054	0.277
FY 2012–FY 2013 * Coma, Brain Compression/Anoxic Damage (HCC 75)	−0.165	0.021	<0.001
FY 2014–FY 2016 * Multiple Sclerosis (HCC 77)	0.074	0.017	<0.001
FY 2017–FY 2019 * Multiple Sclerosis (HCC 77)	0.040	0.018	0.026
FY 2014–FY 2016 * Parkinson's and Huntington's Diseases (HCC 78)	0.021	0.008	0.007
FY 2017–FY 2019 * Parkinson's and Huntington's Diseases (HCC 78)	0.036	0.008	<0.001
FY 2012–FY 2013 * Respiratory Arrest (HCC 78)	0.272	0.044	<0.001
FY 2014–FY 2016 * Seizure Disorders and Convulsions (HCC 79)	0.161	0.006	<0.001
FY 2017–FY 2019 * Seizure Disorders and Convulsions (HCC 79)	0.171	0.007	<0.001
FY 2012–FY 2013 * Cardio-Respiratory Failure and Shock (HCC 79)	0.338	0.007	<0.001
FY 2014–FY 2016 * Coma, Brain Compression/Anoxic Damage (HCC 80)	−0.160	0.018	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2017–FY 2019 * Coma, Brain Compression/Anoxic Damage (HCC 80)	−0.094	0.016	<0.001
FY 2012–FY 2013 * Congestive Heart Failure (HCC 80)	0.208	0.006	<0.001
FY 2014–FY 2016 * Respiratory Arrest (HCC 83)	0.199	0.045	<0.001
FY 2017–FY 2019 * Respiratory Arrest (HCC 83)	0.177	0.054	0.001
FY 2012–FY 2013 * Acute Myocardial Infarction (HCC 81)	0.013	0.012	0.302
FY 2014–FY 2016 * Cardio-Respiratory Failure and Shock (HCC 84)	0.254	0.007	<0.001
FY 2017–FY 2019 * Cardio-Respiratory Failure and Shock (HCC 84)	0.285	0.007	<0.001
FY 2012–FY 2013 * Unstable Angina and Other Acute Ischemic Heart Disease (HCC 82)	0.085	0.013	<0.001
FY 2014–FY 2016 * Congestive Heart Failure (HCC 85)	0.232	0.005	<0.001
FY 2017–FY 2019 * Congestive Heart Failure (HCC 85)	0.215	0.006	<0.001
FY 2012–FY 2013 * Angina Pectoris/Old Myocardial Infarction (HCC 83)	0.088	0.009	<0.001
FY 2014–FY 2016 * Acute Myocardial Infarction (HCC 86)	−0.005	0.011	0.641
FY 2017–FY 2019 * Acute Myocardial Infarction (HCC 86)	0.024	0.010	0.012
FY 2012–FY 2013 * Specified Heart Arrhythmias (HCC 92)	0.077	0.006	<0.001
FY 2014–FY 2016 * Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	0.081	0.012	<0.001
FY 2017–FY 2019 * Unstable Angina and Other Acute Ischemic Heart Disease (HCC 87)	0.071	0.014	<0.001
FY 2012–FY 2013 * Cerebral Hemorrhage (HCC95)	−0.144	0.017	<0.001
FY 2014–FY 2016 * Angina Pectoris (HCC 88)	0.054	0.014	<0.001
FY 2017–FY 2019 * Angina Pectoris (HCC 88)	0.044	0.013	0.001
FY 2012–FY 2013 * Ischemic or Unspecified Stroke (HCC 96)	−0.040	0.007	<0.001
FY 2014–FY 2016 * Specified Heart Arrhythmias (HCC 96)	0.084	0.005	<0.001
FY 2017–FY 2019 * Specified Heart Arrhythmias (HCC 96)	0.083	0.005	<0.001
FY 2012–FY 2013 * Hemiplegia/Hemiparesis (HCC 100)	0.006	0.009	0.534
FY 2014–FY 2016 * Cerebral Hemorrhage (HCC 99)	−0.133	0.015	<0.001
FY 2017–FY 2019 * Cerebral Hemorrhage (HCC 99)	−0.109	0.015	<0.001
FY 2012–FY 2013 * Cerebral Palsy and Other Paralytic Syndromes (HCC 101)	0.017	0.022	0.430
FY 2014–FY 2016 * Ischemic or Unspecified Stroke (HCC 100)	−0.053	0.006	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2017–FY 2019 * Ischemic or Unspecified Stroke (HCC 100)	−0.059	0.007	<0.001
FY 2012–FY 2013 * Vascular Disease with Complications (HCC 104)	0.021	0.011	0.045
FY 2014–FY 2016 * Hemiplegia/Hemiparesis (HCC 103)	0.000	0.008	0.952
FY 2017–FY 2019 * Hemiplegia/Hemiparesis (HCC 103)	−0.003	0.008	0.741
FY 2012–FY 2013 * Vascular Disease (HCC 105)	−0.002	0.006	0.778
FY 2014–FY 2016 * Monoplegia, Other Paralytic Syndromes (HCC 104)	0.040	0.028	0.159
FY 2017–FY 2019 * Monoplegia, Other Paralytic Syndromes (HCC 104)	0.019	0.032	0.552
FY 2012–FY 2013 * Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 107 and 108)	0.309	0.006	<0.001
FY 2014–FY 2016 * Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	0.131	0.013	<0.001
FY 2017–FY 2019 * Atherosclerosis of the Extremities with Ulceration or Gangrene (HCC 106)	0.083	0.013	<0.001
FY 2014–FY 2016 * Vascular Disease with Complications (HCC 107)	0.017	0.011	0.101
FY 2017–FY 2019 * Vascular Disease with Complications (HCC 107)	0.018	0.011	0.097
FY 2012–FY 2013 * Aspiration and Specified Bacterial Pneumonias (HCC 111)	0.430	0.009	<0.001
FY 2014–FY 2016 * Vascular Disease (HCC 108)	−0.004	0.006	0.470
FY 2017–FY 2019 * Vascular Disease (HCC 108)	−0.014	0.006	0.022
FY 2012–FY 2013 * Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 112)	0.315	0.024	<0.001
FY 2014–FY 2016 * Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	0.305	0.005	<0.001
FY 2017–FY 2019 * Cystic Fibrosis or Chronic Obstructive Pulmonary Disease (HCC 110 or HCC 111)	0.262	0.006	<0.001
FY 2012–FY 2013 * Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 119)	0.057	0.020	0.003
FY 2014–FY 2016 * Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	0.169	0.022	<0.001
FY 2017–FY 2019 * Fibrosis of Lung and Other Chronic Lung Disorders (HCC 112)	0.096	0.025	<0.001
FY 2014–FY 2016 * Aspiration and Specified Bacterial Pneumonias (HCC 114)	0.357	0.008	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2017–FY 2019 * Aspiration and Specified Bacterial Pneumonias (HCC 114)	0.335	0.009	<0.001
FY 2012–FY 2013 * Renal Failure (HCC 131)	0.239	0.006	<0.001
FY 2014–FY 2016 * Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	0.234	0.021	<0.001
FY 2017–FY 2019 * Pneumococcal Pneumonia, Empyema, Lung Abscess (HCC 115)	0.309	0.013	<0.001
FY 2012–FY 2013 * Nephritis (HCC 132)	0.063	0.049	0.203
FY 2014–FY 2016 * Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	0.021	0.017	0.214
FY 2017–FY 2019 * Proliferative Diabetic Retinopathy and Vitreous Hemorrhage (HCC 122)	0.140	0.018	<0.001
FY 2012–FY 2013 * Decubitus Ulcer of Skin (HCC 148)	0.140	0.007	<0.001
FY 2014–FY 2016 * Exudative Macular Degeneration (HCC 124)	−0.024	0.014	0.097
FY 2017–FY 2019 * Exudative Macular Degeneration (HCC 124)	−0.009	0.015	0.531
FY 2012–FY 2013 * Chronic Ulcer of Skin, Except Decubitus (HCC 149)	0.048	0.011	<0.001
FY 2014–FY 2016 * Acute Renal Failure (HCC 135)	0.321	0.006	<0.001
FY 2017–FY 2019 * Acute Renal Failure (HCC 135)	0.340	0.006	<0.001
FY 2014–FY 2016 * Chronic Kidney Disease, Stage 5 (HCC 136)	0.037	0.021	0.083
FY 2017–FY 2019 * Chronic Kidney Disease, Stage 5 (HCC 136)	0.082	0.025	0.001
FY 2012–FY 2013 * Severe Head Injury or Major Head Injury (HCC 154 or HCC 155)	0.065	0.015	<0.001
FY 2014–FY 2016 * Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	0.182	0.018	<0.001
FY 2017–FY 2019 * Chronic Kidney Disease, Severe (Stage 4) (HCC 137)	0.171	0.017	<0.001
FY 2014–FY 2016 * Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	0.172	0.015	<0.001
FY 2017–FY 2019 * Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone (HCC 157)	0.151	0.014	<0.001
FY 2012–FY 2013 * Vertebral Fractures without Spinal Cord Injury (HCC 157)	0.054	0.013	<0.001
FY 2014–FY 2016 * Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	0.071	0.011	<0.001
FY 2017–FY 2019 * Pressure Ulcer of Skin with Full Thickness Skin Loss (HCC 158)	0.051	0.010	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
FY 2012–FY 2013 * Hip Fracture/Dislocation (HCC 158)	0.181	0.009	<0.001
FY 2014–FY 2016 * Chronic Ulcer of Skin, Except Pressure (HCC 161)	0.067	0.008	<0.001
FY 2017–FY 2019 * Chronic Ulcer of Skin, Except Pressure (HCC 161)	0.076	0.009	<0.001
FY 2014–FY 2016 * Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	0.096	0.014	<0.001
FY 2017–FY 2019 * Severe Head Injury or Major Head Injury (HCC 166 or HCC 167)	0.085	0.015	<0.001
FY 2012–FY 2013 * Major Complications of Medical Care and Trauma (HCC 164)	-0.061	0.009	<0.001
FY 2014–FY 2016 * Vertebral Fractures without Spinal Cord Injury (HCC 169)	0.080	0.011	<0.001
FY 2017–FY 2019 * Vertebral Fractures without Spinal Cord Injury (HCC 169)	0.078	0.012	<0.001
FY 2014–FY 2016 * Hip Fracture/Dislocation (HCC 170)	0.246	0.008	<0.001
FY 2017–FY 2019 * Hip Fracture/Dislocation (HCC 170)	0.301	0.009	<0.001
FY 2012–FY 2013 * Artificial Openings for Feeding or Elimination (HCC 176)	0.233	0.010	<0.001
FY 2014–FY 2016 * Complications of Specified Implanted Device or Graft (HCC 176)	−0.081	0.009	<0.001
FY 2017–FY 2019 * Complications of Specified Implanted Device or Graft (HCC 176)	−0.072	0.009	<0.001
FY 2012–FY 2013 * Amputation Status, Lower Limb/Amputation Complications (HCC 177)	0.121	0.016	<0.001
FY 2014–FY 2016 * Artificial Openings for Feeding or Elimination (HCC 188)	0.180	0.009	<0.001
FY 2017–FY 2019 * Artificial Openings for Feeding or Elimination (HCC 188)	0.100	0.010	<0.001
FY 2014–FY 2016 * Amputation Status, Lower Limb/Amputation Complications (HCC 189)	0.151	0.015	<0.001
FY 2017–FY 2019 * Amputation Status, Lower Limb/Amputation Complications (HCC 189)	0.125	0.015	<0.001
ESRD patient with dialysis status	0.443	0.009	<0.001
ESRD patients after transplant who are not on dialysis after transplant	0.379	0.038	<0.001
Full dual eligibility	0.154	0.005	<0.001
Original eligibility due to disability	0.053	0.004	<0.001

(continued)

Table Z-1. All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
Nursing facility in the hospital	−0.072	0.026	0.006
For-profit nursing facility	0.064	0.008	<0.001
Arkansas	0.392	0.032	<0.001
Arizona	−0.201	0.044	<0.001
Connecticut	−0.242	0.032	<0.001
Delaware	0.073	0.059	0.212
Florida	0.088	0.030	0.003
Georgia	0.209	0.031	<0.001
Iowa	−0.001	0.029	0.970
Idaho	−0.415	0.051	<0.001
Illinois	0.179	0.027	<0.001
Kansas	0.152	0.034	<0.001
Kentucky	0.152	0.033	<0.001
Louisiana	0.614	0.034	<0.001
Massachusetts	−0.192	0.026	<0.001
Maryland	−0.225	0.029	<0.001
Maine	−0.421	0.045	<0.001
Michigan	−0.244	0.030	<0.001
Minnesota	−0.051	0.034	0.131
Mississippi	0.453	0.038	<0.001
Montana	−0.237	0.055	<0.001
North Carolina	−0.164	0.028	<0.001
North Dakota	−0.161	0.046	<0.001
New Hampshire	−0.361	0.046	<0.001
New Jersey	0.024	0.030	0.416
New Mexico	−0.047	0.052	0.366
Ohio	−0.061	0.027	0.021
Oklahoma	0.293	0.032	<0.001
Oregon	−0.257	0.047	<0.001
Rhode Island	−0.230	0.038	<0.001
South Carolina	0.081	0.041	0.046
South Dakota	−0.076	0.042	0.075

(continued)

Table Z-1. **All ECCPs: Complete multivariate regression results of the model predicting the probability of a potentially avoidable hospitalization per resident using a FY 2012 baseline, FY 2014–FY 2019 (continued)**

Parameter	Any potentially avoidable hospitalizations		
	β	SE	p
Tennessee	0.102	0.034	0.003
Texas	0.118	0.024	<0.001
Utah	−0.450	0.070	<0.001
Virginia	−0.130	0.031	<0.001
Vermont	−0.364	0.068	<0.001
Washington	−0.569	0.035	<0.001
Wisconsin	−0.223	0.032	<0.001
West Virginia	−0.066	0.042	0.118
Wyoming	−0.170	0.069	0.014
Alabama	0.374	0.029	<0.001
Indiana	0.140	0.023	<0.001
Missouri	0.338	0.022	<0.001
Colorado	−0.245	0.039	<0.001
Nevada	−0.046	0.063	0.463
Pennsylvania	0.118	0.024	<0.001
Constant	−3.103	0.046	<0.001

SOURCE: RTI analysis of Medicare claims data.

NOTES: The HCCs interacted with FY 2012–FY 2013 are version 12 (v12) HCCs and the HCCs interacted with FY 2014–FY 2016 and FY 2017–FY 2019 are version 22 (v22) HCCs. There are more v22 HCCs than version 12 HCCs, so that is why you may not see some HCCs interacted with FY 2012–FY 2013. Although in several places in this table HCC variables across different time periods appear out of sequence, the coefficients in this table are labeled correctly.

APPENDIX AA
HEALTH CARE-ASSOCIATED INFECTION RATES AMONG LONG-STAY NURSING FACILITY RESIDENTS

AA.1   Overview

NFI 2 aimed to increase the quality of care provided by long-term nursing facilities (NFs). Assessing the rate of health care-associated infections (HAIs) in NFs provides valuable information about an NF's quality of care (Beganovic & Laplante, 2018). Many HAIs are considered preventable and the result of poor care practices (Ouslander et al., 2011). NF residents are at high risk for infections because of their increased age, cognitive and functional decline, use of indwelling devices, frequent care transitions, and close contact with other residents and health care workers. Inadequate prevention and treatment of HAIs may lead to negative outcomes for long-term care residents. Specifically, HAIs have been linked to increased medical expenditures and increased mortality among NF residents (Office of Inspector General, 2014).

We examined acute care transitions (ACTs) for HAIs among long-stay NF residents and how they vary across facilities in the NFI 2 Clinical + Payment (C+P), Payment-Only (P-O), and national comparison groups. We also examined how facility characteristics, such as facility contractor staffing levels and profit status, may be associated with HAIs that result in ACTs.

The analyses presented in this appendix explore how rates of ACTs for HAIs vary across the NFI 2 Clinical + Payment (C+P), Payment-Only (P-O), and national comparison groups. The analyses also examine resident and facility factors that may be associated with facility-level rates of ACTs for HAIs. For each set of analyses, we examine three types of HAI ACTs: (1) HAI ACTs for an inpatient hospitalization, (2) HAI ACTs for an emergency department (ED) visit or observation stay, and (3) any HAI ACT. We start by providing an overview of our analytic approach (*Appendix Section AA.2*), then we show the results of our descriptive analysis (*Appendix Section AA.3*); and we conclude with a discussion of our multivariate results (*Appendix Section AA.4*).

AA.2   Methods

Data Sources

We obtained Medicare data (eligibility, enrollment, claims, and assessments) from the CMS Integrated Data Repository (IDR). Resident assessment data were acquired from the Minimum Data Set 3.0 (MDS). Facility characteristics were captured using data from the Certification and Survey Provider Enhanced Reporting (CASPER) system, Nursing Home Compare (NHC), and Provider of Service (POS) files. Daily staffing data were obtained from the Payroll Based Journal (PBJ) system.

Analytical Sample Creation

This analysis included all residents eligible for NFI 2 in FY 2018 and FY 2019 as described in *Appendix I*. We further excluded those facilities and residents that did not have a match in the additional data sources we used to obtain facility characteristics and quality information. In total, 15,009 facilities and 1,648,958 residents were included in this analysis.

Outcome Variables

To identify HAIs, we used the definition that CMS and RTI developed for identifying HAIs in skilled nursing facilities (Li et al., 2019). We used the principal diagnosis on the Medicare inpatient and outpatient claims for residents' ACT to identify HAIs. For each resident, we examined the three separate HAI ACT outcomes: (1) any HAI ACT, including for inpatient hospitalizations, ED visits, and observation stays, (2) HAI ACTs for ED visits or observation stays only, and (3) HAI ACTs for inpatient hospitalizations only. We identified ACTs, ED visits, and inpatient hospitalizations as defined in *Appendix I*.

The general inclusion criteria for HAIs are:

- Infections that are both likely to be acquired during nursing home care and severe enough to require acute care transfer
- Infections related to invasive (not implanted) medical devices (e.g., infections associated with catheters, insulin pumps, and central lines; infections of tracheostomy stoma).

The exclusion criteria for HAIs are listed below. Conditions that meet one of more of the following criteria will not be counted as HAI for this measure:

- Chronic infections (e.g., chronic viral hepatitis B with or without the delta agent)
- Infections that typically take a long period of time to present (e.g., typhoid arthritis)
- Infections that are more likely related to a hospital stay (e.g., postprocedural retroperitoneal abscess)
- Infections under sequela and subsequent encounter codes (e.g., sequelae of inflammatory diseases of the central nervous system)
- Codes that include "causing disease classified elsewhere" (e.g., meningitis in bacterial diseases classified elsewhere)
- Codes that probably represent secondary infection, where the primary infection would likely already be coded (e.g., viral endocarditis, pericarditis, myocarditis, cardiomyopathy)
- Infections likely to be community acquired (e.g., *Echinococcus granulosus*-caused infection of the liver)

- Infections common in other countries and/or acquired through animal contact (e.g., subacute and chronic melioidosis)

Table AA-1 lists the ICD-10 codes used to identify HAIs.

Table AA-1. ICD-10 codes identifying health care-associated infections

HAI category	Primary diagnosis ICD-10 Code							
Infections related to devices or stumps	T80211A	T80212A	T80218A	T80219A	T8351XA	T8359XA	T836XXA	T8571XA
	T8572XA	T8572XA	T86822	T880XXA	T8740	T8741	T8742	T8743
	T8744	—	—	—	—	—	—	—
Ear/eye infections	B300	B301	B302	B303	B308	B309	H05011	H05012
	H05013	H02019	—	—	—	—	—	—
Gastrointestinal Infections	A020	A021	A0220	A0223	A0224	A0225	A0229	A028
	A029	A030	A031	A032	A033	A038	A039	A040
	A041	A042	A043	A044	A045	A046	A047	A0472
	A048	A049	A073	A074	A078	A0811	A0819	A082
	A0831	A0832	A0839	A084	A088	A09	A329	A691
	B150	B159	B169	B1710	B1711	B178	B179	B1910
	B1920	B199	K9402	K9422	N10	—	—	—
Genito-urinary infections	N3001	N3000	N340	N390	N410	N451	N453	N454
	N493	N99511	N99521	N99531	—	—	—	—
Neurological infections	A390	A392	A394	A3981	A3982	A3989	A399	A850
	A851	A858	A86	A870	A871	A878	A879	G001
	G002	G003	G008	G009	G038	G039	—	—
Respiratory infections	A3700	A3701	A3710	A3711	A3780	A3790	A3791	A481
	A482	B340	B341	B342	J00	J09X1	J09X2	J09X3
	J09X9	J0130	J0140	J020	J028	J029	J0300	J0380
	J0390	J040	J0410	J0411	J042	J050	J0510	J0511
	J060	J069	J1000	J1001	J1008	J101	J102	J1081
	J1082	J1083	J1089	J1100	J1108	J111	J112	J1181
	J1182	J1183	J1189	J120	J121	J122	J123	J1289
	J129	J13	J14	J150	J151	J1520	J15211	J15212
	J1529	J153	J154	J155	J156	J157	J158	J159
	J168	J180	J181	J182	J188	J189	J200	J201
	J202	J203	J204	J205	J206	J207	J208	J209
	J210	J211	J218	J219	J22	J391	J40	J440
	J470	J852	J9502	J95851	—	—	—	—
Sepsis	A400	A401	A403	A408	A409	A4101	A4102	A411
	A412	A413	A414	A4150	A4151	A4152	A4153	A4159
	A4181	A4189	A419	A4901	A4902	A491	A492	A493
	B376	B377	I2601	I2690	I76	R6520	R6521	R7881
	A480	A4852	B86	B870	B871	L00	L0100	L0102
Skin infections	L0103	L03011	L03012	L03019	L03031	L03032	L03039	L03111
	L03112	L03113	L03114	L03115	L03116	L03119	L03211	L03221
	L03311	L03312	L03313	L03314	L03315	L03316	L03317	L03811
	L03818	L03319	L0390	L0889	L089	L303	—	—
Unknown causes	B348	B349	A488	A498	A499	—	—	—

Independent Variables

In our multivariate analysis, we examined a range of resident- and facility-level characteristics for association with HAIs.

Resident-level characteristics

- Initiative exposure and group categories
- Age/sex group
- Race/ethnicity
- Dual Medicare-Medicaid eligibility status
- Original reason for Medicare entitlement
- Clinical and functional characteristics (e.g., dementia status, BMI, ADL difficulty, presence of CMS Hierarchical Condition Categories)

Facility-level characteristics

- Chain, profit, and corporate affiliation status
- Hospital-based facility
- Bed count
- Rural/suburban/urban location
- Staffing characteristics (e.g., staff hours per resident per day, proportion of staff hours by contracted staff)
- Count of Nursing Home Compare infection-related deficiency citations
- Racial/ethnic composition
- Proportion of residents with Medicare Advantage
- Proportion of residents with Medicare as primary payer
- Proportion of residents receiving respiratory treatment
- Proportion of residents vaccinated for pneumococcal pneumonia
- State identifiers

Analysis

We describe and compare facility rates of each HAI ACT outcome across the NFI 2 C+P, P-O, and national comparison groups, stratified by year and HAI clinical groupings. For the multivariate analyses, we performed a cross-sectional analysis of eligible residents across FY 2018 and FY 2019. To understand factors associated with HAI, we utilized logistic regression models at the resident year level on each of the three ACT HAI outcomes separately. In each model, we included the list

of independent variables described above. In the results section below, we present adjusted odds ratios and 95 percent confidence intervals for each independent variable.

AA.3   Descriptive Results of HAI Analyses

This section presents descriptive results on the prevalence of ACTs, ED visits, and inpatient hospitalizations for an HAI. For each year and NF group, column "N" represents the count of residents experiencing at least one transfer event (ACTs, ED visits or inpatient hospitalizations) due to HAI and column "%" provides the percentage of residents who experienced at least one transfer event due to HAI as a proportion of all eligible residents. We note that because we are measuring the count of residents experiencing at least one transfer event, a single resident may appear in multiple condition specific rows but only be counted once in the "total" row. **Table AA-2** contains the count and percentage of ACTs due to HAI overall and separately by diagnosis group, for the C+P, P-O, national sample, and within-state reference groups in FY 2018 and FY 2019. **Table AA-3** and **Table AA-4** present similar information to **Table AA-2** for any outpatient ED visit or observation stay due to HAI and any inpatient hospitalization due to HAI, respectively.

Our results showed that facilities in the P-O and C+P groups had a lower rate of ACTs due to HAI as compared with the national sample and the within-state reference groups. Among all the HAI related ACTs, sepsis is the most common principal diagnosis.

Table AA-2. Residents experiencing at least one ACT due to HAI, FY 2018–FY 2019

Measure	Payment-Only 2018 N	%	2019 N	%	Clinical + Payment 2018 N	%	2019 N	%	National sample 2018 N	%	2019 N	%	Within-state reference group 2018 N	%	2019 N	%
Total HAI ACTs	1,750	13.77	1,567	13.43	1,482	13.13	1,350	12.54	114,323	17.23	104,131	16.62	23,871	14.91	21,518	14.13
Infections related to devices or stumps	20	0.16	22	0.19	21	0.19	34	0.32	1,116	0.17	1,073	0.17	211	0.13	193	0.13
Ear/eye infections	—	—	2	0.02	1	0.01	1	0.01	37	0.01	25	0.00	12	0.01	8	0.01
Gastrointestinal infections	34	0.27	23	0.2	26	0.23	33	0.31	2,636	0.4	2,335	0.37	455	0.28	478	0.31
Neurological infections	2	0.02	—	—	1	0.01	—	—	34	0.01	29	0.00	7	0.00	8	0.01
Respiratory infections	391	3.08	324	2.78	282	2.5	231	2.15	28,641	4.32	23,140	3.69	5,818	3.63	4,627	3.04
Sepsis	1,054	8.3	916	7.85	963	8.53	873	8.11	62,397	9.4	58,291	9.3	13,543	8.46	12,517	8.22
Skin Infections	84	0.66	83	0.71	49	0.43	51	0.47	5,658	0.85	5,423	0.87	1,043	0.65	1,045	0.69
Unknown causes	3	0.02	2	0.02	6	0.05	4	0.04	397	0.06	325	0.05	104	0.06	67	0.04
Genito-urinary infections	372	2.93	368	3.15	279	2.47	273	2.54	28,937	4.36	27,538	4.39	5,526	3.45	5,083	3.34

SOURCE: RTI analysis of Medicare claims data.

NOTE: % based on full sample population which may be variable across condition due to exclusion criteria. — = no records with this event.

Table AA-3. Residents experiencing at least one ED visit due to HAI, FY 2018–FY 2019

Measure	Payment-Only 2018 N	%	Payment-Only 2019 N	%	Clinical + Payment 2018 N	%	Clinical + Payment 2019 N	%	National sample 2018 N	%	National sample 2019 N	%	Within-state reference group 2018 N	%	Within-state reference group 2019 N	%
Total HAI ED visits	416	3.27	396	3.39	227	2.01	237	2.2	34,151	5.15	31,034	4.95	6,293	3.93	5,588	3.67
Infections related to devices or stumps	1	0.01	1	0.01	—	—	1	0.01	33	0	34	0.01	7	0.00	4	0.00
Ear/eye infections	—	—	2	0.02	—	—	1	0.01	17	0	10	0.00	6	0.00	3	0.00
Gastrointestinal infections	8	0.06	2	0.02	5	0.04	6	0.06	564	0.08	549	0.09	89	0.06	76	0.05
Neurological infections	1	0.01	—	—	—	—	—	—	1	0	1	0.00	—	—	1	0.00
Respiratory infections	123	0.97	104	0.89	68	0.6	46	0.43	11,467	1.73	9,206	1.47	1,995	1.25	1,582	1.04
Sepsis	52	0.41	40	0.34	28	0.25	19	0.18	3,913	0.59	3,773	0.6	729	0.46	719	0.47
Skin infections	31	0.24	41	0.35	14	0.12	23	0.21	2,662	0.4	2,626	0.42	439	0.27	473	0.31
Unknown causes	3	0.02	1	0.01	2	0.02	—	—	279	0.04	212	0.03	73	0.05	46	0.03
Genito-urinary infections	219	1.72	221	1.89	117	1.04	145	1.35	17,101	2.58	16,370	2.61	3,239	2.02	2,967	1.95

SOURCE: RTI analysis of Medicare claims data.

NOTE: % based on full sample population which may be variable across condition due to exclusion criteria. — = no records with this event.

Table AA-4. Residents experiencing at least one inpatient hospitalization due to HAI, FY 2018–FY 2019

Measure	Payment-Only 2018		Payment-Only 2019		Clinical + Payment 2018		Clinical + Payment 2019		National sample 2018		National sample 2019		Within-state reference group 2018		Within-state reference group 2019	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total HAI inpatient hospitalizations	1,474	11.6	1,296	11.11	1,325	11.74	1,188	11.03	93,162	14.04	84,683	13.51	19,824	12.39	17,965	11.8
Infections related to devices or stumps	20	0.16	21	0.18	21	0.19	33	0.31	1,089	0.16	1,046	0.17	206	0.13	189	0.12
Ear/eye infections	—	—	1	0.01	1	0.01	—	—	22	0.00	15	0.00	7	0.00	5	0.00
Gastrointestinal infections	27	0.21	21	0.18	21	0.19	28	0.26	2,145	0.32	1,854	0.3	380	0.24	412	0.27
Neurological infections	2	0.02	—	—	1	0.01	—	—	33	0.00	28	0.00	7	0.00	8	0.01
Respiratory infections	296	2.33	240	2.06	225	1.99	192	1.78	20,276	3.06	16,248	2.59	4,302	2.69	3,406	2.24
Sepsis	1,027	8.08	898	7.7	950	8.42	866	8.04	60,793	9.16	56,823	9.07	13,238	8.27	12,230	8.03
Skin infections	54	0.42	46	0.39	36	0.32	30	0.28	3,430	0.52	3,128	0.5	668	0.42	646	0.42
Unknown causes	—	—	1	0.01	4	0.04	4	0.04	119	0.02	116	0.02	31	0.02	21	0.01
Genito-urinary infections	166	1.31	161	1.38	168	1.49	138	1.28	13,768	2.07	12,978	2.07	2,612	1.63	2,453	1.61

SOURCE: RTI analysis of Medicare claims data.

NOTE: % based on full sample population which may be variable across condition due to exclusion criteria. — = no records with this event.

AA.4 Resident and Facility Factors Associated with ACT due to HAI, Multivariate Results

Tables AA-5 through *AA-7* show selected results from our multivariate logistic analyses.

We find that both P-O and C+P residents have significantly lower adjusted odds of a transfer event due to HAI compared against non-Initiative residents, a finding largely in-line with the overall lower ACT rate in both Initiative groups. These results do not adjust for potential differences in baseline rates of HAI between Initiative and comparison facilities like the main utilization and expenditure analyses described in *Appendix I*.

We find that the percentage of contract staff hours is significantly associated with increases in ACT rates caused by HAI; this is potentially due to high turnover in contract staff leading to quality challenges. Similarly, registered nurse (RN) quarter hours per resident day (15 min for every one resident day) were weakly but statistically significantly associated with decreases in ACT caused by HAI while licensed practitioner nurse certified nursing assistant hours were associated with no effect. Additionally, rural and suburban residents are significantly more likely to experience HAI caused ACT potentially. Finally, we find that infection deficiency citations were significantly associated with all ACT HAI categories.

Table AA-5. Acute care transitions due to HAI: Selected odds ratios

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
Exposure Category						
Exposure, 0-89 days	0.61	0.59	0.62	0.61	0.60	0.62
Exposure, 90 -179 days	1.30	1.28	1.33	1.28	1.26	1.30
Exposure, 180 – 269 days	1.44	1.41	1.47	1.52	1.48	1.55
Exposure, 270- 364 days	1.74	1.71	1.78	1.80	1.76	1.84
Exposure, 365 days	Reference			Reference		
Sex and Age Category						
Male, <65	0.90	0.87	0.94	0.93	0.90	0.97
Male, 65–69	0.95	0.91	0.99	0.91	0.87	0.95
Male, 70–74	1.04	0.99	1.08	1.04	1.00	1.08
Male, 75–79	1.14	1.10	1.19	1.20	1.15	1.25
Male, 80–84	1.24	1.19	1.29	1.26	1.21	1.32
Male, 85–89	1.32	1.27	1.38	1.29	1.24	1.35
Male, 90–94	1.40	1.34	1.47	1.35	1.29	1.42
Male, 95+	1.31	1.22	1.41	1.29	1.20	1.39
Female, <65	Reference			Reference		
Female, 65–69	1.03	0.99	1.07	1.02	0.97	1.06
Female, 70–74	1.09	1.05	1.13	1.08	1.04	1.12
Female, 75–79	1.13	1.09	1.17	1.11	1.07	1.15
Female, 80–84	1.20	1.16	1.25	1.15	1.11	1.19
Female, 85–89	1.20	1.16	1.24	1.18	1.13	1.22
Female, 90–94	1.20	1.16	1.25	1.12	1.08	1.16
Female, 95+	1.06	1.02	1.11	1.04	0.99	1.08
Race and Ethnicity						
White, Non-Hispanic	Reference			Reference		
Black, Non-Hispanic	0.90	0.88	0.92	0.89	0.87	0.91
Asian	1.01	0.95	1.07	0.96	0.90	1.01
Hispanic	0.98	0.95	1.01	0.98	0.95	1.02
Other Race/Ethnicity	0.92	0.88	0.96	0.90	0.86	0.94
Dual Eligibility	1.23	1.21	1.25	1.24	1.22	1.27
Original Entitlement due to Disability	1.11	1.09	1.13	1.08	1.07	1.10
Dementia	1.00	0.98	1.01	1.01	0.99	1.02
Anemia	1.07	1.05	1.08	1.07	1.06	1.09

(continued)

Table AA-5. Acute care transitions due to HAI: Selected odds ratios (continued)

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
BMI Category						
BMI, Underweight	0.93	0.91	0.96	0.95	0.92	0.97
BMI, Normal	Reference			Reference		
BMI, Overweight	1.05	1.03	1.06	1.06	1.04	1.08
BMI, Obese	1.14	1.12	1.16	1.18	1.16	1.20
Activities of Daily Living Score (ADL)						
ADL, 0-7	Reference			Reference		
ADL, 8-14	1.09	1.06	1.12	1.11	1.08	1.14
ADL, 15-21	1.22	1.19	1.24	1.26	1.23	1.29
ADL, 22-28	1.38	1.34	1.42	1.42	1.38	1.47
Cognitive Function Scale						
Cognitively Intact	Reference			Reference		
Mildly Impaired	0.98	0.97	1.00	0.98	0.96	1.00
Moderately Impaired	0.97	0.95	0.98	0.99	0.97	1.01
Severely Impaired	1.00	0.97	1.03	1.03	1.00	1.06
Hierarchical Condition Count (HCC)						
HCC Count, 0-2	Reference			Reference		
HCC Count, 3-4	1.29	1.26	1.32	1.30	1.27	1.33
HCC Count, 5-7	1.56	1.51	1.60	1.55	1.51	1.60
HCC Count, 8 or more	1.61	1.54	1.68	1.63	1.56	1.71
Percentage of Medicare Advantage Residents						
Less than 10%	Reference			Reference		
Between 10% and 20%	0.93	0.91	0.94	0.95	0.93	0.96
Between 20% and 30%	0.87	0.85	0.89	0.87	0.85	0.89
Greater than 30%	0.81	0.79	0.83	0.81	0.79	0.82
Corporate Affiliation	1.01	1.00	1.03	1.01	0.99	1.02
Chain	0.97	0.96	0.99	0.97	0.95	0.98
Infection Deficiency Count						
0 Citations	Reference			Reference		
1 Citation	1.02	1.01	1.04	1.01	1.00	1.03
2 Citations	1.07	1.04	1.10	1.05	1.02	1.08
3 or Greater Citations	1.10	1.03	1.17	1.15	1.09	1.22
Percentage of Contractor Hours						
Less than 1%	Reference			Reference		
Between 1% and 15%	1.03	1.02	1.05	1.03	1.01	1.05
Between 15% and 30%	1.09	1.06	1.13	1.10	1.06	1.13
Greater than 30%	1.11	1.04	1.17	1.15	1.08	1.21

(continued)

Table AA-5. Acute care transitions due to HAI: Selected odds ratios (continued)

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
Proportion of Medicare Residents	0.99	0.99	1.00	1.00	0.99	1.01
Proportion of Residents Receiving Respiratory Treatment (10%)	1.03	1.02	1.03	1.01	1.01	1.02
Percentage of Residents Vaccinated for Pneumococcal Pneumonia (10%)	1.00	0.99	1.00	1.00	0.99	1.00
Bed Count (20 beds)	1.00	0.99	1.00	0.99	0.99	1.00
RN Hours per Resident day (15 min)	0.96	0.95	0.97	0.96	0.95	0.97
LPN Hours per Resident day (15 min)	0.99	0.99	1.00	1.00	1.00	1.01
CNA Hours per Resident day (15 min)	1.00	0.98	1.02	1.01	0.99	1.03
Percentage of Hispanic Residents (10%)	1.03	1.02	1.04	1.03	1.02	1.04
Percentage of Black Residents (10%)	1.01	1.01	1.02	1.01	1.01	1.02
Percentage of Asian Residents (10%)	1.01	0.99	1.02	1.01	1.00	1.02
Percentage of Other Residents (10%)	1.03	1.02	1.04	1.03	1.02	1.04
PHQ Score	1.00	1.00	1.00	1.00	1.00	1.00
Urban						
Urban	Reference			Reference		
Suburban	1.20	1.18	1.22	1.21	1.19	1.24
Rural	1.27	1.22	1.32	1.28	1.23	1.33
Group						
National Sample & Within-State Reference Group	Reference			Reference		
Payment-Only	0.92	0.87	0.97	0.96	0.90	1.02
Clinical + Payment	0.82	0.77	0.87	0.84	0.79	0.90
Constant	0.06	0.05	0.07	0.05	0.05	0.06

OR = odds ratios; LCL = lower confidence limit; UCL = upper confidence limit.

SOURCE: RTI analysis of Medicare claims data.

Table AA-6. Inpatient hospitalizations due to HAI: Selected odds ratios

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
Exposure Category						
Exposure, 0-89 days	0.69	0.68	0.71	0.69	0.67	0.70
Exposure, 90 -179 days	1.47	1.44	1.50	1.42	1.39	1.45
Exposure, 180 – 269 days	1.57	1.53	1.60	1.65	1.61	1.69
Exposure, 270- 364 days	1.90	1.86	1.95	1.92	1.88	1.97
Exposure, 365 days	Reference			Reference		
Sex and Age Category						
Male, <65	0.95	0.92	0.99	1.00	0.96	1.04
Male, 65–69	1.03	0.98	1.07	0.99	0.94	1.04
Male, 70–74	1.10	1.06	1.15	1.12	1.07	1.17
Male, 75–79	1.21	1.16	1.27	1.28	1.23	1.34
Male, 80–84	1.33	1.27	1.39	1.37	1.31	1.44
Male, 85–89	1.42	1.35	1.48	1.39	1.32	1.45
Male, 90–94	1.47	1.40	1.55	1.43	1.36	1.51
Male, 95+	1.35	1.25	1.46	1.43	1.32	1.54
Female, <65	Reference			Reference		
Female, 65–69	1.05	1.00	1.09	1.06	1.01	1.11
Female, 70–74	1.11	1.06	1.16	1.10	1.05	1.15
Female, 75–79	1.15	1.10	1.20	1.13	1.08	1.17
Female, 80–84	1.22	1.18	1.27	1.17	1.13	1.22
Female, 85–89	1.22	1.18	1.27	1.20	1.16	1.25
Female, 90–94	1.22	1.18	1.28	1.14	1.10	1.19
Female, 95+	1.07	1.02	1.12	1.06	1.01	1.12
Race and Ethnicity						
White, Non-Hispanic	Reference			Reference		
Black, Non-Hispanic	0.89	0.87	0.91	0.87	0.85	0.90
Asian	1.02	0.96	1.08	0.99	0.94	1.05
Hispanic	0.95	0.92	0.99	0.97	0.94	1.01
Other Race/Ethnicity	0.91	0.87	0.95	0.88	0.84	0.92
Dual Eligibility	1.26	1.24	1.29	1.27	1.24	1.30
Original Disability	1.10	1.08	1.12	1.09	1.07	1.11
Dementia	1.00	0.98	1.02	1.01	0.99	1.03
Anemia	1.08	1.06	1.10	1.08	1.07	1.10
BMI Category						
BMI, Underweight	0.93	0.91	0.96	0.95	0.92	0.98
BMI, Normal	Reference			Reference		
BMI, Overweight	1.04	1.03	1.06	1.05	1.03	1.07
BMI, Obese	1.15	1.13	1.17	1.19	1.16	1.21

(continued)

Table AA-6. Inpatient hospitalizations due to HAI: Selected odds ratios (continued)

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
Activities of Daily Living Score (ADL)						
ADL, 0-7		Reference			Reference	
ADL, 8-14	1.09	1.06	1.12	1.14	1.10	1.17
ADL, 15-21	1.26	1.23	1.29	1.33	1.29	1.36
ADL, 22-28	1.48	1.44	1.53	1.55	1.50	1.60
Cognitive Function Scale						
Cognitively Intact		Reference			Reference	
Mildly Impaired	0.97	0.95	0.99	0.98	0.96	1.00
Moderately Impaired	0.96	0.95	0.98	0.99	0.97	1.02
Severely Impaired	1.03	1.00	1.06	1.07	1.03	1.10
Hierarchical Condition Count (HCC)						
HCC Count, 0-2		Reference			Reference	
HCC Count, 3-4	1.32	1.29	1.35	1.33	1.29	1.36
HCC Count, 5-7	1.63	1.58	1.68	1.60	1.55	1.66
HCC Count, 8 or more	1.68	1.60	1.76	1.70	1.62	1.78
Percentage of Medicare Advantage Residents						
Less than 10%		Reference			Reference	
Between 10% and 20%	0.93	0.92	0.95	0.95	0.93	0.97
Between 20% and 30%	0.89	0.87	0.91	0.88	0.86	0.90
Greater than 30%	0.83	0.81	0.85	0.83	0.81	0.85
Corporate Affiliation	1.01	1.00	1.03	1.00	0.99	1.02
Chain	0.97	0.95	0.98	0.96	0.95	0.98
Infection Deficiency Count						
0 Citations		Reference			Reference	
1 Citation	1.02	1.00	1.03	1.01	0.99	1.02
2 Citations	1.07	1.04	1.10	1.05	1.02	1.08
3 or Greater Citations	1.07	1.00	1.14	1.16	1.09	1.23
Percentage of Contractor Hours						
Less than 1%		Reference			Reference	
Between 1% and 15%	1.02	1.01	1.04	1.03	1.01	1.04
Between 15% and 30%	1.08	1.05	1.12	1.08	1.05	1.12
Greater than 30%	1.11	1.04	1.18	1.15	1.08	1.22
Proportion of Medicare Residents	1.00	0.99	1.00	1.00	0.99	1.01
Proportion of Residents Receiving Respiratory Treatment (10%)	1.02	1.02	1.03	1.01	1.00	1.02
Percentage of Residents Vaccinated for Pneumococcal Pneumonia (10%)	1.00	0.99	1.00	1.00	1.00	1.01
Bed Count (20 beds)	1.00	1.00	1.00	1.00	1.00	1.00
RN Hours per Resident day (15 min)	0.97	0.96	0.98	0.97	0.96	0.98

(continued)

Table AA-6. Inpatient hospitalizations due to HAI: Selected odds ratios (continued)

Category	2018			2019		
	OR	**LCL**	**UCL**	**OR**	**LCL**	**UCL**
LPN Hours per Resident day (15 min)	1.00	0.99	1.01	1.01	1.00	1.01
CNA Hours per Resident day (15 min)	1.00	0.98	1.02	1.01	0.99	1.03
Percentage of Hispanic Residents (10%)	1.04	1.03	1.05	1.04	1.03	1.05
Percentage of Black Residents (10%)	1.02	1.02	1.03	1.03	1.02	1.03
Percentage of Asian Residents (10%)	1.02	1.01	1.03	1.03	1.02	1.04
Percentage of Other Residents (10%)	1.03	1.02	1.05	1.03	1.02	1.05
PHQ Score	1.00	1.00	1.00	1.00	1.00	1.00
Urban						
Urban	Reference			Reference		
Suburban	1.06	1.04	1.08	1.08	1.06	1.10
Rural	1.17	1.13	1.22	1.18	1.13	1.24
Group						
National Sample & Within-State Reference Group	Reference			Reference		
Payment-Only	0.94	0.88	1.00	0.96	0.90	1.02
Clinical + Payment	0.84	0.79	0.90	0.83	0.78	0.89
Constant	0.04	0.03	0.04	0.03	0.03	0.03

OR = odds ratios; LCL = lower confidence limit; UCL = upper confidence limit.

SOURCE: RTI analysis of Medicare claims data.

Table AA-7. Emergency department visits due to HAI: Selected odds ratios

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
Exposure Category						
Exposure, 0-89 days	0.39	0.37	0.40	0.41	0.39	0.43
Exposure, 90 -179 days	0.85	0.83	0.88	0.86	0.83	0.88
Exposure, 180 – 269 days	1.06	1.03	1.10	1.10	1.06	1.14
Exposure, 270- 364 days	1.26	1.22	1.30	1.34	1.29	1.38
Exposure, 365 days	Reference			Reference		
Sex and Age Category						
Male, <65	0.80	0.76	0.85	0.78	0.74	0.83
Male, 65–69	0.79	0.73	0.84	0.69	0.64	0.74
Male, 70–74	0.83	0.77	0.89	0.81	0.76	0.87
Male, 75–79	0.93	0.87	0.99	0.91	0.85	0.97
Male, 80–84	0.96	0.90	1.03	0.91	0.85	0.97
Male, 85–89	1.01	0.95	1.09	0.96	0.89	1.03
Male, 90–94	1.13	1.05	1.22	1.06	0.98	1.15
Male, 95+	1.08	0.95	1.22	0.83	0.73	0.96
Female, <65	Reference			Reference		
Female, 65–69	0.95	0.89	1.01	0.87	0.82	0.93
Female, 70–74	1.01	0.95	1.07	0.96	0.91	1.03
Female, 75–79	1.03	0.97	1.09	1.00	0.94	1.06
Female, 80–84	1.08	1.02	1.14	0.98	0.93	1.04
Female, 85–89	1.06	1.00	1.12	0.98	0.92	1.04
Female, 90–94	1.06	1.00	1.12	0.97	0.91	1.03
Female, 95+	0.97	0.90	1.04	0.87	0.81	0.94
Race and Ethnicity						
White, Non-Hispanic	Reference			Reference		
Black, Non-Hispanic	0.96	0.93	1.00	0.96	0.92	1.00
Asian	1.03	0.91	1.16	0.78	0.68	0.89
Hispanic	1.05	0.99	1.12	1.00	0.94	1.07
Other Race/Ethnicity	0.97	0.90	1.04	0.94	0.87	1.01
Dual Eligibility	1.08	1.05	1.12	1.13	1.09	1.17
Original Disability	1.08	1.04	1.11	1.09	1.06	1.12
Dementia	0.98	0.95	1.00	0.98	0.96	1.01
Anemia	1.03	1.00	1.05	1.03	1.01	1.06
BMI Category						
BMI, Underweight	0.92	0.87	0.96	0.95	0.90	1.00
BMI, Normal	Reference			Reference		
BMI, Overweight	1.05	1.03	1.08	1.06	1.03	1.09
BMI, Obese	1.08	1.05	1.11	1.13	1.10	1.17

(continued)

Table AA-7. Emergency department visits due to HAI: selected odds ratios (continued)

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
Activities of Daily Living Score (ADL)						
ADL, 0-7						
ADL, 8-14	1.09	1.05	1.14	1.09	1.05	1.14
ADL, 15-21	1.13	1.09	1.17	1.13	1.09	1.18
ADL, 22-28	1.12	1.07	1.17	1.12	1.07	1.18
Cognitive Function Scale						
Cognitively Intact		Reference			Reference	
Mildly Impaired	1.00	0.98	1.03	0.96	0.93	0.99
Moderately Impaired	0.95	0.93	0.98	0.96	0.93	0.99
Severely Impaired	0.86	0.82	0.91	0.91	0.86	0.95
Hierarchical Condition Count (HCC)						
HCC Count, 0-2		Reference			Reference	
HCC Count, 3-4	1.28	1.24	1.33	1.28	1.23	1.33
HCC Count, 5-7	1.49	1.42	1.56	1.53	1.45	1.60
HCC Count, 8 or more	1.56	1.44	1.68	1.63	1.51	1.76
Percentage of Medicare Advantage Residents						
Less than 10%		Reference			Reference	
Between 10% and 20%	0.87	0.84	0.89	0.92	0.90	0.95
Between 20% and 30%	0.79	0.76	0.82	0.78	0.75	0.81
Greater than 30%	0.72	0.69	0.75	0.71	0.68	0.74
Corporate Affiliation	1.00	0.97	1.02	1.01	0.98	1.04
Chain	1.01	0.99	1.04	0.99	0.97	1.02
Infection Deficiency Count						
0 Citations		Reference			Reference	
1 Citation	1.04	1.02	1.07	1.01	0.99	1.03
2 Citations	1.03	0.98	1.08	1.02	0.98	1.07
3 or Greater Citations	1.13	1.03	1.25	1.01	0.91	1.11
Percentage of Contractor Hours						
Less than 1%		Reference			Reference	
Between 1% and 15%	1.08	1.05	1.11	1.06	1.03	1.09
Between 15% and 30%	1.08	1.02	1.15	1.10	1.04	1.16
Greater than 30%	1.09	0.98	1.21	1.18	1.07	1.30
Proportion of Medicare Residents	0.95	0.94	0.96	0.94	0.93	0.96
Proportion of Residents Receiving Respiratory Treatment (10%)	1.02	1.01	1.03	1.03	1.02	1.04
Percentage of Residents Vaccinated for Pneumococcal Pneumonia (10%)	0.99	0.98	1.00	0.99	0.98	1.00
Bed Count (20 beds)	0.96	0.96	0.97	0.96	0.96	0.97
RN Hours per Resident day (15 min)	0.90	0.89	0.91	0.91	0.90	0.93

(continued)

Table AA-7. Emergency department visits due to HAI: selected odds ratios (continued)

Category	2018			2019		
	OR	LCL	UCL	OR	LCL	UCL
LPN Hours per Resident day (15 min)	0.97	0.96	0.98	0.99	0.98	1.00
CNA Hours per Resident day (15 min)	0.99	0.96	1.02	1.03	1.00	1.06
Percentage of Hispanic Residents (10%)	0.96	0.95	0.98	0.97	0.95	0.98
Percentage of Black Residents (10%)	0.94	0.93	0.95	0.95	0.94	0.96
Percentage of Asian Residents (10%)	0.89	0.87	0.92	0.89	0.86	0.92
Percentage of Other Residents (10%)	1.01	1.00	1.03	1.01	0.99	1.03
PHQ Score	1.00	1.00	1.01	1.01	1.00	1.01
Urban						
Urban	Reference			Reference		
Suburban	1.88	1.84	1.93	1.92	1.87	1.97
Rural	2.05	1.95	2.16	2.07	1.96	2.18
Group						
National Sample & Within-State Reference Group	Reference			Reference		
Payment-Only	0.85	0.76	0.95	0.92	0.83	1.03
Clinical + Payment	0.74	0.64	0.85	0.89	0.77	1.02
Constant	0.05	0.04	0.06	0.04	0.03	0.05

OR = odds ratios; LCL = lower confidence limit; UCL = upper confidence limit.

SOURCE: RTI analysis of Medicare claims data.

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APPENDIX BB
INITIATIVE EFFECT ON AGGREGATE MEDICARE EXPENDITURES

BB.1   Overview

In this appendix, we present additional estimates of aggregate Medicare expenditures for specific categories, to supplement the figures for aggregate total Medicare expenditures shown in ***Chapter II.5***. Results are presented separately for the Clinical + Payment (C+P) and Payment-Only (P-O) intervention groups, combined across all ECCPs, and for each individual ECCP, to highlight variation in the Initiative effects. The methods we employed were described in ***Chapter II.5***.

BB.2   Results

Tables BB-1 through ***BB-3*** present estimates of the Initiative effect on expenditures associated with all-cause hospitalizations, all-cause emergency department (ED) visits, and potentially avoidable (PA) hospitalizations, by intervention group and ECCP. These values are incorporated into the net estimate for total Medicare expenditures presented in ***Chapter II.5***.

The results in ***Table BB-1*** indicate that the Initiative had inconsistent impacts across both C+P and P-O groups. MOQI and RAVEN were the only two ECCPs in the C+P group that showed statistically significant, unfavorable increases in aggregate expenditures associated with resident all-cause hospitalizations. None of the ECCPs showed statistically significant favorable results for C+P facilities, nor did any of the ECCP models in the P-O group show any statistically significant Initiative effects, favorable or unfavorable, on aggregate hospitalization expenditures across FY 2017–FY 2019.

The Initiative effect on aggregate expenditures associated with all-cause emergency department visits was inconsistent across the intervention groups and the ECCPs; only one of the models (OPTIMISTIC) experienced a statistically significant impact, favorable or unfavorable, on expenditures in the P-O group ***(Table BB-2)***.

The Initiative effect on aggregate expenditures associated with potentially avoidable hospitalizations was inconsistent across the intervention groups and the ECCPs; the C+P group saw a statistically significant increase in expenditures overall as well as in the ATOP2 and RAVEN models, while the P-O group experienced a statistically significant increase in expenditures in AQAF and a significant *decrease* in the RAVEN model during FY 2017–FY 2019 ***(Table BB-3).***

Table BB-1. All ECCPs: Initiative effect on aggregate all-cause hospitalization expenditures, FY 2017–FY 2019

ECCP (State)	Number of ECCP Participating Residents	Mean Exposure Days	Intervention Effect on Medicare HP Expenditures per Resident ($)			Initiative Effect on Aggregate Medicare HP Expenditures ($)		
			Estimate $	90% CI		Estimate $	90% CI	
Clinical + Payment								
All	32,147	243	366	(309)	1,040	7,809,206	(6,597,716)	22,216,129
AQAF (AL)	5,100	242	(186)	(1,143)	771	(630,138)	(3,865,865)	2,605,589
ATOP2 (NV)	3,206	249	(2,281)	(5,679)	1,117	(5,080,904)	(12,649,873)	2,488,064
MOQI (MO)	4,103	254	**1,048**	**394**	**1,702**	**2,763,579**	**1,038,059**	**4,489,099**
NY-RAH (NY)	10,333	228	363	(1,835)	2,561	2,339,819	(11,835,404)	16,515,042
OPTIMISTIC (IN)	4,986	235	139	(963)	1,241	472,205	(3,276,043)	4,220,454
RAVEN (PA)	4,419	272	**883**	**30**	**1,737**	**2,907,917**	**98,408**	**5,717,426**
Payment-Only								
All	36,079	248	61	(386)	507	1,486,335	(9,449,057)	12,421,727
AQAF (AL)	4,284	254	355	(494)	1,204	1,057,784	(1,469,220)	3,584,787
ATOP2 (CO)	4,483	241	103	(870)	1,076	304,355	(2,573,400)	3,182,109
MOQI (MO)	5,343	254	331	(494)	1,156	1,232,525	(1,841,326)	4,306,376
NY-RAH (NY)	11,183	246	462	(540)	1,463	3,482,607	(4,070,243)	11,035,456
OPTIMISTIC (IN)	5,911	240	(284)	(1,262)	694	(1,103,382)	(4,903,772)	2,697,008
RAVEN (PA)	4,875	254	(1,126)	(2,450)	198	(3,821,137)	(8,313,946)	671,671

HP = Inpatient hospitalization.

SOURCE: RTI analysis of Medicare claims data.

NOTE: Values are rounded to the nearest ones place for simplicity; "Aggregate ECCP Effect on Medicare Hospitalization Spending" is calculated based on the **unrounded** values of the columns for "Mean Exposure Days" and "Intervention Effect on Medicare HP Expenditures per ECCP Resident ($)."

Table BB-2. All ECCPs: Initiative effect on aggregate all-cause emergency department visit expenditures, FY 2017–FY 2019

ECCP (State)	Number of ECCP Participating Residents	Mean Exposure Days	Intervention Effect on Medicare ED Expenditures per Resident ($)			Initiative Effect on Aggregate Medicare ED Expenditures ($)		
			Estimate $	90% CI		Estimate $	90% CI	
Clinical + Payment								
All	32,147	243	9	(17)	34	183,008	(360,200)	726,215
AQAF (AL)	5,100	242	13	(23)	50	44,255	(79,319)	167,828
ATOP2 (NV)	3,206	249	33	(74)	139	72,819	(164,030)	309,668
MOQI (MO)	4,103	254	31	(19)	82	82,144	(51,379)	215,666
NY-RAH (NY)	10,333	228	(14)	(77)	49	(90,457)	(496,007)	315,093
OPTIMISTIC (IN)	4,986	235	(42)	(104)	19	(143,355)	(352,972)	66,262
RAVEN (PA)	4,419	272	48	(7)	102	156,659	(23,395)	336,713
Payment-Only								
All	36,079	248	9	(19)	37	218,034	(457,897)	893,964
AQAF (AL)	4,284	254	(5)	(52)	42	(14,898)	(154,453)	124,658
ATOP2 (CO)	4,483	241	(78)	(197)	41	(231,014)	(583,056)	121,027
MOQI (MO)	5,343	254	39	(38)	115	144,032	(140,432)	428,496
NY-RAH (NY)	11,183	246	14	(31)	59	107,189	(230,478)	444,857
OPTIMISTIC (IN)	5,911	240	**81**	**28**	**135**	**316,290**	**107,141**	**525,439**
RAVEN (PA)	4,875	254	(47)	(130)	36	(159,003)	(441,844)	123,838

ED = Emergency department visit

SOURCE: RTI analysis of Medicare claims data.

NOTE: Values are rounded to the nearest ones place for simplicity; "Aggregate ECCP Effect on Medicare Hospitalization Spending" is calculated based on the **unrounded** values of the columns for "Mean Exposure Days" and "Intervention Period Effect on Medicare Hospitalization Expenditures per ECCP Participating Resident."

Table BB-3. All ECCPs: Initiative effect on aggregate potentially avoidable hospitalization expenditures, FY 2017–FY 2019

ECCP (State)	Number of ECCP Participating Residents	Mean Exposure Days	Intervention Effect on Medicare PA HP Expenditures per Resident ($)			Initiative Effect on Aggregate Medicare PA HP Expenditures ($)		
			Estimate $	90% CI		Estimate $	90% CI	
Clinical + Payment								
All	32,147	243	**321**	**47**	**596**	**6,865,558**	**1,000,939**	**12,730,178**
AQAF (AL)	5,100	242	127	(375)	628	429,072	(1,266,598)	2,124,742
ATOP2 (NV)	3,206	249	**594**	**39**	**1,149**	**1,322,782**	**87,360**	**2,558,204**
MOQI (MO)	4,103	254	57	(449)	563	150,935	(1,183,011)	1,484,881
NY-RAH (NY)	10,333	228	447	(362)	1,257	2,885,194	(2,333,628)	8,104,015
OPTIMISTIC (IN)	4,986	235	29	(543)	600	98,110	(1,845,707)	2,041,926
RAVEN (PA)	4,419	272	**551**	**111**	**991**	**1,813,400**	**365,046**	**3,261,754**
Payment-Only								
All	36,079	248	40	(143)	224	988,481	(3,502,128)	5,479,090
AQAF (AL)	4,284	254	**378**	**38**	**718**	**1,123,746**	**111,915**	**2,135,578**
ATOP2 (CO)	4,483	241	(176)	(664)	312	(520,272)	(1,964,738)	924,195
MOQI (MO)	5,343	254	252	(111)	615	937,415	(415,154)	2,289,985
NY-RAH (NY)	11,183	246	118	(279)	514	887,008	(2,104,481)	3,878,497
OPTIMISTIC (IN)	5,911	240	(163)	(643)	317	(634,851)	(2,499,652)	1,229,949
RAVEN (PA)	4,875	254	**(583)**	**(1,089)**	**(76)**	**(1,977,474)**	**(3,695,834)**	**(259,115)**

HP = hospitalization; PA = potentially avoidable.

SOURCE: RTI analysis of Medicare claims data.

NOTE: Values are rounded to the nearest ones place for simplicity; "Aggregate ECCP Effect on Medicare Hospitalization Spending" is calculated based on the **unrounded** values of the columns for "Mean Exposure Days" and "Intervention Period Effect on Medicare Hospitalization Expenditures per ECCP Participating Resident."

APPENDIX CC
PERCENTAGE OF RESIDENTS WITH ADVANCE DIRECTIVES

CC.1   Overview

The goal of this analysis is to understand the relationship between the ECCP's end-of-life (EOL) care-directed activities and the number of residents with documented advance directives. We examined the percentage of eligible residents with at least one advance directive and how that proportion changed from the last three years of NFI 1 (2014–2016) through the first three years of NFI 2 (2017–2019). These data were drawn from the CASPER database and reflect facility-level proportions of all residents[28] with advance directives, rather than a proportion of facility eligible residents with advance directives.[29] An important limitation is that CASPER only reports if a resident had one or more advance directive of any kind and does not distinguish type of directive, such as if the resident had a "do not resuscitate" or a "do not hospitalize" order.

CC.2   Results

Table CC-1 presents the mean percentage of residents with an advance directive for the six ECCP states combined and separately for the ECCP Clinical + Payment (C+P) and Payment-Only (P-O) facilities from 2014 through 2017. We also share how the mean percentage of residents with an advance directive changes over time for the national comparison group.

Consistent with our primary data findings (reported in Chapter 2), for C+P facilities, the percentage of residents with an advance directive diminishes across the latter years of NFI 2. In addition, C+P facilities have a lower percentage of residents with advance directives across all years (2014–2017) compared to P-O facilities. However, the percentage of residents with an advance directive increases across time for all C+P ECCPs combined, whereas the percentage for P-O decreases. The national comparison group's percent of residents with advance directives remained stable during the same time period (2014-2019).

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[28] Percentage of residents with an advance directive includes all eligible and ineligible residents in the facility such as residents receiving rehabilitation with fewer than 101 days and long-stay residents enrolled in Medicare Advantage plans.

[29] Multiple variables, including census of residents with advance directives, are integrated into our analytic file process from the CASPER database with RTI programs AF450, AF500, and AF600.

Table CC-1. Mean percentage of residents with advance directives

ECCP (state)	2014	2015	2016	2017	2018	2019
Clinical + Payment						
All ECCPs (all states)	40.72	41.64	46.99	48.46	47.54	47.58
AQAF (AL)	32.41	38.22	40.76	41.20	33.47	33.49
ATOP2 (NV)	28.37	29.55	34.99	33.54	41.00	38.28
MOQI (MO)	38.83	35.41	37.44	45.42	53.65	54.02
NY-RAH (NY)	59.27	56.00	61.63	61.35	60.58	64.83
OPTIMISTIC (IN)	27.43	29.97	36.70	38.50	30.30	26.55
RAVEN (PA)	52.90	55.63	66.57	67.88	69.71	70.07
Payment-Only						
All ECCPs (all states)	57.41	56.48	55.65	54.03	57.53	53.68
AQAF (AL)	37.29	34.13	33.76	30.05	26.09	28.28
ATOP2 (CO)	80.52	68.31	69.98	57.78	70.88	68.58
MOQI (MO)	56.71	59.36	45.44	59.29	66.11	51.49
NY-RAH (NY)	65.72	67.31	64.66	64.51	64.00	68.83
OPTIMISTIC (IN)	53.36	55.87	62.27	60.51	60.07	46.88
RAVEN (PA)	43.99	46.28	51.61	44.20	51.94	49.85
National comparison group						
National comparison group	54.37	53.97	54.41	54.37	54.63	54.09

SOURCE: RTI analysis of Medicare claims data.

APPENDIX DD
PROJECT-RELATED PUBLICATIONS

During the course of NFI 1 and NFI 2, RTI produced several publications related to various findings from the Initiative. A list of these publications is below. Additional papers not listed below have been either been submitted or are planned.

Daras, L. C., Wang, J. M., Ingber, M. J., Ormond, C., Breg, N. W., Khatutsky, G., & Feng, Z. (2017). What are nursing facilities doing to reduce potentially avoidable hospitalizations? *JAMDA, 18*(5), 442-444. https://doi.org/10.1016/j.jamda.2017.02.007

Feng, Z., Ingber, M. J., Segelman, M., Zheng, N. T., Wang, J. M., Vadnais, A., Coomer, N. M., & Khatutsky, G. (2018). Nursing facilities can reduce avoidable hospitalizations without increasing mortality risk for residents. *Health Affairs, 37*(10), 1640-1646. https://doi.org/10.1377/hlthaff.2018.0379

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Segelman, M., Ingber, M. J., Feng, Z., Khatutsky, G., Bercaw, L., Gasdaska, A., Huber, B., & Voltmer, H. (2021). Treating in place: Acute care for long-stay residents in nursing facilities under a CMS Initiative. *Journal of the American Geriatrics Society, 69*(2), 407-414. https://doi.org/10.1111/jgs.16901

Vadnais, A. J., Vreeland, E., Coomer, N. M., Feng, Z., & Ingber, M. J. (2020). Reducing transfers among long-stay nursing facility residents to acute care settings: Effect of the 2013–2016 Centers for Medicare and Medicaid Services Initiative. *JAMDA, 21*(9), 1341-1345. https://doi.org/10.1016/j.jamda.2020.01.002

APPENDIX EE
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Li, Q., Chong, N., Hughes, K., Daras, L. C., Ingber, M., Smith, L., & Erim, D. (2019). Final Technical Expert Panel Summary Report: Development of a Healthcare-Associated Infections Quality Measure for the Skilled Nursing Facility Quality Reporting Program. Centers for Medicare and Medicaid Services. RTI International.

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