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Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents: Final Annual Report Project Year 3

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EVALUATION OF THE INITIATIVE TO REDUCE AVOIDABLE HOSPITALIZATIONS AMONG NURSING FACILITY RESIDENTS: FINAL ANNUAL REPORT PROJECT YEAR 3

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EXECUTIVE SUMMARY

E.1 Overview

This report details analyses and findings from the third year of the Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Home Residents. The quantitative analysis results in this report were produced using Medicare data from the second Initiative year, 2014. Medicaid claims data are not included in these analyses because they are not available at this time. A brief summary of observations from our 2015 primary data collection activities, just coming to a close, is presented.

Compared to data from the first Initiative year, 2013, data from 2014 indicate much more clearly that the Initiative has effects on many of the measures, including some more consistent patterns of effects for a few of the Enhanced Care and Coordination Providers (ECCPs). In Pennsylvania and Missouri, there are strong patterns indicating intervention effects in reducing utilization and spending. The measures are not all significant, but most are. Other ECCPs, in Alabama, Indiana, and New York, show mostly consistent indicators of reductions, but few measures are statistically strong. The ECCP effects in Nebraska and Nevada are mixed.

The MDS-based quality measures do not show any pattern of change related to the Initiative. If the Initiative's focus is more on avoiding hospitalizations and emergency department (ED) use related to resident changes in condition than on improving quality, the effects of the interventions on the broad range of MDS-based quality measures may be very limited (see the main report for details on the MDS-based quality measures).

We are currently completing primary data collection for 2015. In this report, we present a brief summary of our preliminary findings based on information from site visits, phone interviews, and web-based surveys.

E.2 Introduction

This report presents the status of the Centers for Medicare & Medicaid Services (CMS) Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents (hereafter referred to as the Initiative) from the point of view of the 2015 evaluation. The Initiative is designed to affect hospitalization rates by directly changing practices at the facility level. The Initiative tests a series of clinical interventions or care models aimed at improving the health and health care of long-stay nursing facility residents, with the goals of reducing avoidable inpatient hospital admissions, improving quality metrics, and decreasing the total cost of health care spending for the Medicare-Medicaid enrollees participating in the Initiative.

The Initiative involves seven Enhanced Care and Coordination Providers (ECCPs) consisting of academic institutions, quality improvement organizations (QIOs), a health care provider network, and a hospital association. As of September 1, 2015, these ECCPs have partnered with 144 nursing facilities in seven states to implement strategies aimed at reducing hospitalizations and improving care for fee-for-service, long-stay nursing facility residents whose care is funded through Medicare, Medicaid, or the Veterans Administration. Each ECCP designed its own interventions within the Initiative, under CMS guidance. Each of the

interventions is described briefly in ***Section 1.1*** of the main report. Two of the ECCPs, in Alabama and New York, implement the Initiative through ECCP staff educating facility staff rather than implementing a clinical care component. The other ECCPs include direct patient oversight by ECCP staff as well. In brief, aside from ECCP hands-on care by nurses and advanced practice nurses, generally the interventions include introducing tools for facility staff to recognize a change of condition of a resident, to report resident condition to a physician, and to monitor pharmacy use. Other elements, specific to particular ECCPs, distinguish the interventions, as do the methods of implementation.

After CMS approved the preliminary protocols, including communication plans, readiness reviews, and operations manuals, the ECCPs began implementing their initiatives in the partner nursing facilities in February 2013. All ECCPs have staggered implementation in multiple cohorts of facilities; the last cohort began in September 2013. In addition to implementation occurring in facilities at different times, the rollout of Initiative components has been staggered over time. The facility residents eligible for the Initiative are those who have been in the facility at least 101 days and those who have Minimum Data Set (MDS) assessments indicating that there is no active discharge plan in place, irrespective of length of stay in the facility.

In this executive summary, we present the results of the quantitative data analysis from the second Initiative year, 2014, covering the effects of each ECCP intervention on utilization, spending, and MDS-based quality outcomes. This analysis includes data for the entire calendar year 2014 for all participating facilities irrespective of their degree of implementation of the Initiative. For each ECCP, we put the quantitative results into context by describing the findings of our site visits, interviews, and surveys for 2014 and the follow-up in 2015. In ***Section E.3,*** we give a brief overview of the evaluation methods. A more detailed description is in ***Section 2*** of the main report. A comparison of summary utilization and spending across the intervention and comparison groups in ECCP states is presented in ***Section E.4*** showing how the patterns of these measures vary.

The results in ***Section E.5*** are presented separately for each ECCP in Alabama, Indiana, Missouri, Nebraska, Nevada, New York, and Pennsylvania. The analytical method yields estimates of changes over time and distinguishes the ECCP-related changes from general changes shared by comparison groups. As can be seen in this report, the implementations and challenges differ by state.

Preliminary qualitative analysis results and status of implementation of the Initiative as determined by primary data collection are described in ***Section E.6***. ***Section E.7*** provides an overall summary discussion of the results.

E.3 Methods

The evaluation is designed to assess ECCP interventions as they unfold, measuring both process and outcome elements. The evaluation assesses the effectiveness of the overall Initiative as well as components of each ECCP intervention. A combination of quantitative and qualitative methods is used to evaluate the seven ECCP interventions, customizing the overarching evaluation design to (1) capture each ECCP's unique features and (2) develop an in-depth understanding of

the transformative processes that may occur throughout the Initiative's implementation. This approach allows us to directly link structural and process changes to outcomes.

A principal desired outcome of the Initiative is the reduction of avoidable hospitalizations. These admissions are identified by matching the principal diagnosis on acute hospital admissions to a list of conditions deemed potentially avoidable. RTI International uses the definition of potentially avoidable hospitalizations developed by Walsh et al. (2010) in their study of high-cost dually eligible populations. Since this publication, a few conditions were added or deleted based on subject matter expert input. The updated list of potentially avoidable hospitalization conditions reflects International Classification of Diseases, Ninth Revision (ICD-9) code changes through 2012.

Quantitative methods are used to evaluate the impact of ECCP interventions on outcomes, using a matched comparison group of non-ECCP facilities to determine the effect of interventions. A comparison group of non-ECCP facilities with characteristics similar to ECCP facilities was identified within each state. RTI uses multivariate analyses to evaluate key utilization, expenditure, and MDS-based quality outcomes in a difference-in-differences regression model framework. The models control for many characteristics of the resident population, clinical and demographic, as well as some facility characteristics. The main predictor variable that we focus on for the Initiative effect indicates the magnitude of the difference in the change in the measured outcome between the ECCP intervention group and the comparison group. This allows for changes over time common to both groups to be adjusted for, and for differences between the groups related to the Initiative to be measured. Greater technical detail is given in ***Section 2*** of the main report.

The qualitative design focuses on primary data analyses using information collected from the ECCPs and their partnering facilities directly. Formal site visit protocols and telephone interviews are used to ensure standardized primary data are collected. A web-based survey is also used to collect data from Initiative facilities beyond the interviews. Additionally, a one-time web-based survey of comparison facilities is conducted to collect data about specific interventions and quality improvement initiatives related to reducing hospitalizations that are being implemented outside of the ECCP interventions.

The primary data complement the quantitative secondary data analyses, providing critical context to interpret evaluation findings. In addition to informing secondary data analyses, the primary data analyses provide a better understanding of the ECCPs and the processes of implementing various models of the Initiative in participating facilities. This in-depth qualitative approach allows us to assess the fidelity to the original Initiative design and to gather necessary information to describe the barriers to implementation. In addition to describing the situation in 2014 related to the quantitative results, we report findings from the primary data collection for the Initiative in 2015.

E.4 Descriptive Findings

This section presents a brief overview of the results from descriptive analyses of key evaluation outcomes. The complete descriptive results are located in Sections 2.10.1 to 2.10.4 of the main report. All statistics are for the Initiative eligible residents.

E.4.1 Medicare Utilization

The 2014 data show that in each of the seven states in both the ECCP and comparison groups, approximately 25 to 30 percent of all residents experienced at least one hospitalization, and roughly 10 to 15 percent experienced at least one potentially avoidable hospitalization. There is greater inter-state variation in the percentages of residents who visited the ED at least once in 2014, from roughly 15 percent to close to 25 percent; between approximately 5 and 10 percent of residents had at least one potentially avoidable ED visit. Within each state, the differences between the ECCP and comparison groups in the percentages of residents with any hospitalization or ED visit are relatively small.

The descriptive analyses also reveal some trends in utilization across the 4-year reporting period. For example, among ECCP groups and comparison groups in most states, there was an overall decrease in both the percentage of residents ever hospitalized and those who were ever hospitalized for a potentially avoidable condition in a given year. However, in many comparison groups, the magnitude of the reduction was less than that in the respective ECCP group. In addition, there was a steady increase in the use of observation stays over the 4-year period in virtually all states and all groups. However, relatively few residents have a hospital outpatient observation stay in any given year. A complete summary of the descriptive utilization outcomes for years 2011 through 2014 is available in this report in Section 2.10.1.

E.4.2 Medicare Expenditures

Average expenditures for ECCP facility residents are generally similar to those in the comparison group within each state; more variation is seen in spending across the states. Residents in three states, New York, Indiana and Nevada, have higher levels of per resident Medicare expenditures than those in the other four states. In 2014, total Medicare expenditure was the highest for residents of ECCP facilities in New York, which averaged $29,652 ($26,781 in comparison facilities), followed by $24,754 for residents of ECCP facilities in Indiana ($22,688 in Indiana comparison facilities) and $23,857 for residents of ECCP facilities in Nevada ($22,279 in Nevada comparison facilities).

In 2014, we continued to observe high levels of Medicare expenditure on skilled nursing facility (SNF) services. Expenditure on SNF services also varied substantially among the states, ranging from an average of $9,920 for SNF services per ECCP facility resident in New York to $4,505 per ECCP facility resident in Missouri. However, despite the wide range in expenditure on SNF services, all states had higher average expenditure on SNF services than on average all-cause hospitalizations. It is likely that much of the SNF-related expenditure we observe is incurred by those residents who were eligible for the Initiative because of no discharge plan. A complete summary of the descriptive expenditure outcomes for 2011 through 2014 is available in Section 2.10.2.

E.4.3 MDS-Based Quality Outcomes

The MDS-based quality measure scores are summarized for each state by ECCP and comparison facilities. A complete summary of the descriptive MDS-based quality measures for years 2011 through 2014 is available in Section 2.10.3 of this report. From 2011 to 2014, some measures showed overall quality improvement in both the ECCP and the comparison facilities in

all the states with minimal fluctuations, such as use of physical restraints and antipsychotic medications. Other measures increased in some states, declined in some, and fluctuated in others. The scores for most measures varied substantially across states. We also observed variations in quality between the ECCP and comparison groups; however, in general, we observed greater variations across states than within states.

E.4.4 Facility Staffing and Inspection Deficiencies

For the most part, direct-care staffing levels are similar in the ECCP and comparison groups within each state and vary more between states.[1] The scope–severity weighted health-related deficiency scores are relatively similar across the ECCP and comparison groups within each state. However, they vary substantially both across the states and over time. This pattern is as expected given known discrepancies in state inspection survey practices and the level of stringency state survey agencies apply in interpreting and enforcing federal regulations. A complete summary of facility staffing and inspection deficiencies for years 2011 through 2014 is available in Section 2.10.4 of this report.

E.5 ECCP-Specific Multivariate Regression Results and Qualitative Context

In determining the effects of the Initiative, we analyzed the data for each ECCP implementation separately. Although there are commonalities in the interventions, major differences exist. There are also differences in the regulatory environments and utilization patterns in the states that make pooling undesirable. In this section, for each state, we describe the multivariate analysis results on key utilization, expenditure, and MDS-based quality outcomes. In multivariate regression analyses, we are primarily interested in estimating the effect of ECCP intervention on a given outcome for residents in intervention facilities, relative to the outcome for residents in comparison facilities during an Initiative year, accounting for Base Year differences. Statistical estimation of the strength of the effects of the predictors is made using a set of observations that characterize each resident in the study. Some of the predictors are risk adjusters, such as medical conditions of the residents and some facility characteristics. Other predictor variables account for the year of the observation, whether the resident is in one of the ECCP facilities, and whether the observation is for a resident who is in an ECCP facility in an Initiative year. This last variable captures the ECCP effect of interest: the change in the outcome not shared with the comparisons after accounting both for Base Year outcome differences between ECCP facilities and comparisons and for changes that apply to all facilities over time.

The evaluation assessed differences between each ECCP and their matched comparison group on selected Medicare utilization, expenditure, and MDS-based quality outcomes in an Initiative year relative to the Base Year, 2012. In this report, we focus on the effect of ECCP intervention in 2014, the first year during which the Initiative was mostly, if not fully, implemented in all seven ECCP participating states, as compared to 2012. In the summary below, we highlight results regarding the ECCP effects on four utilization outcomes—count of all-cause hospitalizations, count of potentially avoidable hospitalizations, count of all-cause ED

[1] One exception occurred in New York where 2014 direct-care staffing levels increased dramatically in the ECCP group as compared to the comparison group. This was a result of one facility, which, in the process of closing discharged residents before letting go of staff resulting in inflated staffing ratios for New York's ECCP group.

visits, and count of potentially avoidable ED visits—and on five types of expenditure outcomes—total Medicare expenditure, expenditure for all-cause hospitalizations, expenditure for potentially avoidable hospitalizations, expenditure for all-cause ED visits, and expenditure for potentially avoidable ED visits.

We report marginal effect estimates in meaningful units, such as counts or dollars, instead of raw regression coefficients. Effect estimates with a negative sign signify reductions, which are desired for the outcomes measured in this analysis. The term "statistically significant," where cited in the summary, refers to a *p* value of 0.10 or lower (better) for an estimated effect. A *p* value of 0.10 means a 10 percent probability of observing an estimate of at least that magnitude by chance. When many estimates are generated and tested, the probability of observing some estimates this large by chance is greater than 10 percent.

A summary of quantitative findings for the Initiative in each state is provided below. Within each state, we begin with some contextual information from the qualitative findings through Project Year 2 (2014), which helps with the interpretation of quantitative results. The primary qualitative findings from Project Year 3 (2015) are presented in Section E.6. The dollar values of the effects are the actual model estimates. The percent estimates were computed using the 2012 mean values the as basis of the change; other bases may be used.

E.5.1 Summary of Findings: Alabama

The Alabama Quality Assurance Foundation's (AQAF's) Nursing Facility Initiative (NFI) is an education-only model in which Registered Nurses (RNs) provide training and support to staff within 23 participating nursing facilities. Primary components include Interventions to Reduce Acute Care Transfers (INTERACT) tools, morning huddles, medication management, advance care planning, consistent staffing, and quality assurance and performance improvement (QAPI). Through 2014, staff turnover among the AQAF RNs persisted, and a floating RN position was created to serve as a temporary substitute to ensure continuation of the NFI goals in facilities experiencing AQAF RN turnover. RNs continued to focus primarily on building relationships and trust with facility staff and leadership, which was said to be a critical first step in rolling out various components of the Initiative. Because relationship development and trust-building took several months, many of the components of the NFI had not been rolled out as of 2014. Most facilities had introduced INTERACT and medication management, but use of these tools varied widely across facilities. Newer components (e.g., morning huddles, advance care planning, consistent staffing, and quality improvement/QAPI) were still in the early stages of implementation, not yet widespread across facilities. Both AQAF NFI leadership and facility staff indicated that the model remains promising toward the goal of reducing avoidable hospitalizations, but because roll-out was slower than planned, additional time would be needed to see significant changes in hospitalization rates.

In Alabama, the multivariate regression estimates of the marginal effect of the ECCP intervention on the count of utilization outcomes in 2014 are summarized in ***Table ES-1***. The negative intervention effects for all the outcomes suggest that the ECCP intervention worked in the desired direction of reducing utilization. However, the effect size is small and not statistically significant (at the 0.10 significance level) for all-cause or potentially avoidable hospitalizations. The effect is moderate and statistically significant for all-cause and potentially avoidable ED

visits. Specifically, the ECCP intervention was associated with 0.077 fewer all-cause ED visits per resident ($p < 0.01$), on average, or a 20.1 percent reduction from the average count per resident in 2012, which was 0.384. For the count of potentially avoidable ED visits, the ECCP intervention resulted in 0.027 fewer visits per resident ($p < 0.05$), on average, or a 24.1 percent decrease from the average count per resident in 2012, which was 0.111.

The results for the estimated effect of ECCP intervention on Medicare expenditures are also reported in ***Table ES-1***. The estimate shows a reduction in spending for all five types of expenditures, including total Medicare spending, expenditures for all-cause hospitalizations, potentially avoidable hospitalizations, all-cause ED visits, and potentially avoidable ED visits. However, the effect is statistically significant only for the expenditure for all-cause ED visits, where the ECCP intervention was associated with an estimated \$29 ($p < 0.05$) lower spending per resident in 2014, on average, which amounts to an 18.5 percent reduction from the average expenditure of \$155 for all-cause ED visits in 2012.

Table ES-1
Summary of ECCP intervention effects on utilization and expenditure outcomes, Alabama

Outcome	Mean, 2012	Effect: 2012 to 2014	Effect (% of mean)
Medicare utilization (count of events per resident)			
All-cause hospitalizations	0.519	-0.023	-4.4%
Potentially avoidable hospitalizations	0.222	-0.012	-5.4%
All-cause ED visits	0.384	-0.077***	-20.1%
Potentially avoidable ED visits	0.111	-0.027**	-24.1%
Medicare expenditure (dollars per resident)			
Total	19,825	-107	-0.5%
All-cause hospitalizations	4,274	-82	-1.9%
Potentially avoidable hospitalizations	1,559	-128	-8.2%
All-cause ED visits	155	-29**	-18.5%
Potentially avoidable ED visits	49	-7	-13.4%

NOTE: The 2012 mean indicates the overall mean of each outcome among all residents in that year. Effect is the marginal effect of the ECCP intervention in 2014 relative to the baseline difference between ECCP and comparison in 2012.

ECCP = Enhanced Care and Coordination Providers; ED = emergency department.

Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Overall, these results suggest a slight reduction in utilization and expenditures in Alabama from 2012 to 2014 that might be attributable to the ECCP intervention, although the effect estimates are not consistently statistically significant. In particular, there is no evidence of a significant ECCP impact on reducing hospitalizations, potentially avoidable hospitalizations, or expenditures associated with these hospitalizations, which are among the major drivers for Medicare spending among nursing facility residents. Only the reduction for all-cause ED visits was significant for both count and expenditure.

The ECCP intervention demonstrates no definitive effect on MDS-based quality outcomes in Alabama, with the directions of the intervention effects indicating both improving and worsening quality; only one measure (reduction in one or more falls with injury) is statistically significant at a 0.1 level of confidence. With no systematic effect observed at this point, we consider the effect of the ECCP intervention on these MDS-based quality measures ambiguous in direction and too small to be measured at this stage.

E.5.2 Summary of Findings: Indiana

Indiana University Geriatrics Department's Optimizing Patient Transfers, Impacting Medical Quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC) design remained largely unchanged in 2014, operating in 19 facilities. The project places highly trained RNs in each facility to provide direct clinical support, education, and training to nursing facility staff. Seven OPTIMISTIC nurse practitioners (NPs) support the OPTIMISTIC RN and provide evaluation and care needs. The degree of implementation of the model in facilities was affected by a range of issues. A lack of clarity regarding the role of OPTIMISTIC staff in the facilities affected the degree of acceptance and integration into facility life. A coaching model was established to assist the OPTIMISTIC RNs in addressing implementation challenges, including those that were facility specific. Nursing facility staff turnover, although anticipated, proved to be a formidable challenge requiring continual rebuilding of relationships and re-education of front-line staff. The roll out and facility acceptance of tools such as the Stop and Watch; Situation, Background, Assessment, and Recommendation (SBAR); and Care Paths varied across facilities. This was complicated by facility concerns regarding the time required to train/retrain facility staff in OPTIMISTIC's suite of tools, dementia issues, and other clinical and end-of-life issues. This concern resulted in modifications to OPTIMISTIC training efforts. Transition visits accounted for a large portion of the ECCP NPs' time, and as a result, the number of Collaborative Care Reviews completed went from an expected two per week to one per week. Some of the primary care physicians required the ECCP NPs to contact them before writing orders, presenting a barrier to use and efficiency of NP time. Lastly, data collection challenges, including timely identification and correction of data entry errors, resulted in increased use of OPTIMISTIC staff time that otherwise could have been devoted to other OPTIMISTIC model components.

Regression estimates of the effect of the Indiana ECCP intervention on the count of utilization outcomes in 2014 are listed in ***Table ES-2***. The marginal effects on all-cause hospitalizations, potentially avoidable hospitalizations, all-cause ED, and potentially avoidable ED visits are negative, suggesting that the intervention was associated with a reduction in at least one of those types of events. However, the only marginal effects that were statistically significant from zero were all-cause and potentially avoidable hospitalizations. The intervention was associated with 0.092 fewer hospitalizations per resident and 0.051 fewer potentially avoidable hospitalizations per resident, a 21.2 percent and 29.3 percent reduction from the 2012 rates, respectively (p-values < 0.01). There were reductions of all-cause ED visits and potentially avoidable ED visits but they were not statistically significant.

The only statistically significant effects on expenditures were for all-cause hospitalizations and ED visits, although all effects were estimated to be reductions in expenditures (***Table ES-2***). The intervention was associated with a decrease of $1,368 in all-

cause hospitalizations (an 18.9 percent reduction from 2012 expenditures, $p < 0.05$) and $46 in all-case ED visits (a 30.9 percent reduction, $p < 0.01$). There were reductions in total Medicare expenditures as well as expenditures on potentially avoidable hospitalizations and potentially avoidable ED visits but they were not statistically significant.

Table ES-2
Summary of ECCP intervention effects on utilization and expenditure outcomes, Indiana

Outcome	Mean, 2012	Effect: 2012 to 2014	Effect (% of mean)
Medicare utilization (count of events per resident)			
All-cause hospitalizations	0.433	-0.092***	-21.2%
Potentially avoidable hospitalizations	0.174	-0.051***	-29.3%
All-cause ED visits	0.318	-0.037	-11.6%
Potentially avoidable ED visits	0.086	-0.001	-1.2%
Medicare expenditure (dollars per resident)			
Total	22,115	-1,368	-6.2%
All-cause hospitalizations	4,171	-788**	-18.9%
Potentially avoidable hospitalizations	1,420	-236	-16.6%
All-cause ED visits	149	-46***	-30.9%
Potentially avoidable ED visits	42	-11	-26.8%

NOTE: The 2012 mean indicates the overall mean of each outcome among all residents in that year. Effect is the marginal effect of the ECCP intervention in 2014 relative to the baseline difference between ECCP and comparison in 2012.

ECCP = Enhanced Care and Coordination Providers; ED = emergency department.

Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The marginal effect of the Indiana ECCP intervention was associated with reductions in all utilization and expenditure outcomes presented here, although only some effects were statistically significant. One consistent finding was a significant reduction in both count and expenditure of all-cause hospitalizations; results for potentially avoidable hospitalizations and ED visits were less consistent.

There was no definitive effect of the ECCP intervention on MDS-based quality outcomes in Indiana. Estimated effects were both positive and negative, indicating both worsening and improving quality. Only one measure (pressure ulcers Stage II or higher) had a statistically significant adverse effect. Given the lack of a systematic pattern, we cannot attribute this observed effect to the ECCP intervention.

E.5.3 Summary of Findings: Missouri

In 2014, all 16 of the Missouri Quality Initiative facilities remained in the Initiative. Project staff stabilized early in Project Year 2. A full-time employee Database Coordinator was added to assist facility staff and Missouri Quality Initiative for Nursing Homes (MOQI) Advanced Practice Registered Nurses (APRN) in data collection and report generation. The

ECCP maintained overall fidelity to the model with some modifications and intensified efforts in the APRN, quality improvement, advance directives, and health information technology (HIT) components. Staff at nearly all of the facilities reported anecdotal evidence that the MOQI is reducing some of their hospitalizations. The use of INTERACT, particularly Stop and Watch and SBAR, became routine in some facilities. APRNs identified goals for educating staff on clinical preventive measures (hydration, urinary continence, and mobility) to reduce risks for hospitalization and increased focus on advance directives. In addition, APRNs increased focus on root cause analysis and met monthly with the Project Coordinator to review each facility transfer. The APRNs created customized reports on transfers in the project's Qualtrics database and used the information to target education and work with facility quality improvement committees. Family and physician demands for hospital transfers remained a major barrier to reducing hospitalizations in many nursing facilities. A new Health Insurance Portability and Accountability Act–related requirement contributed to delays in the HIT component. Data available from the MOQI reports and interviews indicated that the Initiative components are slowly gaining a foothold in most of the facilities despite HIT challenges and facility and APRN turnover.

In Missouri, the multivariate regression estimates of the marginal effect of the ECCP intervention on the utilization count outcomes in 2014 are summarized in ***Table ES-3***. The intervention effects for all four of the outcomes are negative and significant, suggesting that the ECCP intervention worked in the desired direction of reducing utilization of hospitalizations and ED visits. The ECCP intervention was associated with a decrease in the count of all-cause hospitalizations by 0.105 per resident ($p < 0.01$), on average, or a 21.4 percent reduction from the average count per resident in 2012, which was 0.491. For the count of potentially avoidable hospitalizations, the ECCP intervention correlated with 0.071 fewer visits per resident ($p < 0.01$), on average, or a 34.5 percent decrease from the average count per resident in 2012, which was 0.206. The ECCP intervention was also associated with a decrease in the count of all-cause ED visits by 0.098 per resident ($p < 0.01$), on average, or a 27.9 percent reduction from the average count per resident in 2012, which was 0.351. For the count of potentially avoidable ED visits, the ECCP intervention correlated with 0.041 fewer visits per resident ($p < 0.01$), on average, or a 39.1 percent decrease from the average count per resident in 2012, which was 0.105.

The results for the estimated effect of ECCP intervention on Medicare expenditures are also reported in ***Table ES-3***. The estimates are negative, meaning a reduction in spending, for all five types of expenditures. The effect is not statistically significant for total expenditures, but is significant for the other four types of expenditures. The ECCP intervention was associated with decreased spending on all-cause hospitalizations by an estimated \$729 ($p < 0.05$) per resident in 2014, on average, which amounts to a reduction of about 16.2 percent from the average expenditure of \$4,503 in 2012. The effect on potentially avoidable hospitalizations was smaller in magnitude at \$456 ($p < 0.05$) per resident in 2014, on average, or about 28.8 percent less than the average expenditure of \$1,587 in 2012. The ECCP intervention similarly was associated with reduced expenditures on all-cause and potentially avoidable ED visits. Expenditures on all-cause ED visits were about 30.6 percent or \$53 ($p < 0.01$) lower, on average, in 2014 than the average of \$173 in 2012, and expenditures on potentially avoidable ED visits were about 28.0 percent or \$15 ($p < 0.01$) lower, on average, in 2014 than the average of \$55 in 2012.

Table ES-3
Summary of ECCP intervention effects on utilization and expenditure outcomes, Missouri

Outcome	Mean, 2012	Effect: 2012 to 2014	Effect (% of mean)
Medicare utilization (count of events per resident)			
All-cause hospitalizations	0.491	-0.105***	-21.4%
Potentially avoidable hospitalizations	0.206	-0.071***	-34.5%
All-cause ED visits	0.351	-0.098***	-27.9%
Potentially avoidable ED visits	0.105	-0.041***	-39.0%
Medicare expenditure (dollars per resident)			
Total	20,345	-92	-0.5%
All-cause hospitalizations	4,503	-729**	-16.2%
Potentially avoidable hospitalizations	1,587	-456**	-28.8%
All-cause ED visits	173	-53***	-30.6%
Potentially avoidable ED visits	55	-15*	-28.0%

NOTE: The 2012 mean indicates the overall mean of each outcome among all residents in that year. Effect is the marginal effect of the ECCP intervention in 2014 relative to the baseline difference between ECCP and comparison in 2012.

ECCP = Enhanced Care and Coordination Providers; ED = emergency department.

Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Overall, these results suggest that reduced utilization and expenditures in Missouri from 2012 to 2014 are associated with the ECCP intervention. The effect estimates are consistently significant across outcome types, for both count utilization and expenditures, for all measures of hospitalizations and ED visits, which are among the major drivers for Medicare spending among nursing facility residents.

We observed no overall pattern for effect of the ECCP intervention on MDS-based quality outcomes in Missouri. As with other states, the estimated effects in Missouri indicated both improving and worsening quality. The only significant estimated effect was an increase in catheter inserted and left in bladder. As only one quality outcome had a statistically significant estimated effect at a 0.10 significance level, it cannot be definitively attributed to the ECCP intervention.

E.5.4 Summary of Findings: Nebraska

The Alegent ECCP placed six NPs in 15 nursing facilities in 2014, although one facility left the Initiative in October. This ECCP has four major components: integration of NPs into participating facilities, dental hygiene, improved communication, and education. In 2014, the ECCP continued to expand each of these interventions, although their primary focus was on placing NPs in participating facilities and empowering those NPs to act in the best interest of residents. Although ECCP NPs provided informal mentorship to facility staff, the ECCP did not roll out the first in-service on INTERACT communication tools until May and June 2014. Additionally, facility staff still were largely unaware of the ECCP's 24-hour call service.

Consequently, the ECCP NPs attended to emergent conditions only when they were in the facility; residents' primary care physicians still sent their patients to the emergency room when emergent conditions arose at other times. However, in 2014, the ECCP made significant strides in gaining the trust and support of these physicians. Compared with the first year, physicians increasingly allowed the ECCP NP to write orders for their patients who were enrolled in the Initiative. Finally, the ECCP increased the hours of supporting clinical staff in 2014. They hired a second dental hygienist, which allowed them to assess all enrolled residents every 6 months and conduct cleanings on those residents with teeth. They also increased the hours of the consulting pharmacist from 10 to 16 hours per week, a reflection on the ECCP's focus on reducing polypharmacy and decreasing the use of unnecessary psychotropic medications.

The multivariate regression estimates of the effect of Nebraska's ECCP on the utilization count outcomes in 2014 are summarized in ***Table ES-4***. Our findings indicate that the ECCP intervention had no effect on the utilization count outcomes that was statistically significantly different from zero (at the 0.10 significance level) in 2014. Despite the lack of statistical significance, we provide comment on the direction of these effects. As illustrated in ***Table ES-4***, the effect estimates for both all-cause and potentially avoidable hospitalizations are negative. This suggests that the ECCP intervention may have worked in the desired direction for those two outcomes, reducing utilization. In contrast, the effect estimates were positive for both all-cause ED visit and potentially avoidable ED visits, indicating that being in the ECCP intervention may have caused increased utilization of such services.

The results for the estimated effect of ECCP intervention on Medicare expenditures are reported in ***Table ES-4***. The effect estimates for both all-cause ED visits and potentially avoidable ED visits were in the undesirable direction; however, these estimates were not statistically significant. The effect estimates for the remaining three types of expenditures, by contrast, were in the desired direction. These include total Medicare spending and expenditures for all-cause hospitalizations and potentially avoidable hospitalizations. Two of these expenditure outcomes, all-cause hospitalizations and potentially avoidable hospitalizations, were statistically significant. In 2014, the ECCP intervention reduced spending on all-cause hospitalizations by an estimated \$971 per resident ($p < 0.01$), which amounts to a reduction of about 24.5 percent from the average expenditure for all-cause hospitalizations in 2012 (\$3,972). Similarly, for potentially avoidable hospitalizations, the ECCP intervention declined by an estimated 33.9 percent, or \$477, per resident from the average expenditure per resident in 2012, \$1,404 ($p < 0.05$).

Table ES-4
Summary of ECCP intervention effects on utilization and expenditure outcomes, Nebraska

Outcome	Mean, 2012	Effect: 2012 to 2014	Effect (% of mean)
Medicare utilization (count of events per resident)			
All-cause hospitalizations	0.428	-0.046	-10.7%
Potentially avoidable hospitalizations	0.189	-0.036	-19.0%
All-cause ED visits	0.366	0.029	7.9%
Potentially avoidable ED visits	0.099	0.010	10.1%
Medicare expenditure (dollars per resident)			
Total	18,640	-1,475	-7.9%
All-cause hospitalizations	3,972	-971***	-24.5%
Potentially avoidable hospitalizations	1,404	-477**	-33.9%
All-cause ED visits	199	54	26.9%
Potentially avoidable ED visits	63	16	25.0%

NOTE: The 2012 mean indicates the overall mean of each outcome among all residents in that year. Effect is the marginal effect of the ECCP intervention in 2014 relative to the baseline difference between ECCP and comparison in 2012.

ECCP = Enhanced Care and Coordination Providers; ED = emergency department.

Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Overall, despite a lack of statistical significance in all utilization outcomes, the negative effect estimates coupled with the statistically significant reductions in expenditures for both all-cause and potentially avoidable hospitalizations indicate that there may be some reduced utilization and expenditure for those two variables associated with the ECCP in Nebraska from 2012 to 2014. In contrast, the effects of the intervention on both all-cause and potentially avoidable ED visits, although not statistically significant, indicated that the ECCP intervention may have resulted in increased utilization of and spending on those services. We will continue to monitor these patterns in the remaining years of the Initiative.

The results of the ECCP intervention on MDS-based quality outcomes in Nebraska suggest no overall meaningful effect on quality. The mixture of positive and negative estimated effects indicated both quality decline and improvement. The only statistically significant effect was an adverse increase of the measure "activities of daily living (ADL) decline." Given that there were no other significant effects, the ECCP intervention did not demonstrate an overall impact on quality outcomes in Nebraska.

E.5.5 Summary of Findings: Nevada

Nevada's Admissions and Transitions Optimization Program (ATOP) provides clinical support, training, and education to 24 participating facilities. In 2014, ECCP facility-based APRN and RN turnover was approximately 50 percent. Consequently, instead of one APRN or physician assistant and two RNs rotating among four to five nursing facilities in each of five pods (groups of facilities), as was their model, ECCP clinical staff rotated among five to nine

facilities. The ECCP continued training and promoting the use of INTERACT tools and focused on the SBAR, Stop and Watch, and quality improvement tools. Adoption varied widely, depending upon support of facility leadership, facility-staff turnover, the facility's own corporate systems, and integration of ECCP clinical staff. In facilities in which they were fully integrated, ECCP staff were involved in quality improvement and QAPI meetings as well as residents' care conferences. To improve trust and integration, ECCP staff offered trainings tailored to the needs of each facility; for example, skills trainings, such as IV insertion, and condition-specific trainings, such as recognition of dehydration. Other trainings, conducted by the ECCP, were open to both participating and non-participating facilities. The ECCP, which is a QIO, believes in improving quality of care in all facilities in the state and, therefore, invites all facilities to its group trainings. Topics of these include INTERACT tools and the Physician Orders for Life-Sustaining Treatment. The comparison group is every non-ECCP long-term care nursing facility in the state and has fewer facilities than the ECCP group. There are relatively few facilities in the state. In other states, the comparison group is about twice as large as the ECCP group. This does not preclude finding Initiative effects in Nevada, but the sample difference should be recognized.

The multivariate regression estimates of the effect of Nevada's ECCP on the utilization count outcomes in 2014 are summarized in ***Table ES-5***. We find that effects of the ECCP intervention were statistically significant in both all-cause hospitalizations and potentially avoidable ED visits. The ECCP intervention decreased the count of all-cause hospitalizations by an average of 0.074 per resident, or 17.5 percent from the average count per resident in 2012 (0.423) ($p < 0.1$). For the count of potentially avoidable ED visits, the ECCP intervention resulted in an average increase of 0.049 visits per resident, or 70.0 percent from the count per resident in 2012 (0.070) ($p < 0.05$). We note that although the percent increase in count per resident for potentially avoidable ED visits is large, this is related to the relatively low count of ED visits per resident in 2012; a relatively small increase in the number of visits could result in a large percent increase. There is no statistically significant effect of ECCP intervention on the count of potentially avoidable hospitalizations or all-cause ED visits. The effects that are statistically significant are in opposite directions and therefore do not present a consistent pattern.

The results for the estimated effect of the ECCP on Medicare expenditures are also reported in ***Table ES-5***. The estimate of the effect of the intervention is negative, indicating a possible reduction in spending, for three of the five types of expenditures: total Medicare expenditure, all-cause hospitalizations, and potentially avoidable hospitalizations. This reduction in spending is statistically significant for one type of expenditure: total Medicare spending. In 2014, the ECCP intervention resulted in a reduction in total Medicare expenditure of an estimated $2,919 per resident, or 13.0 percent from the average total Medicare expenditure per resident in 2012 ($22,530) ($p < 0.1$). As ***Table ES-5*** illustrates, in the remaining two outcomes, all-cause ED visits and potentially avoidable ED visits, the estimated ECCP effects are positive, suggesting that the ECCP intervention may have resulted in increased spending for these two outcomes. However, only one of these expenditure outcomes, potentially avoidable ED visits, was statistically significant. The ECCP intervention resulted in an increase of $49 per resident per potentially avoidable ED visit, which is an increase of 102 percent from the 2012 average of $48 per resident ($p < 0.1$). Again, we note that the large percent increase in spending per resident

on potentially avoidable ED visits is made possible by the relatively low expenditure per resident in 2012.

Table ES-5
Summary of ECCP intervention effects on utilization and expenditure outcomes, Nevada

Outcome	Mean, 2012	Effect: 2012 to 2014	Effect (% of mean)
Medicare utilization (count of events per resident)			
All-cause hospitalizations	0.423	-0.074*	-17.5%
Potentially avoidable hospitalizations	0.155	-0.008	-5.2%
All-cause ED visits	0.251	0.020	8.0%
Potentially avoidable ED visits	0.070	0.049*	70.0%
Medicare expenditure (dollars per resident)			
Total	22,530	-2,919*	-13.0%
All-cause hospitalizations	5,579	-748	-13.4%
Potentially avoidable hospitalizations	1,539	-104	-6.8%
All-cause ED visits	159	57	36.1%
Potentially avoidable ED visits	48	49*	102.2%

NOTE: The 2012 mean indicates the overall mean of each outcome among all residents in that year. Effect is the marginal effect of the ECCP intervention in 2014 relative to the baseline difference between ECCP and comparison in 2012.

ECCP = Enhanced Care and Coordination Providers; ED = emergency department.

Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Overall, these results do not illustrate a clear pattern in the effects of the ECCP intervention on utilization and expenditure from 2012 to 2014. Although our findings did show that the effect of the ECCP intervention was in the desired direction for many utilization and expenditure outcomes, for the most part, these variables lacked statistical significance. Furthermore, both utilization and expenditure outcomes indicated that the ECCP intervention may result in an increase in all-cause and potentially avoidable ED visits. Although this could result if hospital admissions are being converted to ED visits with observation, there is no evidence at this time of ECCP activity to encourage this shift.

The results of the ECCP intervention on MDS-based quality outcomes in Nevada indicate both improving and worsening quality. Three measures had statistically significant estimated effects at a 0.10 significant level: a reduction in "catheter inserted and left in bladder," and an increase for both "one or more falls with injury" and "antipsychotic medication use." However, with conflicting effects observed, we consider the effect of the ECCP intervention on quality in Nevada inconclusive.

E.5.6 Summary of Findings: New York

This ECCP is entirely education focused. The RN Care Coordinators (RNCCs) in the New York Reducing Avoidable Hospitalizations (NY-RAH) Initiative do not provide clinical

care to residents but focus on increasing each facility's capacity to (1) identify root causes for potentially avoidable hospitalizations and (2) review and modify its policies and procedures to prevent such hospitalizations. In 2014, the ECCP continued training on INTERACT Tools, palliative care education, and implementing electronic solutions for nursing facilities. Training on the INTERACT Tools and palliative care education were the primary focus of 2014, whereas training on the Medical Order for Life Sustaining Treatment form and the implementation of direct messaging mailboxes was only in the early stages as of late 2014. Facility leadership and ownership changes had a direct impact on facility adoption of the intervention tools and delays for the intervention implementation timelines. ECCP leadership and subcontract changes also occurred, contributing to some intervention implementation delays. These changes included a new medical and clinical director and the termination of a subcontracted organization that was assisting with the implementation of facility-based electronic solutions. Aside from the ongoing staffing and management challenges, ECCP leadership and facilities reported increased buy in from facility staff for the Initiative overall and wider adoption of the SBAR and Stop and Watch tools, although this adoption varied across the facilities. In November 2014, one participating NY-RAH facility closed, reducing the number of participating facilities to 29 from 30.

In New York, the multivariate regression estimates of the effect of the ECCP intervention on the mean count of utilization events per person in 2014 are summarized in ***Table ES-6***. The negative intervention effects for all outcomes suggest that the ECCP intervention worked in the desired direction of reducing the mean count of utilization events. However, the effect sizes are small, and are only statistically significant (at the 0.10 significance level) for the mean count of potentially avoidable hospitalizations. The intervention is associated with a 0.026 lower mean count of potentially avoidable hospitalizations per resident ($p < 0.1$), on average. This represents a 15.1 percent decrease from the average count per resident in 2012, which was 0.172.

The results for the estimated effect of ECCP intervention on Medicare expenditures are reported in ***Table ES-6***. The estimates are negative, indicating a reduction in spending, for all five types of expenditures measured. However, none of the effects are statistically significant (at the 0.10 significance level).

Table ES-6
Summary of ECCP intervention effects on utilization and expenditure outcomes, New York

Outcome	Mean, 2012	Effect: 2012 to 2014	Effect (% of mean)
Medicare utilization (count of events per resident)			
All-cause hospitalizations	0.505	-0.047	-9.3%
Potentially avoidable hospitalizations	0.172	-0.026*	-15.1%
All-cause ED visits	0.215	-0.016	-7.4%
Potentially avoidable ED visits	0.054	-0.006	-11.1%
Medicare expenditure (dollars per resident)			
Total	26,371	-1,204	-4.6%
All-cause hospitalizations	8,995	-798	-8.9%
Potentially avoidable hospitalizations	2,246	-271	-12.1%
All-cause ED visits	95	-12	-12.5%
Potentially avoidable ED visits	27	-3	-11.4%

NOTE: The 2012 mean indicates the overall mean of each outcome among all residents in that year. Effect is the marginal effect of the ECCP intervention in 2014 relative to the baseline difference between ECCP and comparison in 2012.

ECCP = Enhanced Care and Coordination Providers; ED = emergency department.

Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

These results suggest an overall trend of reduced utilization and expenditures in New York from 2012 to 2014 possibly attributable to the ECCP intervention, although the effect estimates are not consistently statistically significant. There is no evidence of a statistically significant ECCP effect on reducing expenditures associated with hospitalizations, but the effects on both hospitalization spending outcomes have significance levels that are encouraging for the future.

There were no statistically significant effects of the ECCP intervention on MDS-based quality outcomes in New York, although most outcomes were negative, indicating potential quality improvement. However, we consider the ECCP effect on quality too small to be measured at this stage and unclear in direction.

E.5.7 Summary of Findings: Pennsylvania

UPMC-RAVEN (Reducing AVoidable hospitalizations using Evidence-based interventions for Nursing facilities in Western Pennsylvania) is anchored around Certified Registered Nurse Practitioners (CRNPs) providing resident care in the facilities; these CRNPs are very popular, and their work is appreciated. During Project Year 2, all participating UPMC-RAVEN facilities reported being committed to the Initiative, including facilities that changed ownership. There were isolated reports of very resistant physicians who did not allow their residents to participate in the Initiative, but most physicians supported the program. RAVEN CRNPs can assess residents, write orders, and provide direct care under a collaborative practice agreement (CPA) in all facilities; CPAs are also required for providing on-call support for

telemedicine. With the exception of CRNPs work, the delays in implementing all other UPMC-RAVEN components continued well into the second year. Facility location, especially if remote and rural, posed some recruitment and retention as well as long-distance travel challenges to UPMC-RAVEN staff, altering the role of some lead NPs into visiting and supporting facilities where facility-based NPs could not be hired. Facilities reported using Stop and Watch and SBAR, with several facilities modifying the tools to better suit their needs or to correct perceived tool defects. However, the uptake of INTERACT tools varied widely across facilities and largely depended on the administration's commitment and willingness to enforce their use, as well as pre-existing practices in the facilities. Telemedicine was fully implemented by the end of the Project Year 2 and appeared to have a slow start with some delays and multiple challenges. The number of telemedicine consults was reported to be very small; however, it appeared that the use of telemedicine was gaining ground and may be ramping up by Year 3.

In Pennsylvania, there was strong evidence for the beneficial effect of the ECCP intervention across most utilization and expenditure outcomes. ***Table ES-7*** summarizes the effect of the ECCP intervention on the utilization count outcome. All intervention effects are negative, with statistically significant effects (at the $p < 0.05$ level or better) for all-cause hospitalizations, potentially avoidable hospitalizations, and potentially avoidable ED visits. The ECCP intervention was associated with a decrease in the count of all-cause hospitalizations by 0.490 per resident ($p < 0.01$) on average, a reduction of 25.9 percent compared to the average count per resident in 2012. Potentially avoidable hospitalizations were reduced by 0.192 per resident ($p < 0.05$), a 27.8 percent reduction from the 2012 average resident count. Potentially avoidable ED visits also decreased by 0.090 visits per resident ($p < 0.01$), a 40.0 percent reduction from the 2012 average resident count.

Consistently beneficial effects of the ECCP intervention are also indicated on expenditure outcomes, as summarized in ***Table ES-7***. All estimates are negative, suggesting a reduction in spending associated with the ECCP intervention, with all outcomes except all-cause ED visits statistically significant (at the < 0.05 significance level). The ECCP intervention was associated with a decrease in the total Medicare expenditure by $3,662 per resident in 2014 ($p < 0.01$), on average, or a reduction of 16.8 percent from the average total expenditure of $21,771 in 2012. The magnitude of effect on all-cause hospitalizations and potentially avoidable hospitalizations was even stronger, with all-cause hospitalizations reduced by $1,423 ($p < 0.001$) and potentially avoidable hospitalizations reduced by $472 ($p < 0.01$), or relative to 2012 average resident expenditures, about 31.0 and 30.3 percent lower, respectively. Potentially avoidable ED visits demonstrated a similar effect, with a $17 reduction ($p < 0.05$), or a 35.5 percent decrease relative to the 2012 average of $47. The effect of the ECCP intervention on physician services and SNF services was also strong, with physician services reduced by $387 ($p < 0.001$) and SNF services reduced by $1,220 ($p < 0.01$), which, relative to the 2012 average resident expenditures for each outcome, represented a 26.3 percent and 19.8 percent decrease, respectively.

Table ES-7
Summary of ECCP intervention effects on utilization and expenditure outcomes, Pennsylvania

Outcome	Mean, 2012	Effect: 2012 to 2014	Effect (% of mean)
Medicare utilization (count of events per resident)			
All-cause hospitalizations	0.490	-0.127***	-25.9%
Potentially avoidable hospitalizations	0.198	-0.055**	-27.8%
All-cause ED visits	0.328	-0.035	-10.7%
Potentially avoidable ED visits	0.090	-0.036***	-40.0%
Medicare expenditure (dollars per resident)			
Total	21,771	-3,662***	-16.8%
All-cause hospitalizations	4,597	-1,423***	-31.0%
Potentially avoidable hospitalizations	1,561	-472***	-30.3%
All-cause ED visits	165	-14	-8.7%
Potentially avoidable ED visits	47	-17**	-35.5%

NOTE: The 2012 mean indicates the overall mean of each outcome among all residents in that year. Effect is the marginal effect of the ECCP intervention in 2014 relative to the baseline difference between ECCP and comparison in 2012.

ECCP = Enhanced Care and Coordination Providers; ED = emergency department.

Statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Overall, these results suggest a strong pattern of reduced utilization and expenditures in Pennsylvania, which, given the consistent direction and magnitude of effects, points to the effectiveness of the ECCP intervention. In particular, the effect estimates for reduced hospitalizations and potentially avoidable hospitalizations, as well as utilization-related expenditures, are highly significant statistically. These represent a major driver of Medicare spending among nursing facility residents.

Results of the effect of the ECCP intervention on MDS-based quality outcomes in Pennsylvania indicate an overall lack of definitive effect. The directions of the estimated effects indicated both quality improvement and decline, with only one statistically significant effect, a reduction on decline in ADLs. Overall, with only one significant effect, we consider the effect of the intervention on these MDS-based quality measures too small to be systematically measured at this stage.

E.5.8 ECCP-Wide Estimated Reductions or Increases in Medicare Spending

Below, we present the effects of the Initiative on the entire ECCP eligible population in each state on Medicare spending in total, for all-cause hospitalizations, and for potentially avoidable hospitalizations. We also compute estimates of the net savings or costs of the Initiative when the payments associated with the grants to the ECCPs are accounted for. Additional analyses on aggregate estimates of spending and utilization counts are included in ***Appendix J***.

In order to aggregate reductions or increases in spending, we multiply the individual-level average marginal effect of ECCP intervention and its 90% confidence interval (CI) values by the number of ECCP participants in each state. This produces the ECCP population estimate of the intervention-associated total reduction or increase in spending, aggregated over all resident participants in each ECCP in 2014.

For total Medicare spending, we also incorporate the total grant for Initiative implementation for each ECCP, which is combined with the estimated total intervention effect (reduction or increase) on spending to produce the estimated total Initiative *net* savings or costs, as reported in ***Table ES-8***. This estimate and 90% CI values are presented in the last 3 columns of the table. In the table, reductions or savings are expressed as negative numbers (indicated by parentheses), and increases or costs are shown as positive numbers.

We must note that differences in the total effects across the ECCPs are a reflection of both the strength of average marginal effect for each ECCP and the number of people in each ECCP group. A small effect at the individual level over a large group of people can result in a large total that is not statistically significant. This must be considered in drawing conclusions from the aggregate estimates reported here.

As shown in ***Table ES-8***, while all states show an average ECCP effect on spending in the desired direction, a reduction, two states have a statistically significant effect at the participant level, Nevada and Pennsylvania. Aggregated to the ECCP level, the combined intervention effect on total Medicare spending in Nevada is a reduction of $9,886,653. The Initiative net for Nevada, after adding in the grant for implementation, is an estimated savings of $6,440,769, with a 90% CI that ranges from a net savings to a loss. In Pennsylvania, the aggregate spending reduction is $9,902,048; after including the grant there is a net savings estimated at $5,030,527. The 90% CI for Pennsylvania is the only one that does not include a net loss. In the rest of the states, the total ECCP estimated effect on spending is in the desired direction, a reduction, although this effect is not significant at the participant level. After incorporating the total grant for implementation, Indiana, Nebraska, and New York still indicate a total effect in the desired direction, an Initiative net savings, while Alabama and Missouri have estimates that indicate an Initiative net cost, although the 90% CIs for all of these ECCP effects range from loss to savings. The overall Initiative net, as a sum of all the states' Initiative net, is a savings of $9,711,398, with the 90% CI ranging from loss to savings. Including only the states with statistically significant ECCP effects on the individual level, Nevada and Pennsylvania, the estimated Initiative net savings remain similar, at $11,471,296, with the 90% CI crossing zero, but with a range mostly indicating net savings.

Table ES-8
Total Medicare expenditure: ECCP-wide total estimates of intervention-associated reduction/increase, 2014
(Reductions in spending are indicated by negative quantities in parentheses)

ECCP	Number of ECCP Participants, 2014	Average ECCP Effect on Spending: (Reduction)/Increase per Participant, 2014			Total ECCP Effect on Spending: (Reduction)/Increase, 2014			Total Grant for Initiative, 2014 $	Total Initiative Net (Savings)/Costs, 2014 [a]		
		Estimate $	90% CI		Estimate $	90% CI			Estimate $	90% CI	
AL	3,273	(107)	(1,547)	1,334	(350,211)	(5,064,336)	4,366,436	3,799,179	3,448,968	(1,265,157)	8,165,615
IN	2,927	(1,368)	(2,738)	3	(4,004,136)	(8,015,185)	8,691	3,135,477	(868,659)	(4,879,708)	3,144,168
MO	2,282	(92)	(1,776)	1,592	(209,944)	(4,052,632)	3,631,846	3,608,119	3,398,175	(444,513)	7,239,965
NE	1,458	(1,475)	(3,637)	687	(2,150,550)	(5,302,292)	1,001,461	1,032,969	(1,117,581)	(4,269,323)	2,034,430
NV*	3,387	(2,919)	(5,801)	(37)	(9,886,653)	(19,646,510)	(126,726)	3,445,884	(6,440,769)	(16,200,626)	3,319,158
NY	6,964	(1,204)	(4,162)	1,754	(8,384,656)	(28,982,827)	12,212,188	5,283,651	(3,101,005)	(23,699,176)	17,495,839
PA***	2,704	(3,662)	(5,241)	(2,084)	(9,902,048)	(14,171,467)	(5,634,963)	4,871,521	(5,030,527)	(9,299,946)	(763,442)
TOTAL/ AVERAGE (All) [b]	**22,995**	**(1,517)**	**(3,707)**	**672**	**(34,888,198)**	**(85,235,251)**	**15,458,933**	**25,176,800**	**(9,711,398)**	**(60,058,451)**	**40,635,733**
TOTAL/ AVERAGE (statistically significant only: NV, PA) [b]	**6,091**	**(3,249)**	**(5,552)**	**(946)**	**(19,788,701)**	**(33,817,977)**	**(5,761,689)**	**8,317,405**	**(11,471,296)**	**(25,500,572)**	**2,555,716**

[a] Total Initiative Net (Savings)/Costs are the net balance between [Total ECCP Effect on Spending: (Reduction)/Increase] and [Total Grant for Initiative].

[b] Averages shown in this row are weighted by the number of ECCP participants.

Statistical significance (for average ECCP effect on spending per participant): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Source: \\walwhip01\HIPAA-DATA\0212790.006_NHPAH-HIPAA\004 Task 4 Quant Util & Costs\ykaganova\nb24_new\coeff_table_nb24_mcare.xlsx.

Table ES-9 delineates the ECCP-wide total estimates of the intervention on reductions or increases in Medicare expenditure for all-cause hospitalizations. All states show an ECCP effect on spending in the desired direction, while four states show an intervention-associated statistically significant reduction in all-cause hospitalization expenditures. The total for all states is a reduction of $17,591,992, with an estimated total reduction for statistically significant states only of $9,234,135. Both of these estimates have a 90% CI that indicates a reduction in costs for all-cause hospitalizations, though the reduction is larger when only the states with statistically significant estimates are included. The confidence intervals for the other states include increases in costs.

Table ES-9
Medicare expenditure for all-cause hospitalizations: ECCP-wide total estimates of intervention-associated reduction/increase, 2014
(Reductions in spending are indicated by negative quantities in parentheses)

ECCP	Number of ECCP Participants, 2014	Average ECCP Effect on Spending: (Reduction)/Increase per Participant, 2014			Total ECCP Effect on Spending: (Reduction)/Increase, 2014		
		Estimate $	90% CI		Estimate $	90% CI	
AL	3,273	(82)	(533)	370	(267,772)	(1,745,553)	1,210,008
IN**	2,927	(788)	(1,393)	(183)	(2,305,375)	(4,076,481)	(534,269)
MO**	2,282	(729)	(1,242)	(217)	(1,664,325)	(2,834,394)	(494,256)
NE***	1,458	(971)	(1,565)	(377)	(1,416,008)	(2,282,211)	(549,805)
NV	3,387	(748)	(1,697)	201	(2,533,719)	(5,747,823)	680,385
NY	6,964	(798)	(1,836)	241	(5,556,366)	(12,788,529)	1,675,797
PA***	2,704	(1,423)	(1,949)	(898)	(3,848,427)	(5,269,850)	(2,427,003)
TOTAL/AVERAGE (All) [a]	**22,995**	**(765)**	**(1,511)**	**(19)**	**(17,591,992)**	**(34,744,842)**	**(439,142)**
TOTAL/AVERAGE (statistically significant only: IN, MO, NE, PA) [a]	**9,371**	**(985)**	**(1,543)**	**(427)**	**(9,234,135)**	**(14,462,937)**	**(4,005,333)**

[a] Averages shown in this row are weighted by the number of ECCP participants.

Statistical significance (for average ECCP effect on spending per participant): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Source: \\walwhip01\HIPAA-DATA\0212790.006_NHPAH-HIPAA\004 Task 4 Quant Util & Costs\ykaganova\nb24_new\coeff_table_nb24.xlsx.

In ***Table ES-10***, we report the ECCP-wide aggregate estimates of intervention-associated reductions or increases in Medicare expenditure for potentially avoidable hospitalizations. For all states, there is an average ECCP effect on spending in the desired direction, a reduction; in three states (Missouri, Nebraska, and Pennsylvania), this effect is statistically significant. Aggregated to the ECCP population, the total ECCP effect on Medicare expenditure for potentially avoidable hospitalizations is a reduction of $1,041,602 in Missouri, $694,762 in Nebraska, and $1,276,662 in Pennsylvania; in each case, the 90% CI includes only reductions in the range. These three

states also had statistically significant ECCP reductions for all-cause hospitalizations. Aggregated across all ECCPs, the total of estimated intervention-associated reductions in Medicare expenditure for potentially avoidable hospitalizations is $6,359,087, with a 90% CI that includes an increase in expenditures. The total estimated effect for statistically significant ECCPs only is a reduction of $3,013,026, with a 90% CI showing only reductions in the range.

Table ES-10
Medicare expenditure for potentially avoidable hospitalizations: ECCP-wide total estimates of intervention-associated reduction/increase, 2014
(Reductions in spending are indicated by negative quantities in parentheses)

ECCP	Number of ECCP Residents, 2014	Average ECCP Effect on Spending: (Reduction)/Increase per Participant, 2014			TOTAL ECCP Effect on Spending: (Reduction)/Increase, 2014		
		Estimate $	90% CI		Estimate $	90% CI	
AL	3,273	(128)	(317)	62	(417,468)	(1,038,984)	204,048
IN	2,927	(236)	(508)	36	(689,810)	(1,485,585)	105,965
MO**	2,282	(456)	(749)	(164)	(1,041,602)	(1,709,676)	(373,529)
NE**	1,458	(477)	(815)	(139)	(694,762)	(1,187,574)	(201,949)
NV	3,387	(104)	(521)	313	(352,190)	(1,763,878)	1,059,498
NY	6,964	(271)	(613)	71	(1,886,593)	(4,268,920)	495,734
PA***	2,704	(472)	(732)	(212)	(1,276,662)	(1,979,508)	(573,816)
TOTAL/AVERAGE (All) [a]	**22,995**	**(277)**	**(584)**	**31**	**(6,359,087)**	**(13,434,124)**	**715,951**
TOTAL/AVERAGE (statistically significant only: MO, NE, PA) [a]	**6,444**	**(468)**	**(757)**	**(178)**	**(3,013,026)**	**(4,876,757)**	**(1,149,294)**

[a] Averages shown in this row are weighted by the number of ECCP participants.

Statistical significance (for average ECCP effect on spending per participant): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

Source: \\walwhip01\HIPAA-DATA\0212790.006_NHPAH-HIPAA\004 Task 4 Quant Util & Costs\ykaganova\nb24_new\coeff_table_nb24.xlsx.

E.6 Overall Summary and Preliminary Conclusions from Project Year 3 Primary Data Collection

Below we present early findings and preliminary conclusions drawn from Project Year 3 site visits and early phone interviews, Project Year 2 web-based survey findings of participating facilities, and Project Year 3 web-based survey findings of comparison facilities.

E.6.1 Project Year 3 Site Visits and Early Phone Interviews

Overall, RTI evaluation site visits in Project Year 3 reported that general enthusiasm, acceptance, and support for the Initiative were strong in Missouri, Pennsylvania, Indiana, and Nebraska, but less so in Alabama, Nevada, and New York.

Arrangements

- As in previous years, the ECCPs did not report sharing funds directly with facilities, but they subcontract and partner with multiple organizations to carry out the Initiative.

- As of the end of Project Year 3, most of the nursing facilities contacted to date continue to be committed to the Initiative. The total number of Project Year 3 facilities in the Initiative was 146, unchanged since Project Year 2. Several facilities changed ownership but continued their participation in the Initiative; two dropped during the year.

- Two ECCPs reported receiving additional funding from CMS based on achieving certain quality goals for the Initiative; quality scores were developed by the implementation contractor.

ECCP interventions

- The ECCPs' intervention designs underwent several changes during Project Year 3. For example, one ECCP reported a significant new effort of implementing INTERACT-based patient order sets in selected facilities. For the most part, key model features and individual interventions remain essentially the same in Project Year 3 as they were previously.

- Although most facilities did not report incurring major costs to implement the Initiative when interviewed, survey findings indicated that about one-fifth of all participating facilities reported incurring some type of cost.

- In many ECCPs, ECCP leadership is directly involved in managing the program; most visit participating facilities on a regular basis.

- Although state agencies are represented in advisory boards or steering committees, most are not directly involved and do not support the Initiative directly on a regular basis.

- As of Project Year 3, some ECCPs reported having implemented all aspects of their initiatives (UPMC-RAVEN, MOQI, OPTIMISTIC, Alegent + Creighton), but others are still rolling out some components through Project Year 4 (AQAF-NFI, ATOP, NY-RAH). Reasons for these delays include staffing challenges within the ECCPs (e.g., turnover of ECCP RNs/NPs), minor changes made to the Initiative designs, and a need for ongoing relationship development and trust-building between ECCPs and participating facilities.

ECCP model characteristics

- As originally proposed, most models continue to include direct assignment of ECCP staff to participating facilities on a permanent basis; two models (ATOP, Alegent + Creighton) rotate staff among facilities. One model embeds an RN in facilities, but rotates NPs among facilities (OPTIMISTIC). However, some ECCPs could not maintain the originally proposed staffing arrangements and had to increase caseloads for ECCP nurses or make some other changes.

- With the exception of two ECCPs where education is the main intervention (AQAF-NFI, NY-RAH), most models are centered on NPs or RNs providing hands-on clinical care and assessments and, in the case of NPs, writing orders for residents.

- Most ECCPs provide medication reviews, either directly through ECCP nurses or via consulting partners who sometimes use ECCP-specific tools for medication review. Medication management typically focuses on reducing antipsychotic drug use and polypharmacy.

- All ECCP nurses continue to provide education to facility staff. Five ECCPs educate facility staff directly via ECCP nurses. ECCPs also subcontract or partner with other organizations to deliver educational components of the Initiative.

- INTERACT tools remain important across all ECCPs and appeared to be used more widely in Project Year 3. More support for INTERACT tools from facility leadership was reported. Some facilities are mandating use of INTERACT tools, and others are tracking the use of specific tools or providing incentives to encourage continued use.

- In Project Year 3, end-of-life care (EOL), including palliative care and advance directives counseling to residents and families, as well as education of facility staff, appeared to be a strong focus in most ECCPs. ECCPs in states with standardized forms have focused more on advance care planning than states without standardized forms. One ECCP elected to participate in the National Healthcare Decisions events for their EOL component.

- Some facilities include information technology (IT) interventions in their models. These interventions range from using telemedicine to support ECCP NP coverage after hours to developing special data systems for tracking and integrating data, as well as special registry and e-tools for improving communication and note-taking. Implementation of IT interventions has been slow. Telemedicine, which is part of the UPMC-RAVEN program, enjoys wide general support in facilities, but the actual utilization, although on the rise for Project Year 3, was still very low.

Data collection and data exchange

- As of Project Year 3, data collection was no longer described as a significant burden by most of the ECCP nurses. Most ECCPs addressed data collection workload by

developing new systems to streamline data management, such as web-based data collection and shared database systems, or by hiring additional staff.

Learning Community activities

- There was a gap in the Learning Community activities this year. Few calls have occurred, and the website has had several technical glitches that made it difficult to access for many months.

- Some ECCP staff indicated that these activities were missed, but most described the calls as disappointing and were content that these activities have been essentially discontinued.

Successes and challenges

- In Project Year 3, facility buy in from staff and physicians remained strong across some ECCPs, but inconsistent among others. Physician buy in was low for some ECCPs, but reported to be on the rise largely because of new awareness of upcoming changes expected in quality reporting processes for SNFs.

- Most ECCP nurses report feeling well integrated into facilities. Residents and resident families interviewed accept ECCP staff as part of the care team.

- Implementation of individual components of the Initiative is highly variable, with some facilities having fully implemented all aspects of their ECCP model and others still lagging far behind in component roll-out. This variation is observed across ECCPs and within ECCPs' various participating facilities.

- Although a majority of ECCP and facility staff interviewees have a positive perception of the Initiative goals and potential benefits of reducing hospitalizations, some facility interviewees perceive the Initiative as more work, unnecessary, or designed solely to save money by prioritizing savings over provision of good resident care.

- Attitudes varied on whether specific Initiative interventions are having an effect. For many facilities, anecdotal evidence, in the form of examples and stories of early response to change in condition and avoiding admissions, indicates positive culture change.

- Staff turnover was a persistent problem in Project Year 3. There were high levels of turnover among ECCP clinical staff (NPs and RNs) in some facilities. ECCP leadership turnover also occurred in three ECCPs. Turnover among facility staff on all levels, including facility leadership involved in supporting the Initiative, remains one of the major barriers to implementation.

- Concerns about the imminent termination of ECCP nurses at the end of the Initiative has led to difficulty filling currently vacant positions. To reduce the likelihood of nurses leaving before the end of the project, several ECCPs have described implementing retention bonuses and other incentives to help keep ECCP nurses in place through the final months of the Initiative. There was an announcement by CMS, as this report was being submitted, of a phase 2 of the Initiative, which will change the situation and may improve staff retention.

- Administrative staff in facilities reported a strong preference for receiving updates or ECCP progress reports that highlight changes in hospital admission rates or that compare performance to peer facilities. These reports help support model components that have been implemented, while also helping to highlight where additional work is still needed. Some facilities used these reports for their quality improvement/QAPI activities.

- Although most facility staff are trained to use various INTERACT tools, use remains highly variable and sporadic, in part because of high turnover of facility staff. In facilities with very engaged leadership who provide incentives or accountability, use of INTERACT tools is widespread. When facility leadership, corporate owners, or both are not engaged, use of tools declines.

Unintended consequences

- Education for staff, facility-wide, remains a positive spillover effect across most participating facilities. These staff may spread best practices and knowledge to residents not involved in the Initiative.

- Within ECCP facilities, most interviewees reported using INTERACT tools for all residents, regardless of their enrollment in the Initiative.

- Findings indicate that ECCP model components have been adopted by non-participating facilities and by corporate chains in several states.

- No negative spillover effects were reported in Project Year 3.

Preliminary thoughts on sustainability

- ECCP advanced practice nurses and RNs remain the most valuable component of the Initiative across most facilities. The provision of clinical care by these individuals is reported to be the most essential element for the five ECCPs that use this model.

- Many facilities interviewed expressed interest in keeping their ECCP nurses after the project concludes, though funding was reported to be a major barrier to sustaining this component of the Initiative.

- Education also has been described as a key success of the project, with many facilities across ECCPs reporting continued use of learned tools, such as use of INTERACT forms, advance directives, and consistent assignment of staff, as well as potential ongoing medication review and QAPI/quality improvement efforts.

- State policy may drive the sustainability of the use of some ECCP tools among ECCP facilities.

E.6.2 Project Year 2 Web-based Survey Findings of Participating Facilities

One component of RTI's primary data collection efforts is to conduct surveys of nursing facility administrators from the participating facilities. RTI completed data collection for wave 2 of the nursing facility administrator survey in September 2014. Out of 146 total ECCP facilities surveyed, 130 facilities responded to the survey, for a response rate of 89 percent. The following are the wave 2 data highlights by survey domain.

- In Project Year 2 of the Initiative, we found that most facilities were still phasing in Initiative components. For example, 62 percent of facilities expected to have phased in all Initiative components over the next 1 to 12 months, and only 25 percent overall reported having fully implemented all components.

- Very few facilities (less than 6 percent) reported hiring additional clinical staff or consultants. However, 37 percent reported turnover of key Initiative staff, such as the Director of Nursing.

- Given that facilities are phasing in Initiative components and many experience turnover, staff training is an important activity. Additionally, training is an essential part of most ECCP models. Nearly all facilities reported providing training for the Initiative, and this training was most often provided by the ECCP staff.

- Most care model components are stable and remain the same in the second year of implementation. Staff education and condition management/early identification of change in condition were the top care model components introduced, implemented, or enhanced as a result of the Initiative

- The Initiative is promoting communication between organizations and providers. Project Year 2 of the Initiative was associated with developing more formal procedures or communications with outside organizations such as hospitals and hospice agencies for half of facilities.

- As reported in the survey, overall Initiative support remains strong in the second year. Wave 2 survey findings reflected strong support by nursing facility administrators for the Initiative. Respondents overwhelmingly supported the Initiative: 95 percent strongly supported or supported it.

E.6.3 Project Year 3 Web-Based Survey Findings of Comparison Facilities

The primary data collection activities in our evaluation provide important context for the results of the secondary data analysis. However, finding definitive and robust results from the secondary data analysis has proven difficult because of small sample sizes and the early stage of the Initiative. Some important issues we identified during our site visits and phone interviews include the possibility that there is some degree of parallel change of practice in the comparison group and potential spillover effects of the Initiative to nonparticipating facilities.

In Project Year 3, the RTI team expanded the primary data collection activities to include a one-time web-based survey of comparison facilities. The goal of the survey is to collect data about specific interventions and quality improvement initiatives related to reducing hospitalizations that are being implemented. These data are not available in the existing secondary data sources.

Using a list of 262 comparison facilities, RTI contacted facilities by telephone to obtain names and e-mail addresses of administrators, and were able to obtain e-mail addresses for 236 of the 262 facilities (90 percent). Of the 236 facilities we invited to complete the survey via e-mail, a total of 102 completed or partially completed the survey, yielding a final response rate of 43 percent. Response rates were lowest in Alabama (22 percent) and highest in Pennsylvania (80 percent) and averaged 43 percent across all states. Following are a few preliminary data highlights.

- **Key Finding: Overall, 95 percent of comparison facilities that responded reported that, since January 2011, their facility has introduced policies or procedures designed specifically to reduce avoidable hospitalizations of long-stay residents.**

- The proportion of facilities reporting these findings varied by state. All comparison facilities in Indiana, Missouri, Nevada, and Pennsylvania reported introducing policies or procedures to reduce avoidable hospitalizations of long-stay residents since January 2011, compared to 78 percent in Alabama.

- Several specific policies and procedures to avoid hospitalizations for long-stay residents were reported. Notably, hospitalization rate tracking or review was reported by 93 percent of facilities; SBAR, Know It All Before You Call,[2] or other similar forms to standardize communication between nurses and physicians were reported by 79 percent of facilities; and Stop and Watch (INTERACT), intended to improve certified nursing assistants' recognition of changes in condition, or other systems to alert staff to changes in residents' conditions that could lead to hospitalizations were reported by 71 percent of facilities.

These preliminary results indicate that in the past 4 years, a great majority of comparison group facilities—and in many states, all facilities—have been engaged in practices that are

[2] Know It All Before You Call is a tool of the American Medical Directors Association (AMDA).

related to those of the Initiative. In our subsequent deliverables, we will provide details on the specific details of these practices, time lines, and the types of entities who organized these efforts. These early findings will have major implications for the evaluation results.

E.7 Discussion

The 2014 data indicate much more clearly than data from 2013 that there are probable Initiative effects on many of the measures and some more consistent patterns of effects for a few of the ECCPs. In Pennsylvania and Missouri, there are strong patterns indicating intervention effects reducing utilization and spending. The measures are not all significant, but most are. Other ECCPs, in Alabama, Indiana, and New York, show mostly consistent indications of reductions, but few measures are statistically strong. The ECCP effects in Nebraska and Nevada are mixed, with inconsistencies in direction of effects weakening the evidence. It is also important to note that statistical significance refers to the probability that an effect could be observed by chance. As larger numbers of statistical estimates are made, we observe more chance occurrences of large effects. A pattern of substantive estimated effects is stronger evidence for a causal relationship than sporadic findings. The Initiative effects we have measured are the effects on spending and utilization in the Medicare program, without accounting for the costs of the Initiative to CMS. Some of these costs would be unique to the structures of the Initiative and some to the actual interventions. In this report, we are evaluating the intervention results.

The MDS-based quality measures do not show any pattern of change related to the Initiative. If the focus of the Initiative is on avoiding hospitalizations and ED use related to changes in resident condition, the effects of the interventions on the broad range of MDS-based quality measures may be very limited.

At this point it seems that the more "hands-on" interventions are showing greater effects than the purely educational interventions, though presumably at greater cost (the cost of implementing the interventions is beyond the scope of this report). Our primary data collection indicates that other factors, varying across ECCPs and facilities, make the Initiative effects vary as well.

Continuing from 2014, the 2015 site visits and preliminary telephone interviews also demonstrated varied progress across the ECCPs. Some ECCPs have implemented all or nearly all of their model components, whereas other ECCPs are still in the midst of implementation. The states that have made the most progress in terms of implementation (i.e., Pennsylvania and Missouri) also seem to have the most significant results from the quantitative analyses. Despite varied degrees of implementation, the response to the ECCP RNs and NPs generally has been very positive across all ECCPs. Facilities report a strong appreciation for extra staff on-site, particularly nurses who provide clinical support. Participating facilities also report appreciation for the education provided by the ECCPs. Although the existing quantitative data indicate various degrees of success in reducing hospitalizations thus far, the majority of interviewees viewed the Initiative as positive and potentially beneficial for residents.

Of particular note, relationships remain critically important for success within all ECCPs and across all levels. The "fit" of the ECCP nurses with the facility staff is pivotal in affecting

culture change and developing new best practices within facilities (e.g., consistent use of INTERACT tools). Likewise, the relationships between staff and facility leadership, as well as corporate ownership, were said by interviewees to affect the overall potential success of the ECCP initiatives and greatly influence the consistency of INTERACT tool use. Early engagement across all levels of staff, leadership, and ownership was said by interviewees to be critical in successful deployment of any intervention to nursing facilities. In terms of challenges, qualitative findings pointed to difficulty with implementing new technology, lack of consistent buy in among specific physicians, pressure from families, and lack of facility leadership support as the main barriers to implementation of the Initiative. Staff turnover in the ECCPs and facilities, as well as staff retention difficulties, further complicated the implementation.

Thinking forward to the final year of the current form of the Initiative, many facilities report concern over losing their ECCP nurses at the conclusion of the Initiative. Some facilities are interested in additional funding to retain their ECCP nurses permanently. Many facility interviewees indicated that some aspects of the Initiative will remain in place, even if the ECCP nurses are no longer present in the facilities. Some INTERACT tools, medication review with a focus on reducing antipsychotic medications, quality improvement/QAPI efforts to reduce avoidable admission, and advance care planning were the Initiative components most likely to remain in place after the end of the project. Beyond these specific components of the Initiative, several interviewees across ECCPs indicated that the project has opened their eyes to more opportunities to improve care for residents, while also potentially reducing hospitalizations and resultant costs. Even if the data are inconclusive or inconsistent in demonstrating reductions in hospitalization rates across all ECCPs, this anecdotal evidence suggests a potential mindset shift in facilities that may result in better care and fewer hospitalizations over time.

In the context of the qualitative findings from our site visits, phone interviews, and surveys in the summer of 2014, we know that the interventions were still maturing throughout 2014. They were certainly more developed than in 2013, but were still being refined, and components were being rolled out throughout the year. This protracted implementation of individual components of the Initiative across ECCPs makes it difficult to ultimately tease out what individual interventions are working well. However, the numbers in the multivariate analyses are pointing in the desired direction and savings. If these trends are maintained in the next 2 years of data analysis, it will be easier to make positive conclusions about the overall effect of the Initiative. It is not clear whether it will be possible to attribute these positive results to the specific interventions that are part of each individual ECCP model, that vary somewhat by facility, and that are used with varying effectiveness by different ECCPs.

A potential issue identified during site visits and phone interviews is the possibility that there is some degree of parallel change in practice in the comparison group. A web-based survey of comparison facilities indicated that 95 percent of comparison facilities that responded reported that their facility has introduced policies or procedures designed specifically to reduce avoidable hospitalizations of long-stay residents since January 2011. The intensity of the training and the presence of clinical staff that the ECCPs bring to the facilities seems to make a difference beyond just introducing new tools as may be occurring in the comparison facilities. We will be able to investigate this further in the next year.

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SECTION 1
OVERVIEW

1.1 The Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents

This report details the project's third year evaluation findings regarding the Centers for Medicare & Medicaid Services (CMS) Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents (hereafter referred to as the Initiative). The Initiative is designed to affect hospitalization rates by directly changing practices at the facility level. The Initiative tests a series of clinical interventions or care models aimed at improving the health and health care of long-stay nursing facility residents, with the goal of reducing avoidable inpatient hospital admissions, improving quality metrics, and decreasing the total cost of health care spending for the Medicare-Medicaid enrollees participating in the Initiative. The Initiative seeks to identify the clinical intervention models that are the most promising to inform future policy development.

The Initiative involves seven Enhanced Care and Coordination Providers (ECCPs) with varied characteristics. They include academic institutions, quality improvement organizations (QIOs), a health care provider network, and a hospital association. The seven ECCPs, each initially partnering with 15 to 30 nursing facilities, implemented interventions with the following objectives:

- Reduce the frequency of avoidable hospital admissions and readmissions.
- Improve resident health outcomes.
- Improve the process of transitions between inpatient hospitals and nursing facilities.
- Reduce overall health care spending without restricting access to care or choice of providers.

Although CMS does not require ECCPs to implement a pre-specified intervention in their partner facilities, all interventions must be evidence based, replicable, and sustainable and include the following key activities:

- Hire staff who partner with nursing facility staff to improve recognition, assessment, and management of conditions that are often a cause of avoidable hospitalizations.
- Work in cooperation with existing providers, including residents' primary care providers, nursing facility staff, and families.
- Focus on quality improvement practices related to avoidable hospitalizations while working in cooperation with existing providers.
- Facilitate residents' transitions to and from inpatient hospitals and nursing facilities and facilitate timely and complete exchange of health information.

- Provide support for improved communication and coordination among hospital staff, including attending physicians, nursing facility staff, residents' primary care providers and other specialists, and pharmacy staff.

- Coordinate and improve management and monitoring of prescription drugs to reduce polypharmacy, adverse drug events, and inappropriate use of psychotropic drugs.

As of the time covered by this Project Year 3 report the ECCPs partnered with 146 nursing facilities (see ***Appendix A*****; two of the 146 facilities dropped out very early in the Project Year (late 2014) and are not listed in *Appendix A***) to implement strategies aimed at reducing hospitalizations and improving care for fee-for-service (FFS), long-stay nursing facility residents whose care is funded through Medicare, Medicaid, or the Veterans' Administration. The seven ECCP organizations, including a brief overview of the original design, are:

- Alabama Quality Assurance Foundation Nursing Facility Initiative (AQAF-NFI), Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents (a quality improvement organization [QIO]): 23 facilities

  The AQAF-NFI model design remains largely unchanged; it continues to operate in 23 nursing facilities in central and north-central Alabama. AQAF-NFI leadership has trained Registered Nurse (RN) Care Pathways Coaches (Coaches) in long-term care and placed them in partner nursing facilities to effect procedural changes in existing facility practices. Coaches do not provide clinical care; instead they improve staff education and processes through the use of INTERACT III (Interventions to Reduce Acute Care Transfers) tools, Advancing Excellence in America's Nursing Homes tools, Hand-in-Hand dementia training, consistent assignment of staff, staff development training, advance care planning, and creation of Quality Assurance/Performance Improvement (QAPI). They also use Care Pathways teams to conduct root cause analyses and employ other quality measures toward reducing hospitalizations. In addition, pharmacy partners are working with Coaches to conduct medication reviews within all facilities and provide recommendations for improving medication management. Data collection remains a central focus of the AQAF-NFI, including both potentially avoidable hospitalization–specific data and AQAF-required data that relate to specific aspects of the model.

- Indiana University (IU) Geriatrics Department, Optimizing Patient Transfers, Impacting Medical Quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC): 19 facilities

  Indiana University Geriatrics Department's OPTIMISTIC design remains largely unchanged in Project Year 3. The project places highly trained RNs in each facility to provide direct clinical support, education, and training to nursing facility staff; eight nurse practitioners (NPs) support the OPTIMISTIC RN and provide urgent evaluation and care needs. OPTIMISTIC uses a suite of tools (American Medical Directors Association [AMDA], INTERACT, and their own) and methods to improve medical care, palliative care, and transitional care. OPTIMISTIC RNs and NPs conduct

intensive clinical reviews of residents in response to resident transitions or acute change in condition and through the collaborative care review (CCR) process.[3] The CCR process has been modified to emphasize the current status of the resident with less focus on past health history. The ECCP nurse practitioners review diagnoses, medications, activities of daily living, quality of life, plan of care, advance care plan, resident's and family's concerns, and so on. The CCRs are reviewed by IU geriatricians whose recommendations are conveyed by the ECCP NP to the resident's physician. Finally, OPTIMISTIC facility staff facilitate the roll out of the Physician Orders for Scope of Treatment (POST) form, educating families, residents and nursing home staff on advanced directives.

- The University of Missouri, Sinclair School of Nursing Missouri Quality Initiative for Nursing Homes (MOQI): 16 facilities

  Administered through the Sinclair School of Nursing at the University of Missouri, the Missouri Quality Initiative for Nursing Homes (MOQI) design remains unchanged—to reduce rates of avoidable hospitalizations and readmissions, improve health outcomes and transitions between hospitals and nursing facilities, and reduce health care costs through (1) implementation of INTERACT III tools and processes in 16 nursing facilities and with associated hospitals; (2) placement of a full-time Advanced Practice Registered Nurse (APRN) in each nursing facility to provide direct services, coaching, education, and mentoring to facility staff; and (3) development of electronic medical records (EMR) and information technology (IT) connections between nursing facilities and hospitals, and Surface tablets for the APRNs. The MOQI leadership team is composed of nursing, medical, social work, IT, and data management professionals, and the model is based upon the team's experience in the Quality Improvement Program for Missouri (QIPMO) and long-term care research experience. The team specifically targeted nursing facilities with good nursing quality and survey ratings and high hospitalization rates and those who work with hospitals with high readmission rates.

- Nebraska Alegent + Creighton Health Program (Alegent + Creighton) (a hospital and health care network): 14 facilities[4]

  Alegent + Creighton Health operates in 14 nursing facilities in Omaha and the surrounding area. Alegent + Creighton continues to implement with fidelity to its original design, although the educational component of the program continues to evolve. Members of a team of six NPs are assigned to several nursing facilities. NPs provide clinical services to residents in their assigned facilities and also facilitate

[3] Previously called "Comprehensive Care Reviews" in original OPTIMISTIC Project Operations Manual (November 29, 2012).

[4] The Nebraska ECCP has operated in 15 facilities until October 2014, when one of the facilities (Montclair Nursing and Rehab Center) was terminated from the Initiative, reducing the number of active ECCP facilities to 14.

training among facility staff. Services that they provide include life issue reviews, medication review using the Long Term Care Medication Outcome Monitor (LTC-MOM) tool, history and physical assessment (H&P) exams, and guidance in using INTERACT III tools. In addition to the NPs, the ECCP also provides dental and pharmacy support to participating facilities through a Dental Hygienist, Dentist, and Pharmacist that are part of the ECCP team. The Dental Hygienists provide assessments and cleanings for participating residents.

- HealthInsight Nevada Admissions and Transitions Optimization Program (ATOP) (a QIO): 24 facilities

  The ATOP model has not changed in Project Year 3. Teams of one APRN and two RNs provide direct clinical support, training, and education to four to five nursing facilities clustered in pods. HealthInsight aims to improve care and reduce avoidable hospitalizations by a "rapid response team" to address changes in conditions identified by using INTERACT and modified-INTERACT tools. The Resident Registry, populated by ECCP RNs, captures all relevant clinical data and is designed to provide (1) a risk assessment for each resident's plan of care; (2) web-based data sharing of resident reports for ECCP staff; (3) targeted queries as needed (e.g., for medication reviews); and (4) progress reports to nursing facilities; and (5) CMS reporting requirements.

- New York Reducing Avoidable Hospitalizations (NY-RAH) Project of Greater New York Hospital Association (GNYHA) Foundation: 29 facilities[5]

  GNYHA Foundation and its partner organizations continue to implement NY-RAH with very little change to the project design other than the implementation process and schedule (e.g., management of the project) and changing the medication management intervention stage. The project's goals continue to focus on (1) reducing avoidable hospitalizations from nursing facilities, (2) improving transitions between nursing facilities and hospitals, and (3) improving palliative care provided to nursing facility residents. To achieve these goals, NY-RAH is using RN Care Coordinators (RNCCs) working in nursing facilities to identify areas needing improvement and implementing interventions to address them.

  The RNCCs do not provide direct clinical care to residents but focus on increasing each facility's capacity to identify root causes for potentially avoidable hospitalizations and review and modify its policies and procedures to prevent such hospitalizations. They also focus on developing or modifying policies and procedures to improve transitions and ensure that all residents have the opportunity to engage in advance care planning and receive palliative care when desired. The GNYHA

[5] The New York ECCP has operated in 30 facilities until November 2014, when one of the facilities (Rivington House) closed, reducing the number of active ECCP facilities to 29.

Foundation will also help to facilitate the implementation of electronic solutions to improve unavoidable transitions to the hospital and back to the nursing facility.

The GNYHA Foundation believes that the focus on education and training and systems change will lead to improvements in policies and procedures that will sustain improved practices without the need for additional resources when the grant period ends.

- University of Pittsburgh Medical Center (UPMC) Community Provider Services Program to **R**educe **A**voidable Hospitalizations using **Ev**idence-based Interventions for **N**ursing Facilities (UPMC-RAVEN): 19 facilities

  In the third year, the UPMC-RAVEN Initiative continues to operate in 19 nursing facilities in western Pennsylvania with no change in the project design. An important design focus is the hands-on care provided by UPMC-RAVEN NPs in the facilities. UPMC-based RAVEN leadership has trained enhanced care NPs and RNs in geriatric/palliative care and has placed them in partner nursing facilities. In addition to clinical care for RAVEN eligible residents, these NPs work together with Pharmacist partners to provide medication management and with educational partners to provide individualized learning plans and tailored education components for training in each facility. INTERACT tools, namely SBAR (Situation, Background, Assessment, and Recommendation) and Stop and Watch, are used for early warning and condition monitoring, and the Pennsylvania Physician Orders for End of Life Treatment (POLST) form is used for advance care planning. Telemedicine carts have been introduced to each facility, allowing on-call ECCP NP to assist in the diagnosis and treatment of acute changes in condition and other medical emergencies occurring off hours.

After CMS approved the preliminary materials, including communications plans, readiness reviews, and operations manuals, the ECCPs began implementing their initiatives in their partner nursing facilities in February 2013. All organizations staggered implementation in one, two, or three cohorts; the last cohort began in September 2013. Components of the implementations have been phasing in and evolving over time.

ECCPs continue to participate in a CMS Learning Community led by CMS's operations support contractor, Deloitte Consulting, LLP (Deloitte), who is also responsible for certain day-to-day monitoring tasks for the Initiative. The Learning Community component is intended to disseminate information, best practices, and lessons learned rapidly across ECCPs to facilitate rapid-cycle learning.

1.2 Overview of Evaluation Methods

RTI International, partnering with its two subcontractors—the RAND Corporation, and Qualidigm—and two consultants—David Grabowski, PhD, and Mary Naylor, PhD—continues to conduct a formative evaluation of the Initiative to improve care for residents in nursing facilities by reducing potentially avoidable hospitalizations. The evaluation is designed to evaluate the ECCP interventions as they unfold. The evaluation assesses the effectiveness of the

overall Initiative as well as components of each ECCP intervention. The evaluation aims to assess both the process and outcomes addressing the key issues below.

Process:

- What changes did the ECCP implement?
- How did the Learning Community activities and other rapid-cycle activities affect what the nursing facilities and ECCPs did?
- What were the barriers/enablers associated with intervention implementation?
- Does the intervention improve transitions to and from hospitals?
- What were the unintended consequences associated with intervention implementation?

Outcomes:

- Does the intervention affect rates of hospitalization, avoidable hospitalization, emergency department (ED) visits, avoidable ED visits, and observation stays among long-stay nursing facility residents?
- Does the intervention affect the quality of care, health outcomes, and functional status for long-stay nursing facility residents?
- Does the intervention reduce Medicare, Medicaid, and total combined Medicare-Medicaid costs?

RTI continues to apply a mix of quantitative and qualitative methods to evaluate the seven ECCP initiatives, customizing the overarching evaluation design to (1) capture each ECCP's unique features and (2) develop an in-depth understanding of the transformative processes that may occur throughout the Initiative's implementation. This approach allows us to directly link structural and process changes to outcomes.

Quantitative methods are used to evaluate the impact of ECCP interventions and components on outcomes, using a matched comparison group of non-ECCP facilities to determine the net effect of interventions. RTI uses multivariate analyses to evaluate key quality, utilization, and expenditure outcomes in a difference-in-differences regression model framework. RTI has identified a comparison group of non-ECCP facilities with characteristics similar to ECCP facilities within each state. We initially considered using a two-stage matching process to first select comparison facilities and then residents from those facilities. Propensity score models were developed for the final comparison facility group. However, it was determined the residents in the comparison facilities were similar enough to the ECCP residents in each state that propensity scores were not needed at that stage. Propensity scores are intended to substitute for matching groups on a large number of combinations of characteristics.

The qualitative design focuses on primary data analyses using data collected from the ECCPs and the participating facilities directly. Formal site visit protocols and telephone interviews are used to ensure standardized primary data are collected. The primary data complement secondary data analyses, providing critical context to interpret evaluation findings. In addition to informing secondary data analyses, the primary data analyses provide a better understanding of the ECCPs and processes of implementing various models of the Initiative in participating facilities. This in-depth qualitative approach allows us to assess the fidelity to the original Initiative design, and gather necessary information to describe the barriers for implementation. Our primary data collection and analytic activities are organized by four key conceptual domains: (1) care model description; (2) early start-up and implementation experience; (3) program impact and possible spillover effect; and (4) early experience with Learning Community activities.

1.3 Organization of Annual Report

This report details Project Year 3 findings regarding the Initiative and includes analyses of nursing facilities at various operational stages through August 2015. ***Section 2*** of the report presents Project Year 3 findings using a quantitative analysis approach. The claims data analyzed in this report are from calendar year 2014; the data submissions for this period approached completion during 2015. Analytic methods discussed include identifying ECCP facility comparison groups, aligning data sources, creating analytic files and variables, and specifying statistical models. Results from both descriptive and multivariate regression analyses are also presented and discussed in Section 2. ***Section 3*** presents findings based on qualitative analyses of primary data collected by RTI for the period of July 1, 2014, through August 1, 2015. Note that the primary data collection cycle does not match the annual reporting cycle. As a result, this report includes findings from Project Year 2 (analysis from survey waves 1 and 2) and the beginning of Project Year 3 (i.e., site visits and telephone interviews).

To the extent possible, in both Section 2 and Section 3 we comment on Initiative accomplishments; challenges encountered during intervention implementation; recommendations for potential changes where applicable; and lessons learned. The appendices (submitted in a separate volume) include tables delineating current ECCP participating facilities (***Appendix A***), characteristics of Initiative-eligible residents and nursing facilities included in the multivariate analyses (***Appendix B***), selected multivariate regression model results (***Appendix C***), descriptive statistics of short-stay and long-stay residents (***Appendix D***), subpopulation regression results (***Appendix E***), survey findings (***Appendices F*** and ***G***), and survey instruments (***Appendices H*** and ***I***). Appendices for state maps illustrating the geographic locations of ECCP and matched comparison facilities; conditions defined as potentially avoidable hospitalizations; detailed measure specifications; and primary data collection protocols are available upon request.

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SECTION 2
PROJECT YEAR 3 FINDINGS: QUANTITATIVE ANALYSES

2.1 Introduction

Quantitative evaluation analyses in the annual reports are intended to present results from risk-adjusted, multivariate regression models to estimate the effect of ECCP interventions on participating nursing facilities, relative to the matched comparison group, on selected resident-level outcomes, including utilization of Medicare and Medicaid covered services and related expenditures as well as indicators of quality outcomes. This annual report covers a 4-year period from 2011 to 2014. Data for 2011 and 2012 are used as the baseline to trend evaluation outcomes in each of the subsequent Initiative years, starting from 2013. The final report will include data up to 2016. It is important to note that ECCP participating facilities implemented the Initiative at different rates throughout 2013 depending on their go-live dates and the extent to which the new ECCP protocols were developed and followed. Since 2013 is the first year of transition to the Initiative, we found a limited impact of ECCP intervention on most of the outcome measures in 2013, as presented in RTI's last annual report (September 2014). In this year's report, we anticipate more substantive findings on the effect of ECCP intervention in 2014, given that most facilities have had the Initiative more fully implemented for at least a year. Our qualitative findings are that the interventions are continuing to evolve during the study period.

In the remainder of this section, we first provide an overview of our quantitative approach to annual evaluation analyses (***Section 2.2***) and a brief description of secondary data sources used in all quantitative analyses performed to date or planned for the future (***Section 2.3***). Following a brief description of the method and process used to identify the comparison group of facilities within each ECCP participating state (***Section 2.4***) and our definition of potentially avoidable hospitalizations (***Section 2.5***), we document our approach to identifying the population of Initiative-eligible nursing facility residents in each year who are included in the evaluation analyses (***Section 2.6***). Subsequent sections describe in detail how the outcome measures for evaluation are operationalized annually (***Section 2.7***), the selection of covariates (i.e., independent or control variables) associated with the outcome measures (***Section 2.8***), and specifications of the statistical models used to carry out multivariate regression analyses (***Section 2.9***). We then present and discuss results from both descriptive analyses (***Section 2.10***) and multivariate regression models, including results specific to select subgroups of nursing facility residents (***Section 2.11***). We conclude this section with a brief summary of major quantitative findings thus far across outcome domains and ECCP participating states (***Section 2.12***).

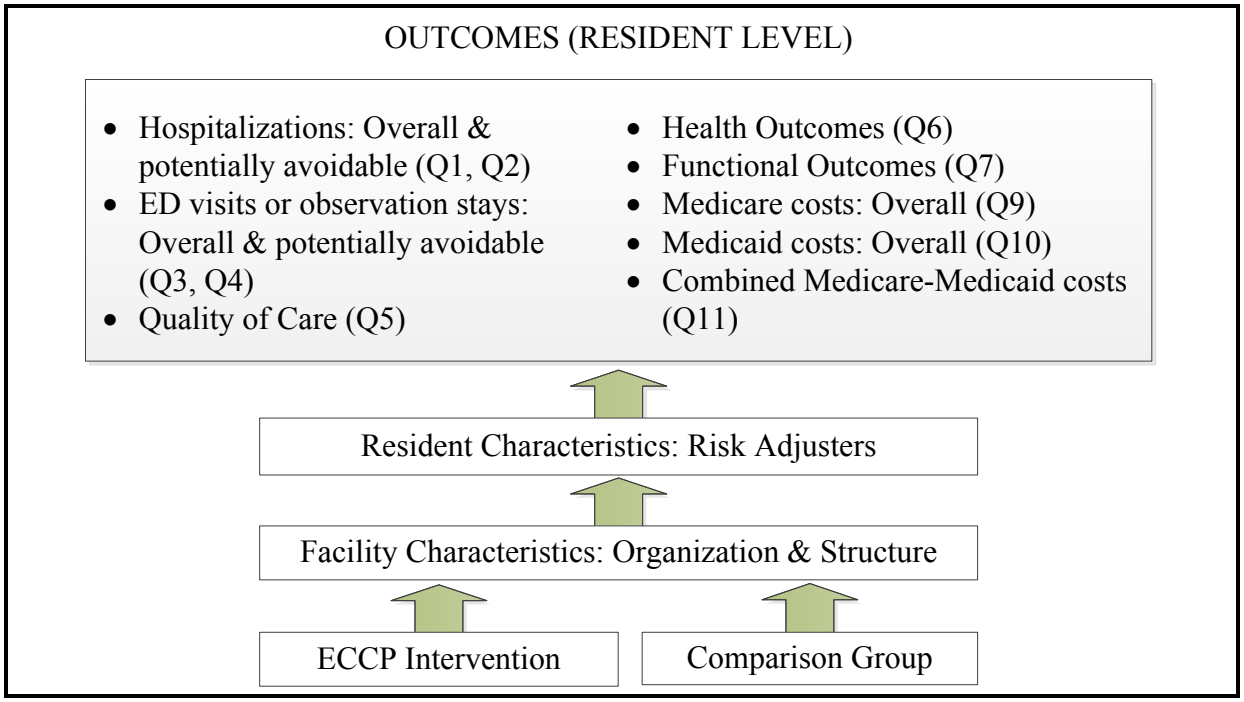
2.2 Analytic Approach to Annual Evaluation: Overview

A regression-based model is used to test quantitative effects of the ECCP interventions (see Section 2.9, for specifications). This model provides the general framework for the evaluation of all outcome measures. Most outcome variables are defined at the resident level. They fall into the following broad categories: service utilization, including hospitalizations (overall and those potentially avoidable) and ED visits or observation stays (overall and those potentially avoidable); Medicare or Medicaid expenditures; and MDS-based quality outcomes. All utilization- and expenditure-related outcomes are defined using Medicare or Medicaid

claims. Resident-level quality outcomes are defined using the nursing home resident assessment Minimum Data Set, Version 3.0 (hereinafter referred to as MDS-based quality outcomes).

The general regression model follows a difference-in-differences design with multiple annual observation periods both before the intervention (2011 and 2012, as Base Years) and periodically after (2013 and onward). The model includes variables for a facility being in the intervention (ECCP) or comparison group for periods during the intervention and marks those same facilities during the Base Years. It also factors in variables characterizing the residents and their facilities, which are predictive of the outcome variables, as illustrated in ***Figure 2-1.*** A summary of all outcome variables, including their definitions, units of analysis, and data sources, is provided in ***Table 2-1***. Further details on the outcome variables, especially those included in multivariate regression analyses, are elaborated in Section 2.7.

Figure 2-1
Analytic framework for assessing the effects of ECCP intervention on resident outcomes



Compared to the last annual report, we made several changes to the analytic approaches, as highlighted below:

- We added estimations of utilization count models, in which the outcome is the count of all hospitalizations, potentially avoidable hospitalizations, all-cause ED visits, or potentially avoidable ED visits, in addition to models estimating the probability of having any of these events.

- Besides total Medicare expenditures, we estimated models of expenditures for select subcategories of utilization, including those for all hospitalizations, potentially

avoidable hospitalizations, all-cause ED visits, potentially avoidable ED visits, physician services, and Skilled Nursing Facility (SNF) services.

- We conducted a series of multivariate analyses to reveal whether the ECCP intervention might have a differential effect on certain subgroups of residents, including those who are younger than age 65, those who have mental illness and those who have dementia.

- For the presentation of multivariate regression model results, we calculated and reported the marginal effects of ECCP intervention on each outcome in meaningful units, such as dollars or percentage points, instead of the estimated coefficients in the models, which are often not intuitively understandable.

A number of caveats should also be noted on the quantitative analyses presented in the current report:

- Only FFS Medicare enrollees who are eligible for participation in the Initiative are included in the analyses (see Section 2.6 for detailed criteria and procedures used to identify Initiative-eligible residents). The majority of them are dually eligible for Medicare and Medicaid. Medicaid-only residents who are Initiative-eligible (relatively few in numbers) are excluded from all analyses so far; they are to be identified from state-provided Medicaid eligibility and claims data (in process).

- Relatedly, only Medicare utilization and expenditures are analyzed and reported. Analyses of state-provided Medicaid data are underway and will be added in future reports once available (see Section 2.3 for an update on Medicaid data). Because the measures of interest are mainly reflected in Medicare claims the limitation is not substantive.

- For several MDS-based and non-MDS-based outcome variables, we choose to report only summary statistics from descriptive analyses, because multivariate regression analyses are not feasible or desirable in these cases (as marked in the last column of Table 2-1). Some of them have either extremely high prevalence (e.g., receipt of influenza vaccine or pneumococcal vaccine) or extremely low prevalence (e.g., physical restraints, observation stays), which present challenges for statistical modelling due to potential "ceiling effect" or "floor effect." In other cases, the variables are not quality measures *per se* (e.g., hospice enrollment, dental problems, swallowing disorder) or are not well established or widely used quality measures (e.g., bowel or bladder incontinence, weight loss). Several other measures, including direct-care staffing levels and health-related inspection survey deficiencies, are aggregated to the facility level, making it difficult to run robust multivariate analyses because of small sample sizes.

Table 2-1
Measures of service utilization, cost, and quality outcomes

Measure	Definition	Variable type	Unit of analysis	Data source	Multivariate analysis
Service Utilization (Questions 1-4):					
Hospitalization, all cause	Whether a resident had an inpatient admission; or total count of inpatient admissions.	Dichotomous or count	Resident	Medicare Part A claims	Yes
Hospitalization, potentially avoidable	Whether a resident had an inpatient admission for any of the conditions defined as potentially avoidable; or total count of inpatient admissions so defined.	Dichotomous or count	Resident	Medicare Part A claims	Yes
ED visits, all cause	Whether a resident had an ED visit that did not lead to inpatient admission, identified as RCC = (045X or 0981) or HCPCS classification code = (99281-99285); or total count of ED visits.	Dichotomous or count	Resident	Medicare outpatient (institutional) claims	Yes
ED visits, potentially avoidable	Whether a resident had an ED visit (as identified above) for any of the same conditions as used to define potentially avoidable hospitalizations; or total count of ED visits so defined.	Dichotomous or count	Resident	Medicare outpatient (institutional) claims	Yes
Observation stays, all cause	Whether a resident had an observation stay that did not lead to inpatient admission, identified as RCC = (0760 or 0762) and HCPCS = (G0378 or G0379); or total count of observations stays.	Dichotomous or count	Resident	Medicare outpatient (institutional) claims	No
Observation stays, potentially avoidable	Whether a resident had an observation stay (as identified above) for any of the same conditions as used to define potentially avoidable hospitalizations; or total count of observation stays such defined.	Dichotomous or count	Resident	Medicare outpatient (institutional) claims	No

(continued)

Table 2-1 (continued)
Measures of service utilization, cost, and quality outcomes

Measure	Definition	Variable type	Unit of analysis	Data source	Multivariate analysis
Quality Outcomes (Questions 5-7):					
RN staffing per resident day	RN hours per resident day.	Continuous	Facility	CASPER	No
LPN staffing per resident day	LPN hours per resident day.	Continuous	Facility	CASPER	No
CNA staffing per resident day	CNA hours per resident day.	Continuous	Facility	CASPER	No
Health inspection score	Score based on the number, scope, and severity of deficiencies identified during each annual inspection survey. All deficiency counts are weighted by scope and severity.	Continuous	Facility	CASPER	No
Health inspection score for quality of care deficiency citations	Score based on the number, scope, and severity of quality of care deficiency citations F tags F309 - F334 identified during each annual inspection survey. All deficiency counts are weighted by scope and severity.	Continuous	Facility	CASPER	No
Health inspection score for quality of life deficiency citations	Score based on the number, scope, and severity of quality of life deficiency citations F tags F240 - F258 identified during each annual inspection survey. All deficiency counts are weighted by scope and severity.	Continuous	Facility	CASPER	No
Assessed and appropriately given the seasonal influenza vaccine	Whether a resident is appropriately given the influenza vaccination during the current or most recent influenza season.	Dichotomous	Resident	MDS 3.0	No
Assessed and appropriately given the pneumococcal vaccine	Whether a resident's PPV status is up to date.	Dichotomous	Resident	MDS 3.0	No
Catheter inserted and left in bladder	Presence/absence of indwelling catheters.	Dichotomous	Resident	MDS 3.0	Yes[1]

(continued)

Table 2-1 (continued)
Measures of service utilization, cost, and quality outcomes

Measure	Definition	Variable type	Unit of analysis	Data source	Multivariate analysis
Physically restrained	Presence/absence 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, and chair prevents rising used in chair or out of bed).	Dichotomous	Resident	MDS 3.0	No
Antipsychotic medication use	Whether a resident received an antipsychotic medication.	Dichotomous	Resident	MDS 3.0	Yes [1]
One or more falls with major injury[2]	Presence/absence of one or more look-back scan assessments that indicate one or more falls that resulted in major injury.[2]	Dichotomous	Resident	MDS 3.0	Yes [1]
Self-report moderate to severe pain	Presence/absence 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.	Dichotomous	Resident	MDS 3.0	Yes[1]
Pressure ulcers Stage II or higher	Presence/absence of Stage II–IV pressure ulcers.	Dichotomous	Resident	MDS 3.0	Yes[1]
Decline in ADLs	Whether 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.	Dichotomous	Resident	MDS 3.0	Yes[1]
Urinary tract infection	Presence/absence of urinary tract infection within the last 30 days.	Dichotomous	Resident	MDS 3.0	Yes[1]
Depressive symptoms	Presence/absence of depressive symptoms within the last 2 weeks measured by PHQ-9 or PHQ-9-OV.	Dichotomous	Resident	MDS 3.0	Yes[1]
Hospice enrollment	Whether a resident received hospice care within the last 14 days.	Dichotomous	Resident	MDS 3.0	No
Bowels or bladder incontinence	Whether a resident frequently or always loses control of the bowel or bladder.	Dichotomous	Resident	MDS 3.0	No

(continued)

Table 2-1 (continued)
Measures of service utilization, cost, and quality outcomes

Measure	Definition	Variable type	Unit of analysis	Data source	Multivariate analysis
Weight loss	Whether 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.	Dichotomous	Resident	MDS 3.0	No
Dental problems	Presence/absence of oral or dental problems.	Dichotomous	Resident	MDS 3.0	No
Swallowing disorder	Presence/absence of symptoms indicating difficulty swallowing.	Dichotomous	Resident	MDS 3.0	No
Cost (Questions 9-11):					
Medicare costs, overall	Total Medicare payment per beneficiary for all covered services, including inpatient, outpatient, SNF, carrier file services, hospice, home health, durable medical equipment, and prescription drugs.	Continuous	Resident	Medicare Parts A/B/D claims	Yes
Medicaid costs, overall	Total Medicaid payment per beneficiary for long-stay/custodial nursing facility care, and Medicaid cost sharing of Medicare payments for all covered services.	Continuous	Resident	State Medicaid claims	—
Medicare-Medicaid costs, combined	Total combined Medicare and Medicaid payments (as specified above) per beneficiary.	Continuous	Resident	Medicare Parts A/B/D and Medicaid claims	—

NOTES:

MDS 3.0 = Nursing Home Minimum Data Set resident assessment data; ADLs = Activities of Daily Living; CNA = Certified Nurse Aide; CASPER = Certification and Survey Provider Enhanced Reporting; ED = Emergency Department; HCPCS = Healthcare Common Procedure Coding System; LPN = Licensed Practical Nurse; RCC = Revenue Center Code; PHQ-9 = Patient Health Questionnaire-9; PHQ-9-OV = PHQ- 9 Observational Version; PPV = Pneumococcal Polysaccharide Vaccine; RN = Registered Nurse; SNF = Skilled Nursing Facility; — = Data not yet available.

[1] The dependent variable used in the multivariate analysis is expressed as the proportion of observed quarters indicating the presence of each outcome per resident in a given year.

[2] These specifications are consistent with Nursing Home Compare and are used in RTI's quarterly reports. In the annual analyses, we expand the measure to include falls with any injury (J1900B = [1, 2] or J1900C = [1, 2]).

2.3 Secondary Data Used in Quantitative Analyses

RTI obtains Medicare secondary data (eligibility, claims, and assessments) from CMS and Medicaid secondary data (eligibility and claims) directly from each state. Medicare data come from several sources, including the Denominator File, the Enrollment Database (EDB), prior years of CMS Claims History Files, the Integrated Data Repository (IDR), and the MDS. The following paragraphs briefly describe these files and their use in our analyses.

2.3.1 Resident Assessment Data—Minimum Data Set 3.0

All Medicare- and Medicaid-certified nursing facilities are required to collect and report MDS data to CMS for every resident in a certified bed (regardless of payment sources) on admission, quarterly and annually, as well as upon a significant change in resident status, and to submit any significant corrections to prior comprehensive or quarterly assessments. The intent is 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 assessments for payment under the Medicare Part A benefit for beneficiaries who receive post-acute care in a skilled nursing facility (SNF). These assessments are completed at 5, 14, 30, 60, and 90 days of the Medicare Part A stay and upon readmission or return to the facility. The MDS assessment was implemented nationally in 1990, updated in 1995 and 1998, and enhanced in 2010 (MDS 3.0). With the implementation of the MDS 3.0, clinical information is also being collected at discharge from the facility.

MDS items measure each resident's demographics, physical health (e.g., chronic diseases, infections, and skin conditions), mental health (e.g., cognitive performance and mood), and functional status (e.g., Activities of Daily Living [ADL]) and give a multidimensional view of his/her health and functional status. 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; it has more valid prompts for measuring health conditions than MDS 2.0 (Saliba and Buchanan, 2008).

The MDS 3.0 is RTI's data source for measures of resident-level MDS-based quality outcomes as well as some characteristics associated with these outcomes. (Other medical characteristics are measured by claims-based Hierarchical Condition Categories (HCC), described below in Section 2.3.2.) We use 6-week run-out time for MDS data; that is, we request MDS data for the target quarter about 6 weeks after the end of the quarter so that almost all data for the target quarter have been submitted.

2.3.2 Medicare Claims and Eligibility

Medicare claims are the source for data on service utilization events (e.g., hospitalizations, ED visits), diagnoses, and spending. RTI obtains Medicare enrollment, eligibility, and claims data through the IDR system. We prefer using data from IDR over other CMS data systems such as the Standard Analytic Files (SAFs) from the Data Extract System (DESY) and the Chronic Condition Warehouse (CCW) Enclave, which have longer data lags than IDR. With data updated on a weekly (or at least monthly) basis, the IDR provides more timely and complete data that better meet CMS's needs for rapid-cycle reporting (through RTI's

ongoing quarterly reports). In addition, Medicare enrollment data from IDR matches with MDS finder files slightly better than enrollment data from DESY. The IDR also provides up-to-date monthly indicators for dual eligible status, which we use to identify dual eligible residents in our analyses. Thus, the IDR is overall better suited to this project.

In creating the Medicare utilization and expenditure measures per beneficiary in each calendar year, we allow 3 months for claims runout from the end of the calendar year. A longer runout period (e.g., 6 months) may be desirable, which allows more time for late submissions or adjustments. This could be done for 2011 and 2012 without any issues. For claims from 2013 and after, however, using a 6-month runout period would leave us little time (2 weeks or less) for processing and analyzing those claims for the current annual report. For consistency, we used 3 months for claims runout for all years of data analyzed and reported in the current report.

Some resident-level, medical characteristics are Medicare HCCs. HCCs are clinically meaningful groupings of ICD-9 diagnosis codes maintained by CMS for the purpose of risk adjusting capitation payments to Medicare Advantage (MA) 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. These resident-level HCC data are updated by CMS annually and are derived from ICD-9-CM codes on principal hospital inpatient, secondary hospital inpatient, hospital outpatient, physician, and clinically trained nonphysician claims. CMS implemented the RTI-designed HCC model for capitation in 2004. HCC data for beneficiaries for a given year represent information from claims made during the prior year. In some cases we combined two or three HCCs into one larger cluster that represents having at least one of the corresponding conditions or diagnoses. (For a list of HCC variables used in the evaluation regressions, see Appendix Table C.1.)

2.3.3 Nursing Facility Data

We use data from the CMS Certification and Survey Provider Enhanced Reporting (CASPER) system for facility characteristics used for selecting comparison groups, direct-care staffing, inspection survey-based measures of quality as well as covariates 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. It includes a compilation of data collected by surveyors during the on-site inspection surveys conducted at nursing facilities for the purpose of certification for 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. Most information in the CASPER system is typically collected during on-site evaluations conducted by state survey agencies. The evaluations occur at least once during a 15-month period (with a 12-month statewide average), with additional surveys occurring as a result of a complaint being investigated. Thus, although the time lag for facility data should be small compared to other data sources (e.g., Medicaid claims), the information may not reflect the most current status.

2.3.4 Medicaid Data

RTI is working with individual states to obtain Medicaid data directly because of the significant lag in Medicaid data availability. The current time lag for Medicaid claims data is considerable and varies by state. RTI will incorporate Medicaid data in each report as they become available. For states that do have complete data accepted by the Medicaid Statistical Information System (MSIS), RTI will consider using such data, provided they have a shorter lag than would be the case if requested directly from the states.

We began our data collection efforts with CMS's Memorandum of Understanding with each state of a participating ECCP to identify the state contact. As of July 2015, we have contacted all seven ECCP states as shown in ***Table 2-2***. Once the appropriate contact was identified for a state we reached out with an introductory e-mail describing the Initiative and evaluation and requested a time for a phone call. We also provided the state with a list of questions regarding their Medicaid data and sent them a list of variables being requested, based on MSIS data elements. The data that we request from the states include all the Medicaid file types to recognize Medicaid-covered events, costs, and the enrollment and eligibility information. Historical data were requested for calendar years 2011 and 2012 to serve as the baseline and for calendar year 2013 and forward on a quarterly basis. We also request that the states provide us with data dictionaries and codebooks for the data.

Table 2-2 also presents our progress in obtaining data from the ECCP states through July 2015. We have established data sharing agreements (such as data use agreements) with five states. These five states have provided us with some form of a data dictionary and codebook. We have begun to receive data from Alabama, Missouri, Nebraska, Nevada, and New York. Two states, Indiana and Pennsylvania will not provide data to RTI. We are working with CMS to determine the best way to access data for these states.

Table 2-2
Medicaid data acquisition progress (through July 2015)

State	Contact made	Data sharing agreement established	Codebook received	Data dictionary received	Data received
Alabama	Yes	Yes	Same as MSIS	Same as MSIS	January 2011 to December 2014 (except last 4 quarters of eligibility data). Delay in receiving further data until the switch to T-MSIS is complete. Timeline unknown.
Indiana	Yes	No	No	No	None
Missouri	Yes	Yes	Yes	Yes	January 2011 to March 2015
Nebraska	Yes	Yes	Yes	Yes	January 2011 to March 2015
Nevada	Yes	Yes	Yes	Yes	January 2011 to June 2015
New York	Yes	Yes	Yes	Yes	January 2011 to June 2014
Pennsylvania	Yes	No	No	No	None

Although we structure our requests to align with the MSIS variables to assist the states in identifying the appropriate data elements, our data requests are state dependent. Because of the large size of some state data systems and state personnel availability, in some states we limited our request to only beneficiaries that received nursing facility care during any given year. To match the Medicaid claims to the Medicare claims for analysis we request a Medicare Health Insurance Claim (HIC) number as well as a Social Security Number (SSN), if they are available in the state Medicaid files. Each state has provided us with either a HIC or SSN and our matching algorithm also uses gender and date of birth. For a match to occur, we require that a person identifier (HIC, SSN, or Medicaid ID) match as well as gender.

Our Medicaid data analysis to date has started for each of the five states for which we have data. We are currently working on the baseline periods (2011 and 2012) to identify nursing facility residents, match the data to the MDS file identifying Initiative-eligible residents, account for adjustment claims, and assign Medicare-like claim types to each claim. This process differs for each state as the data received from each state differ. We have encountered several issues in the data that involve follow-up with the states and significant investigation resulting in delays in our data processing. We continue to be proactive in seeking information and assistance from the states and are making progress in our work.

2.4 Identification of Comparison Groups

Using propensity score models, RTI selected a group of comparison facilities within the same state as the ECCP facilities based on observed facility characteristics in 2012. The propensity matching helps to ensure that comparison facilities have characteristics that are similar to those in the ECCP group. This is important given that the intervention focuses on facilities and their operations. We matched two comparison facilities to each ECCP facility in all states except Nevada, where there are fewer non-ECCP facilities than ECCP facilities to begin with. (Thus no matching was done in Nevada, and all Nevada nursing facilities are included in the evaluation). A more detailed technical documentation on the methodology and process of comparison group selection is provided in our first two quarterly reports (August 2013 and November 2013) and last updated evaluation design report (May 2015).

In 2014, two facilities dropped out of ECCPs, and three comparison facilities were dropped from our analysis. VillageCare's Rivington House, an ECCP facility in New York, was an AIDS facility but closed because of a lack of perceived demand for that specialization. Montclair Nursing and Rehabilitation Center in Omaha was dropped from the Initiative by the Nebraska ECCP because of a perception that the facility cannot devote the necessary time and energy to continue as part of the Initiative. Because those two facilities dropped out of the intervention so late in the year, they remain in our 2014 data for analysis for the period they were active. Three comparison facilities either closed or ceased to provide MDS data and were dropped from our analysis: Lutheran Home (Nebraska), Kindred – Flamingo (Nevada) and Caremeridian (Nevada).

RTI's policy is not to revise the propensity score matching after 2013, despite facility dropouts, to the extent possible. Our results are still valid without rematching facilities, because our regressions that estimate Initiative impact reduce selection bias by controlling for many resident- and facility-level characteristics that could be related to outcomes. A dropout from

either group will not be a major problem unless the proportion of the facilities dropping is very large (which is highly unlikely). In addition, any rematching over time would result in matching comparisons after intervention changes have occurred and thereby the estimated cumulative intervention effect would possibly be diluted or hidden.

In particular, Montclair's and Rivington House's dropouts do not threaten the validity of the evaluation. Since Montclair represents 10 percent of Nebraska ECCP's resident pool and just under 10 percent of total Initiative-eligible resident episode days, its loss is not expected to substantially impact the analysis. Although Rivington has some characteristics that differ greatly from the New York ECCP as a group, it only accounts for about 1 percent of the ECCP's Initiative-eligible population and less than 1 percent of the ECCP's total Initiative-eligible resident episode days. Thus the impact of its closure is expected to be minimal. (Extensive resident- and facility-level descriptions of Montclair, Rivington House, the Nebraska ECCP, and the New York ECCP can be found in the July 7, 2015 memo from RTI to CMS, "Dropout facility descriptive statistics for Q3 2014.")

Table 2-3
Number of active ECCP and matched comparison facilities (effective October 2014)

	ECCP facilities	Comparison facilities	Total
Alabama	23	46	69
Indiana	19	38	57
Missouri	16	32	48
Nebraska	14	29	43
Nevada	24	19	43
New York	29	60	89
Pennsylvania	19	38	57
Total	144	262	406

NOTE: This table reflects the number of facilities in the Initiative as of September 1, 2015. The numbers of ECCP facilities in our 2014 data analysis in Nebraska and New York are 15 and 30, respectively. The facilities Montclair (NE) and Rivington House (NY) dropped out late in the year and are not expected to make a large difference in our analysis, so they remain in the 2014 data. Our data include records from those two facilities only through Q3 2014, shortly before they dropped out.

It should be noted that the propensity matching is not intended to be used to analyze the relationships of individual facilities; rather, it is a group match whereby the intervention and nonintervention groups are matched overall with intervention and comparison facilities having an overlapping range of propensity scores.

RTI's original evaluation design considered additional propensity score matching at the resident level. The initial concern was that the resident characteristics selected as covariates in multivariate regression models might be overly "unbalanced" between residents in ECCP facilities and those in comparison facilities, thereby potentially confounding the estimated impact of ECCP intervention on outcomes. However, we compared selected resident-level covariates

included in multivariate regression models and found little systematic difference between the two groups in each year (see sample descriptive statistics in ***Appendix B***). Additional analyses confirmed that relative differences in the means of resident-level covariates between the two groups were similar with and without propensity weighting. We concluded that additional propensity score matching at the resident level is unnecessary as the potential gains from this exercise are minimal. Therefore, in multivariate analyses no propensity weighting at the resident level is applied.

2.5 Definition of Potentially Avoidable Hospitalizations

RTI is using the definition of potentially avoidable hospitalizations as developed by Walsh et al. (2010) in their study of high-cost dually eligible populations. Since this publication, a few conditions were added or deleted based on subject matter expert input. (Appendix C of the 2014 annual report provides a list of potentially avoidable hospitalization conditions updated through 2012 ICD-9 code changes. The ICD-9-CM was essentially frozen in 2012 pending the advent of ICD-10-CM.)

2.6 Identification of Initiative-Eligible Residents for Annual Evaluation

A resident's eligibility for inclusion in our annual analytic files is primarily determined using MDS assessments. This allows a uniform approach to determining resident eligibility in comparison facilities and Initiative facilities. The basic criteria have been set out in the guidelines for the Initiative; we have operationalized the criteria to meet the needs of the analysis.[6] Below, we describe our approach using the diagram in ***Figure 2-2***. The diagram shows a hypothetical resident's nursing facility use during an observation period. For each calendar year, which is our target period for outcome measures in the annual analyses, we use MDS data submitted to CMS approximately 16 months prior to the end of the year through 2-and-a-half months after the end of the year to identify nursing facility stays; however, the actual time window of data coverage (the observation period) may vary slightly from person to person and from year to year. Elements of the diagram are defined below:

- ST = Stay. A stay is a period of time between a resident's entry (either admission or reentry) into a facility and either (1) a discharge (with or without anticipation of return) or death, or (2) the end of the target period (i.e., the end of the year), whichever comes first.

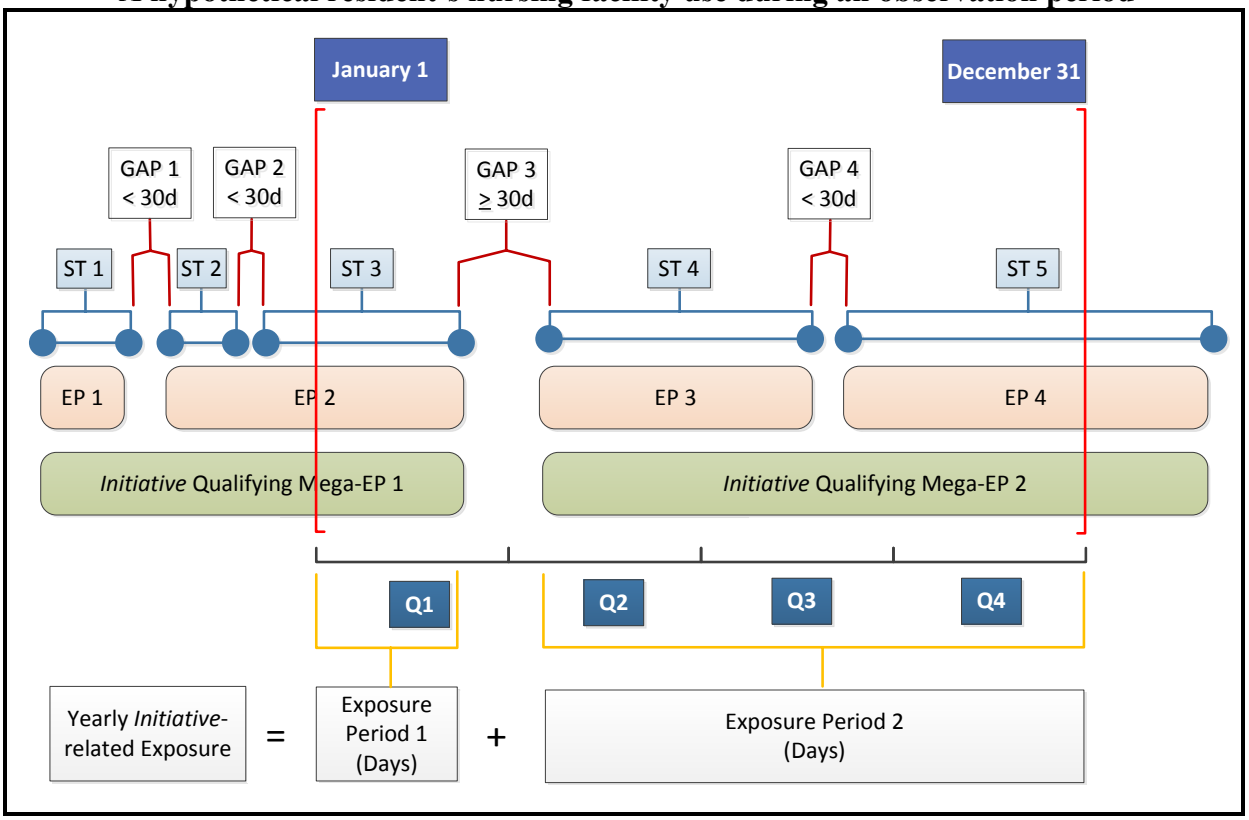
- EP = Episode. An episode of care is a period of time spanning one or more stays. An episode of care begins with an admission and ends with either (1) a discharge or (2) the end of the target period (i.e., the end of the year), whichever comes first. Not every stay discharge ends an episode. The discharge that ends an episode of care is either (1) a discharge assessment with return not anticipated, (2) a discharge assessment with return anticipated but the resident does not return within 30 days (i.e., the gap between the two stays is greater than 30 days), or (3) death. If a resident has a discharge

[6] The basic criteria are that the resident has been present in the facility for at least 101 days or that their assessments indicate that there is no active discharge plan in place.

assessment with return anticipated and returns within 30 days, then there is no interruption to the same episode of care, although the return/reentry will start a new stay (as illustrated by ST 2 and ST 3, which belong to the same episode, EP 2).

- Mega-EP = Mega-episode. A mega-episode is a period of time spanning one or more episodes. A mega-episode of care begins with an admission and ends with either: (1) a discharge (regardless of anticipation of return) and the resident did not return within 30 days, or (2) death. In other words, a mega-episode of care may consist of multiple episodes of care if the gap between two adjacent episodes is less than 30 days. The mega-episode ignores relatively short breaks in nursing facility care and constitutes an Initiative-related exposure period if the Initiative eligibility criteria are met during that period. A mega-episode may span multiple years and is used to determine whether the 101 day criterion is met for eligibility. However, for any analysis year only the portions of eligible mega-episodes within that period constitute the exposure days for that year. This is shown at the bottom of Figure 2-2. The remaining portions of eligible mega-episodes that are not considered the exposure days for that year constitute the exposure days for the prior or following year, depending on which year each remaining portion of eligible mega-episodes overlaps with.

Figure 2-2
A hypothetical resident's nursing facility use during an observation period



NOTE: Characteristics of stays: ST 1 has a discharge *without* anticipation of return; ST 2 has a discharge *with* anticipation of return; ST 3 has a discharge, regardless of anticipation of return; and ST 4 has a discharge *without* anticipation of return.

The hypothetical resident is eligible for inclusion in the annual analysis if she/he has at least one Initiative-qualifying mega-episode that overlaps with the target year of interest (e.g., 2013). An Initiative-qualifying mega-episode (e.g., mega-EP 1 or mega-EP 2) has to meet *either* of the following criteria:

- During the mega-episode, the resident's cumulative days in facility (CDIF, not counting days in a hospital or otherwise outside the facility) have reached 101 days or more; or

- The mega-episode overlaps with an episode of care in any quarter of the year where the target assessment[7] indicates no active discharge plan (MDS Q0400A = 0).

A resident may have Initiative-related exposure periods with more than one nursing facility in a year. In rare cases, Initiative-related exposure periods in different facilities overlap, which is mostly caused by the facilities not submitting discharge assessments or not submitting them in time. These cases were dropped.

For each resident included in the annual analytic files, the Initiative-related nursing facility exposure is the total number of nursing facility days during which the resident is eligible for ECCP intervention (or would be eligible for intervention for residents in comparison facilities) during a calendar year. We use MDS and the mega-episode concept introduced above to determine Initiative-related exposure time annually for each resident. Specifically, for each resident eligible for the annual analysis, the Initiative-related exposure is the sum of days over all qualifying mega-episodes (including constituent stays and brief gaps [less than 30 days] between them) that overlap with the calendar year. For example, in the hypothetical scenario illustrated in Figure 2-2, the resident's total Initiative-related exposure time during the calendar year of interest is the sum of days spanning exposure period 1 and days covering exposure period 2.

We then identify these Initiative-eligible residents in Medicare enrollment data and determine their managed care and FFS status. Initiative-eligible residents with Medicare FFS status for at least 1 month during the calendar year of interest (through December 31 *or* the end of the person's last Initiative-qualifying mega-episode, whichever comes first) form the Medicare analytic sample for that year. Utilization of Medicare-covered services, events, and spending in each year are counted and included for annual analyses *only if* they occur during a person's Initiative-related exposure period within that year. When a resident transfers from one facility directly to another (i.e., both the end of the Initiative-related exposure period in the first facility and the start of the Initiative-related exposure period in the second facility fall on the day of transfer), we count utilization, events, and spending starting on the day of transfer toward the first facility as it is more likely to be responsible for these occurrences. This would include the entire cost of a hospital stay with an admission on that day.

It should be noted that Medicaid-only residents are not included in the analyses for the current annual report. It is not possible to identify Medicaid-only residents from MDS alone. To do so, it requires merging our MDS finder files with state Medicaid enrollment and eligibility

[7] The target assessment is generally the last qualifying MDS assessment in a quarter.

data as they become available. We plan to conduct separate analyses for this subpopulation in the future and report results in subsequent reports.

2.7 Defining Annual Outcome Measures

All the outcome variables under evaluation are defined annually. Below, we describe in further detail how they are defined and coded in our annual analytic files. The description focuses on those resident-level outcome variables that are included in multivariate regression analyses. Summary measures are also discussed briefly for those outcome variables used for descriptive analyses only.

2.7.1 Medicare Utilization

We track and analyze the utilization of Medicare-covered services for individuals who are enrolled in FFS Medicare for at least 1 month during their Initiative-related nursing facility exposure period in each calendar year. For multivariate regression analyses, we define a series of utilization measures two ways, as either a probability or a count. For the probability model, dichotomous variables (1/0) indicate whether a resident experienced each of the following events over her/his Initiative-eligible period annually: (1) at least one hospitalization (all cause), (2) at least one potentially avoidable hospitalization, (3) at least one outpatient ED visit (that did not result in inpatient admission), and (4) at least one potentially avoidable outpatient ED visit. For the count model, we use a total count of each type of utilization events. We use the same set of conditions and diagnosis codes in defining potentially avoidable hospitalizations to identify ED visits that are potentially avoidable.

Each observation in the multivariate data is a description of a resident eligible in the analysis year. The variables indicate the person's risk factors for having an event during the year. In the probability model, the dependent variable for the observation has a value of 1 if at least one tracked event occurred in the year, while in the count model, the dependent variable corresponds to the number of events. The probability of any event and the count of events are usually related and increase/decrease together. Results from both sets of models are presented in this year's annual report.

For descriptive analyses, the occurrence of multiple events is described in group-level summary measures for utilization rates, expressed as the total number of events of a given type per 1,000 person days. It should be noted that these rates are aggregated to the ECCP or comparison group level, where the numerator is the total number of events and the denominator is the sum of Initiative-eligible exposure days over all individuals in each group. These measures are reported in tables of descriptive statistics that are not adjusted for resident characteristics. We create similar utilization measures for several additional types of events or services, such as observation stays (the majority of which overlap with outpatient ED visits), or events that occurred in critical-access hospitals. We report aggregate utilization rates for these events but do not include them in multivariate regression analyses, because these are relatively rare events among residents in our sample.

2.7.2 Medicare Expenditure

The expenditure measures we have calculated and analyzed thus far include Medicare payments for various services for each beneficiary. Total payment is the sum of Medicare paid amounts over all types of Medicare claims with service dates that fall within that person Initiative-eligible exposure period during each calendar year. In this total, we count all Medicare payment amounts for all services included in the following types of Medicare claims: inpatient, outpatient (institutional), SNF, hospice, home health, durable medical equipment, carrier file services, and total payments for Part D drugs.

In the last round of annual analyses (summarized in RTI's Project Year 2 Final Annual Report, September 2014), we conducted multivariate regression analyses of total Medicare expenditure only. In this year's annual report, we estimated the effects of ECCP intervention on expenditures specifically for certain subcategories of service utilization, including expenditures associated with all-cause hospitalizations, potentially avoidable hospitalizations, all-cause ED visits, potentially avoidable ED visits, physician services, and SNF services. Methods for modelling expenditure outcomes are detailed in Section 2.9.

2.7.3 MDS-Based Quality Outcomes

The measures for quality outcomes fall under the overarching theme of quality measurement in health care settings. RTI selected quality outcomes using Donabedian's Structure/Process/Outcome model (1966)—the classic and most commonly used theoretical framework to evaluate health care quality. The structure, process, and outcome model suggests three groups of indicators of the quality of care in health care settings: (1) the professional and organizational resources associated with the provision of care in care delivery settings (structure); (2) the treatments and care provided to patients (process); and (3) the patients' outcomes resulting from medical care, such as pain, infection, and functional ability (outcome).

Using this framework, RTI identifies measures both at the resident level and the facility level. These measures are listed in Table 2-1. (The detailed specifications of these measures are provided in Appendix D in RTI's last annual report, September 2014). This subsection focuses on resident-level MDS-based quality outcomes, and the next subsection focuses on facility-level outcomes. These measures are selected based on two major criteria: (1) whether the measure is clinically relevant to the ECCP's intervention components and the risk of potentially avoidable hospitalization, and (2) whether the measure is aligned with other CMS initiatives (e.g., Nursing Home Compare, the Nursing Home Value-Based Purchasing Demonstration [NHVBPD], and the Five-Star Quality Rating System) or initiatives in which CMS is a partner (e.g., Advancing Excellence in America's Nursing Homes).

Although we report and monitor all MDS-based measures, we include only selected measures in multivariate analyses (as indicated in the last column of Table 2-1) based on the following logic. First, we do not include facility-level measures in the multivariate analyses because the sample sizes of the ECCP and comparison facilities are not sufficient for estimating multivariate regression models at the facility level. Instead, we track the changes of these facility-level measures using summary statistics. In addition to commonly used measures such as staffing ratios, we calculate two specific health inspection scores, one for quality of care

deficiency citations and one for quality of life deficiency citations. Previous studies found that in general, the use of consistent assignment in nursing facilities is associated with fewer deficiency citations, specifically regarding quality of life and quality of care (although the evidence is mixed for the latter). The use of consistent assignment is a component of one ECCP's intervention (AQAF-NFI, Alabama). We therefore monitor these two specific health inspection scores. Second, some MDS-based measures are subject to "ceiling effect" and/or have small across-facility variation. This applies to the two MDS-based measures regarding vaccination (assessed and appropriately given the seasonal influenza vaccine and assessed and appropriately given the pneumococcal vaccine, each with a very high prevalence) and the physical restraint measure (which has a low prevalence). However, we still monitor these MDS-based measures as they may be related to the risk of pneumonia and the risk of hospitalization. Third, a few MDS-based measures are not selected for the multivariate analyses (e.g., bowel or bladder incontinence and weight loss) because the particular practice aspects that may influence these measures are not specifically targeted by the ECCP interventions. Finally, some MDS-based measures (including hospice enrollment, oral/dental problems and swallowing disorder), despite being related to a unique ECCP's intervention component (i.e., focusing on oral health [Alegent + Creighton, Nebraska]), are not endorsed by the National Quality Forum and have not yet gone through vigorous testing for reliability and validity. These MDS-based measures are included for descriptive analyses only and are not included in multivariate analyses.

Outcome Measurement Points, Quarterly Measures, and Annual Measures. For all resident-level MDS-based quality outcomes, RTI first creates quarterly measures, which are reported in the quarterly reports, and then combines them into annual measures for the annual report.

All Medicare- and Medicaid-certified nursing facilities are required to collect and report MDS data to CMS for every resident (regardless of payment sources) on admission, quarterly and annually, or upon a significant change in resident status, and to submit significant corrections to prior comprehensive or quarterly assessments. Thus, for every long-stay resident, we expect to see at least one MDS assessment in a quarter and multiple assessments in a year. In addition, if a long-stay resident goes to a hospital and comes back to the nursing facility under the Medicare Part A benefit for SNF care, the nursing facility completes MDS Prospective Payment System (PPS) assessments for Medicare reimbursement around day 5, 14, 30, 60, and 90. For the majority of the measures, each resident's latest assessment in each quarter that meets the following criteria is considered a measurement point: the assessment type is OBRA[8] (including admission, quarterly, annual, significant change in status, and significant correction to prior comprehensive or quarterly assessment), PPS (including 5-, 14-, 30-, 60-, 90-day or readmission/return assessment), or discharge (including return not anticipated and return anticipated). Other types of MDS records, such as entry and death in facility records, are not used as these records do not contain the necessary health and function information for outcome measurement. The selected assessment as the measurement point is referred to as the target assessment. A resident who stays in a nursing facility for an entire year typically has four target

[8] These assessments are required by the Omnibus Budget Reconciliation Act.

assessments and thus four measurement points for most outcome measures, each associated with a calendar quarter. Target assessments define a set of quarterly measures.

Two outcomes have more measurement points than the target assessment alone to define the quarterly measures. Falls with injury requires scanning all assessments within the resident's current episode that have target dates within the period of interest to determine if falls have occurred. Decline in ADLs requires comparing each resident's target assessment with the one prior and determining whether the need for help with late-loss ADLs has increased in each quarter. Despite more measurement points, these two MDS-based quality outcomes have only one score for each quarter, similar to other outcomes.

Thus, for all outcomes, the quarterly measure indicates whether the resident has the outcome (e.g., pain or falls with injury) in the quarter. This methodology for outcome measurement points and quarterly measures is consistent with the methodology used by CMS to calculate nursing facility MDS-based quality measures that are posted on Nursing Home Compare for public reporting.

In a given year, the number of quarterly measures for each outcome for each resident reflects the number of quarters observed (up to four) for the outcome for the resident. In annual analyses, our approach is to calculate the proportion of these observed quarters indicating the presence of each outcome. For example, the annual measure of pain is the proportion of quarters for each resident we observed that indicate pain. A value of 1 indicates that the resident has pain the entire year (or the fraction of the year if a resident is not a full-year resident); a value of 0 indicates no pain at any time. The same resident would be included again in the next year if he or she survived into the next year and had at least one MDS target assessment eligible for calculating quarterly measures.

We construct the annual scores for two outcomes in a different way to accommodate the way the items are reported. The MDS items used to identify oral/dental problems are active on comprehensive MDS assessments only. A resident typically has one comprehensive assessment per year and the timing of the comprehensive assessment varies by resident. Therefore, we construct the measure as with oral/dental problems on the last observable MDS assessment that has the information needed to determine oral/dental problems. For the swallowing problem, the annual measure is whether the resident has any swallowing problem on any of the observed target assessments. Swallowing problems may not be easily reversible and an annual measure specified this way avoids duplicated flagging of the same problems.

Because each resident can have between one and four observed quarters in a given year (depending on the length of resident's Initiative-related nursing facility exposure), we weight each annual measure by the number of observed quarters divided by four (the yearly maximum number of observed quarters possible). Two measures—oral/dental problems and swallowing problems—are not weighted as they have different specifications from the others. The weighted annual measures are used for two purposes on the basis of two slightly different sets of residents. First, for descriptive measures, we aggregate each weighted annual score for residents who meet the MDS-based quality measure denominator criteria and do not meet the exclusion criteria (consistent with the criteria used for Nursing Home Compare), reporting them at the ECCP or comparison group level. Second, the weighted annual scores are used as dependent variables for

multivariate models to estimate the effects of the ECCP intervention on MDS-based quality outcomes. When estimating the multivariate model for each outcome, we do not exclude residents who meet the exclusion criteria for that MDS-based quality outcome (i.e., those who would be excluded from descriptive measures are included in the multivariate analyses). These residents are typically excluded from the MDS-based quality measure denominators (and thus MDS-based quality measure scores) as a way of risk adjustment. Our multivariate analyses use a comprehensive list of risk adjusters for each outcome and therefore allow for inclusion of these residents.

2.7.4 Facility Staffing and Inspection Deficiency Measures

Measured approximately annually, all facility-level variables are based on periodic nursing facility inspection surveys as maintained in the CASPER system. Most facilities have at least one inspection survey in each calendar year. Some may not have a survey shown in a given year but reappear in early next year (depending on their inspection and recertification survey schedule, which is within an interval between 8 and 15 months). In such cases, we use an adjacent survey for the same facility from either the preceding or subsequent year, whichever has a survey date that is closest to July 1 of the year without a survey.

From year to year, we monitor and report total direct-care staffing levels for RNs, Licensed Practical Nurses (LPNs), and Certified Nurse Aides (CNAs), each measured in hours per resident day. We also track several health-related deficiency citations from annual inspection surveys, including the total count and separately for citations related to quality of care and those pertaining to quality of life. For each, we compute a summary score per facility that reflects a weighted count of deficiency citations using a weighting scheme that is also applied in the Nursing Home Compare quality metrics. The weights are specific to the scope and severity of each deficiency type. (Specific F-tags for quality-of-care– and quality-of-life–related deficiencies and associated scope-severity weights are available in Appendix D in RTI's last annual report, September 2014). In addition, we compute an indicator for whether a facility received a severe type of deficiency (which causes actual or immediate jeopardy to resident health or safety) in each annual survey, defined as any deficiency citation with a grade of G or above.

As noted earlier, these measures are for descriptive analyses only. At the ECCP or comparison group level, we compute and report the average of each measure annually across all facilities in each group.

2.8 Independent Variables

The selection of covariates (i.e., independent or control variables) as risk adjusters in our final regression models is guided by literature review and is also shaped by limitations of the administrative data used in our analyses. State-specific 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 B***.

Resident-level Characteristics. Selected covariates at the individual level include residents' demographic characteristics, clinical diagnoses from the MDS, and comorbidities derived from Medicare claims. Age and sex are combined to create groupings mostly by 5-year

age brackets (except for the under 65 group and 95 or older group) for both sexes, with females age 65 to 69 used as the reference group. Resident's race/ethnicity is coded in three categories, including non-Hispanic White (reference category), non-Hispanic Black, and all other racial/ethnic groups.

Comorbidities are included as clustered by the CMS HCCs used in modeling Medicare costs for the MA program. These groups are clinically and cost homogeneous. They have been used to predict readmissions and mortality in the Medicare hospital quality models used for Hospital Compare. They are also being used in the CMS readmissions models for SNFs, inpatient rehabilitation facilities (IRFs), and long-term care hospitals (LTCHs). Because the number of parameters increases rapidly with the number of adjusters, we aggregate some of the HCC groups that are clinically related. For example, HCCs numbered 7 (metastatic cancer and acute leukemia), 8 (lung, upper digestive tract, and other severe cancers), 9 (lymphatic, head and neck, brain, and other major cancers), and 10 (breast, prostate, colorectal, and other cancers and tumors) are combined into a single category because all of them indicate cancers and our preliminary analysis showed that their effects on Medicare utilization and expenditures are similar. We exclude variables in a model if the number of residents with the characteristic is 0 or very small and aggregation with another variable is not appropriate.

We include two additional diagnoses documented in the MDS, for anemia (which is one of the potentially avoidable conditions for hospitalization) and dementia (Alzheimer's or other types). It should be noted that in RTI's ongoing quarterly reports, we use a broad definition of dementia (or possible dementia), which includes resident with a dementia diagnosis *or* cognitive impairment based on the Brief Interview for Mental Status (BIMS) score; in that context, our intention is to be more inclusive. We discussed the pros and cons of these alternative definitions with one of our consultants on this project, Dr. Debra Saliba. According to Dr. Saliba, dementia is under-recognized and diagnoses typically under-represent the prevalence. On the other hand, an individual may have cognitive impairment, but not have dementia. Another complexity is that many other factors could cause cognitive impairment, such as delirium, sensory deprivation, and insufficient sleep. Thus, cognitive impairment may over-represent true dementia. Dr. Saliba noted that the choice depends on the kinds of research questions or hypotheses under investigation. In multivariate regression analysis, given our primary interest in revealing whether nursing facilities are less (or more) likely to hospitalize residents with dementia, it is appropriate to use the diagnosis as recognized dementia (which is also relatively "cleaner" than a broad measure of cognitive impairment). By this diagnosis-based definition of dementia, between just under 40 percent of residents in Nevada and close to 60 percent of residents in New York in our annual samples are identified with dementia (see ***Appendix B***). Also from the MDS, a summary score (range 0 to 28) measuring the degree of ADL dependence or limitations and the Body Mass Index (BMI) are included as risk adjusters.

It is important to note that all HCCs are defined using diagnoses documented in Medicare claims from the *previous* year. For example, the HCC variables for each resident included in our 2011 annual analytic samples reflect HCC values measured during 2010, and so on. Similarly, all resident-level covariates from the MDS are based on a *prior* MDS assessment roughly 90 days *before* each resident's Initiative-eligible episode began in each year. This way, we use lagged

individual-level risk factors to predict current outcome variables in each year, thereby mitigating potential endogeneity in the relationship between them.

Additional individual-level characteristics as control variables in all models include the number of Initiative-eligible exposure days, an indicator for Medicare-Medicaid dual eligible status (any episode month), and an indicator for enrollment in a MA plan (any episode month). The percentage of residents with periods of dual eligibility in our data ranges from around 65 percent in Nevada to over 80 percent in New York (see ***Appendix B***). Although relatively few residents have ever enrolled in a MA plan over their Initiative-eligible exposure period, the proportion of those who have has increased over the 4-year period (consistent with national trends in the growth of Medicare-managed care penetration over time).[9] In 2014, the proportion of residents in the Initiative who have ever enrolled in a MA plan ranged from 1.1 percent in comparison facilities in Nebraska (2.0 percent in Nebraska ECCP facilities) to 12.0 percent in comparison facilities in New York (11.8 percent in New York ECCP facilities). It is worth noting that in 2014, the percent of residents ever enrolled in a MA plan in Pennsylvania's ECCP group nearly doubled, moving from about 4 percent in 2013 to about 8 percent.

In the regression model, we also control for whether people are eligible for the Initiative because they have no discharge plan (MDS item Q0400A = 0). Many of the residents included in our annual samples solely by this criterion are likely short-stay residents receiving Medicare covered post-acute care in SNF following a prior hospitalization. The total Initiative-related exposure period in any given year is substantially shorter for these individuals than for other "true" long-stay residents.[10] Hence, these likely short-stay residents are observed for a substantially shorter period of time in our data relative to the rest of the residents who qualify for the Initiative by accumulating 101 or more nursing facility days. We would expect to observe a relatively lower prevalence of hospitalization among the former (likely short-stay residents) than among the latter ("true" long stayers), because individuals in the former group are at risk of hospitalization for a significantly shorter period in any given year. Unobserved case-mix differences may also exist between the two groups of residents. Therefore, it is important to control for this indicator in the regression model.

Lastly, we include an indicator for any hospice use in the 2 months *before* the start of a person's Initiative-related exposure period in each calendar year. Hospice use is identified by having any hospice claim over the specified 2-month period. Because patients who opt to receive hospice services typically forgo "curative care" rendered in acute-care settings (as required by Medicare policy), we would expect much lower hospital use among hospice patients than among others in our data.

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[9] In the future, we plan to run sensitivity analyses by dropping the small number of residents who are ever in an MA plan and see whether there is any significant difference in our results (little impact is expected).

[10] In 2014, for example, the average number of Initiative-eligible exposure days for residents who qualify for the Initiative because of no discharge plan was 41 days, compared with an average of 281 days for the rest of the residents who have stayed in the facility for at least 101 cumulative days. These are overall averages of all residents in each group across all seven states (see Appendix D).

Facility-level Characteristics. In addition to resident-level risk factors specified above, we further control for a number of facility level variables that may have an impact on hospital use and the quality of care provided nursing facility residents. Variables related to staffing include an indicator for whether the facility has a physician assistant or NP available (either on-staff or contract); total direct-care RN staffing hours per resident day (HPRD); total LPN staffing HPRD; and total CNA staffing HPRD. Variables concerning facility ownership include for-profit status and chain membership. The payer mix of residents in each facility is measured by the percentage of residents whose primary support is Medicaid and the percentage of residents whose primary support is Medicare. We also include the percentage of residents with advance directives in each facility, which is likely to influence the facility's decision to hospitalize its residents. (Controlling for the percentage does not mask the effect of the Initiative on the content of the directives, which is often *pro forma* and not resident specific.) In addition, we control for whether a facility has an Alzheimer's special care unit, which is indicative of the facility's on-site capacity in managing the care for residents with dementia, which could influence hospital use by and quality of care for their residents.

A review of the summary statistics on both resident-level and facility-level variables as presented in ***Appendix B*** reveal two overarching patterns that are noteworthy. First, there are considerable differences in some of these variables *between* the seven states. Second, there are remarkable similarities in most of these variables between residents and facilities in the ECCP group and those in the comparison group *within* each state. Because we are conducting evaluation analyses within each state, these patterns reinforce our decision *not* to apply additional propensity score weighting at the resident level.

2.9 Statistical Methods for Multivariate Analyses

A regression-based model is used to assess the quantitative effects of the ECCP interventions. This model provides the framework for all of the secondary data analyses. The main outcome variables of interest include hospitalizations, ED visits, MDS-based quality outcomes, and Medicare and Medicaid costs.[11] All the data analyzed and presented in this report, including outcome measures and covariates, are for Initiative-eligible residents with Medicare Part A/B coverage in each analysis year. We first present the most general form of the model, followed by specifications suitable for each type of outcome variables. It is a difference-in-difference design with multiple observation periods both before the intervention period (2011 and 2012) and after (2013, 2014, and subsequent Initiative years).

In the prior annual report examining data from 2013 we used 2011 as the Base Year and examined changes in 2012, another pre-Initiative year, as well as the changes in 2013, the first Initiative year. We also explored averaging the two pre-Initiative years as a base period. Because 2013 was a year of transition, strong differences in the ECCP groups were not expected or observed. There were also some differences observed in the ECCP group before the interventions actually started. This indicated for us that apparent differences can be observed in the ECCP facility residents by chance and that stronger patterns would be needed to affirm effects of the

[11] As noted earlier, Medicaid expenditures are not included in the current report but will be addressed in future analyses. Only Initiative-eligible residents with Medicare coverage are included.

interventions. For the 2014 data, gathered in the second Initiative year, we chose to use 2012 as the Base Year. It is the immediate pre-Initiative year and was the year of data used to match the comparison group.

2.9.1 Multivariate Regression Model: General Specification

We use the following equation to estimate the effect of ECCP intervention on a particular resident-level quantitative outcome Y_{ijt} (e.g., a hospital admission, Medicare spending, or MDS-based quality measure), for the i^{th} resident, in the intervention or comparison facility, j, during the calendar year period, t:

$$Y_{ijt} = \beta_0 + \beta_e * ECCP_i + \beta_x * X_{ijt} + \beta_z * Z_{jt} + \sum_t \beta_t * YEAR_t + \sum_t \beta_{e,t} * ECCP_{it} * YEAR_t +$$

$$\sum_{x,t} \beta_{x,t} * X_{ijt} * YEAR_t + \sum_{z,t} \beta_{z,t} * Z_{jt} * YEAR_t + \varepsilon_{ijt}$$

The mathematical form of this equation varies according to the type of dependent variables being measured (further specified below). Using Medicare spending as an example dependent variable, we assume that spending levels and trends in each period are influenced by the nursing facility's intervention status (ECCP = 0, if comparison facility; ECCP = 1, if ECCP facility). A marker for YEAR2013 represents the first year of the intervention period, a marker for YEAR2014 indicates the second year of the intervention period, and so on. Observations in the Base Year 2012 are set as the reference category, so that the effect of ECCP intervention in 2013, 2014, and subsequent Initiative years is each assessed relative to the baseline difference between the ECCP and comparison groups in 2012. Our reported results are the Initiative effects comparing 2014 and 2012 and do not include discussion of 2013, which was the topic of the last report.

We are primarily interested in the magnitude of the effect of ECCP intervention as it reaches a high degree of implementation. A coefficient indicating a comparative reduction in utilization and spending and increase in quality over time would be a positive finding for the Initiative. Using the standard error of the estimate of the β's, we conduct statistical tests of the null hypothesis that $\beta = 0$ versus the alternative hypothesis that $\beta \neq 0$.

The equation's intercept (β_0) is for all observations in the Base Year 2012. The general effect of time on the dependent variable is estimated by $\beta_t * YEAR_t$, which captures unobserved policy changes, payment changes, and other changes in the environment common to all providers. The effect of the ECCP intervention on residents is captured by $\beta * ECCP_{it} * YEAR_t$. The β indicates the incremental difference between ECCP and comparison residents in a particular year compared with the difference in the Base Year 2012. For the Base Year 2012, the term is the difference between ECCP and comparison groups in that year. If spending was growing at a slower (or faster) pace for residents in ECCP facilities relative to those in comparison facilities, then the β for the year test would be negative (or positive).

Resident- and facility-level characteristics that may influence the outcome are contained in the vector X_{ijt} and Z_{jt}. Included in X_{ijt} are resident characteristics, such as age, sex, and clinical characteristics. Z_{jt} are selected facility characteristics derived from data reported in CASPER (e.g., RN staffing levels, CNA staffing levels, and presence of a dementia unit). We include a common set of resident- and facility-level covariates (as described in Section 2.8) to risk adjust all the outcome measures in regression models. All these covariates are fully interacted with

time, which is specified by 3 calendar year dummies for 2011, 2013, and 2014 (with year 2012 serving as the base reference period). As such, the model allows the possibility that the effect of any risk adjuster on the outcome could vary over time. The last term ε_{ijt} in the equation is a residual term that represents error in the prediction for each individual.

The variable measuring the intervention effect could be a set of markers for the ECCPs, a set of markers for facilities, or a set of markers for intervention characteristics. However, similar markers for intervention characteristics are not available for the comparison facilities. The model would compute the effect of the interventions compared to the average of practice in the comparisons. For example, in some interventions there is special attention paid to dental care. We do not know whether any of the comparison facilities are doing the same. The average prevalence of this intervention is likely low or the ECCP would not have made a point of this. A marker for dental care would indicate the effectiveness of dental care against the average care. Another intervention characteristic is the use of the INTERACT tools or some variant thereof. Except for a list of facilities participating in a study conducted by Dr. Joseph Ouslander, we do not know how prevalent such tools are in the comparison group. Such an indicator would show the effect of using the tools compared to the average practice. The challenge is the determination of the actual intervention in practice. It requires primary data collection over time to determine how the intervention is applied to each facility as opposed to how the intervention was planned. This question can only be answered properly after the intervention has stabilized. Within each state the effect of each intervention component can not be separated from the effects of other components; they are applied as a whole. For these practical reasons, in our current regression models, we use the dummy variable for whether a resident resides in an ECCP participating facility or a comparison facility as a "catch-all" measure for intervention features that distinguish the ECCP facilities from comparison facilities.

Because there are correlations among observations from each facility we correct for the "clustering" effect by accounting for the correlations in the modeling. This corrects the standard errors of the coefficients in the models. Furthermore, in all regression models we control for the total number of Initiative-related exposure days for each resident during each year, to account for differences across individuals in the length of time for which they are eligible for the Initiative and their outcome measures are defined.

2.9.2 Utilization Probability Models

For discrete events, such as inpatient admissions or ED visits, we use the general equation above to fit a logistic regression model that predicts the probability of the event. We employ a Generalized Estimating Equation (GEE) model approach, which is suitable for cross-sectional time series data like the data used in our analyses. Given a dichotomous outcome (0/1), the binomial distribution and the logit link function are specified. An exchangeable working correlation structure is further specified, which allows the adjustment of standard errors for clustering of residents within facilities.

Using this type of model, we estimate the effect of ECCP intervention on each of four utilization probability outcomes, namely, the probability of a resident utilizing at least one of the following events: all-cause hospitalization, potentially avoidable hospitalization, all-cause ED visit (that did not result in inpatient admission), and potentially avoidable ED visit.

2.9.3 Utilization Count Models

To account for the fact that some residents utilized a given type of service more than once during their Initiative-eligible period in a year, we also estimate a parallel set of models whereby the dependent variable is defined as the count of utilization events. Preliminary analysis suggested that the simple Poisson models are inadequate, given the overdispersion of the data, where counts were clustered around 0 and had limited positive spread. We use the GEE method to fit a negative binomial regression model, which is a less restrictive and more appropriate method to fit the utilization count data as it incorporates the dispersion parameter and accounts for within-facility correction (with an exchangeable working correlation structure specified).

Using this type of model, we examine the effect of ECCP intervention on each of four utilization count outcomes, namely, the count of all-cause hospitalizations, potentially avoidable hospitalizations, all-cause ED visits (that did not result in inpatient admissions), and potentially avoidable ED visits.

2.9.4 Medicare Expenditure Models

For total Medicare expenditures, the values exceed zero in virtually all cases. To predict total Medicare spending, we employ a Generalized Linear Model (GLM) with the log link function and Gamma distribution specified, which is a widely used approach to modelling expenditure data that tend to be highly skewed.

In addition to total Medicare spending, we also examine Medicare expenditures associated with each of the following six subcategories of service utilization: all-cause hospitalizations, potentially avoidable hospitalizations, all-cause ED visits, potentially avoidable ED visits, physician services, and SNF services. Because many residents have zero utilization and expenditure for these services, a simple GLM model is inappropriate. To overcome this issue, we employ a two-part model. The first part predicts the probability of service utilization, whereby the outcome equals 1 if a resident has any positive expenditure and 0 otherwise. The second part is conditional on having any positive expenditure and incorporates a GLM model for service users only that predicts their expected spending. Then, using predicted values obtained from these two models, the predicted expenditure per resident is calculated 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 yields a predicted amount of spending for all residents included in the first part of the model, including both actual users and nonusers.

We obtain and report the marginal effect (see Section 2.9.6 for details) of the ECCP intervention on each expenditure outcome in a given Initiative year (e.g., 2014), which is the difference in expected expenditures between including and not including the ECCP*(Initiative year) interaction effect in the model. This marginal effect, if negative and statistically significant, can be interpreted as the cost savings achieved because of the ECCP intervention in that year. Because we expect that ECCPs have little effect on expenditures during the time the resident is hospitalized or sent to the ED, their principal savings will come from avoiding hospitalizations and ED use in the first place.

2.9.5 Models Specific to MDS-Based Quality Outcomes

The multivariate models for MDS-based quality outcomes follow the general specification of the regression model described above. These annual outcomes are created as proportion variables with values ranging from 0 to 1 (see Section 2.7.2), which 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 each outcome). Therefore, we use a GLM model with a logit link function and the binomial distribution for these outcomes. In addition, we account for facility clustering to allow for intra-facility correlation among residents within the same facilities.

2.9.6 Estimation of Marginal Effects of ECCP Intervention

For presentation of multivariate regression model results, we calculate and report the marginal effects of ECCP intervention on each outcome in meaningful units, such as dollars or percentage points. (The estimated values of coefficients in the models are often not in understandable units.) Conceptually, the marginal effect is the effect of a change in a given predictor variable on the conditional mean of the dependent variable. In a simple linear regression model, the marginal effect for a given covariate equals the slope coefficient for that covariate (or an incremental change if a binary 1/0 variable is used). 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. Various methods exist to calculate the average marginal effects. We follow a widely adopted method to derive the average marginal effects by first computing the marginal effect for each observation with respect to a predictor variable of primary interest (which in our case is the ECCP*YR2014 interaction) and then to average it over the entire estimation sample.

Specifically, after estimating the multivariate regression model for each outcome, we generate the marginal effect for our key variable of interest: ECCP*YR2014. Using Medicare spending as an example outcome, the algorithm for calculating the marginal effect involves the following steps. First, for each observation, force the term ECCP*YR2014 to equal 1 regardless of its actual value, leave the values for all other independent variables as is, and use the inverse link function to compute the predicted amount of spending for that observation. Second, for the same observation, repeat everything in the first step except resetting ECCP*YR2014 to 0, to compute the predicted amount of spending. The difference in the two predicted spending amounts is the marginal effect for that observation. Third, repeat the two steps above for all observations in the estimation sample. As a last step, compute the average of all the marginal effects, which is the average marginal effect with respect to ECCP*YR2014. Essentially, it is comparing two populations that have exactly the same values on all the independent variables in the model except ECCP*YR2014. Because the only difference between them is being assigned to the ECCP group in the Initiative year of 2014, the difference in their expected expenditure amounts is attributed to the effect of ECCP intervention in 2014.

Thus, the marginal effect for the interaction term ECCP*YR2014 indicates the effect of the ECCP intervention in 2014 relative to the baseline, estimated over the entire population in both the ECCP and comparison groups, after adjusting for all other covariates in the model. For a dichotomous utilization outcome, the marginal effect is the difference in the predicted probabilities of the outcome event. For a utilization count outcome, the marginal effect is the difference in the predicted counts of the outcome event. For a MDS-based quality outcome as

defined above, the marginal effect is the difference in the predicted proportions of observed quarters that indicate the presence of an adverse outcome. As such, the marginal effects have more intuitive appeals than regression coefficients in illustrating the impact of ECCP intervention.

For the presentation of multivariate regression results, we report the average marginal effect of ECCP intervention on each outcome as well as its 95% confidence interval (where it is estimable) and the *p*-value. Furthermore, we divide the average marginal effect for each outcome by its overall mean value over the entire population in the Base Year 2012 such that the magnitude of the effect can be interpreted as a percent change from the mean value at the base, which also facilitates comparison of effect sizes across outcomes and states.

2.9.7 Subpopulation Analysis

In addition to the main models as described previously, we also conduct a series of multivariate analyses that are intended to reveal whether the ECCP intervention might have a differential effect on certain subgroups of residents included in our analyses. Three subpopulations are of interest and analyzed in this report, including residents who are younger than age 65; residents who have mental health problems (either having a condition in HCC54 [schizophrenia] or HCC55 [major depressive, bipolar, and paranoid disorders); and residents who have dementia. Variables for these statuses are coded 1 if true and 0 if false for each observation.

For each subpopulation analysis, our approach is to add interactions of time and ECCP with the subpopulation indicator (thus, three-way interactions); the two-way interaction between ECCP and the subpopulation indicator is also included in the model, which captures the baseline ECCP–comparison difference between subpopulation members and nonmembers. The coefficient for the three-way interaction, subpopulation*ECCP*YR2014, indicates whether the intervention effect is larger or smaller for residents of the subpopulation group compared with other residents in 2014. We calculate and report the marginal effects with respect to the three-way interaction term. Because there is no clear hypothesis regarding potential differences in the impact of ECCP intervention on outcomes for one subgroup of residents versus another, we treat these subpopulation analyses as exploratory work.

2.10 Descriptive Analysis Results

In this section, we present summary results from descriptive analyses of key evaluation outcomes on Medicare utilization and expenditure as well as quality measures (MDS-based and non-MDS-based). These results are aggregated to the ECCP group and comparison group level within each state, separately for each year. Descriptive statistics cannot be taken as results of an intervention. The observed trends must be understood within the context of possible changes in ECCP resident characteristics as well as each state's comparison group. The findings and trends in utilization outcomes for individual states are explored in detail in the multivariate analysis that controls for resident characteristics, in Section 2.11, Multivariate Regression Results.

2.10.1 Medicare Utilization

In ***Table 2-4*** (Alabama) through ***Table 2-10*** (Pennsylvania), we report the percentage of residents who were hospitalized, visited the ED, or had an observation stay in each year—both

overall and for a potentially avoidable condition. Across all states and ECCP versus comparison groups within them, a few general patterns emerge.

First, approximately 25 to 30 percent of all residents experienced at least one hospitalization and roughly 10 to 15 percent experienced at least one potentially avoidable hospitalization in 2014. Taken together, these two sets of percentages suggest that among those residents who were ever hospitalized in a given year, roughly just under half of them had at least one hospitalization that was potentially avoidable. There is greater inter-state variation in the percentages of residents who visited the ED, which ranged from roughly 15 percent to close to 25 percent; between approximately 5 and 10 percent of residents had a potentially avoidable ED visit. These numbers suggest that among those who ever visited the ED in a given year, just over one-third of them did so for a potentially avoidable reason. In addition, *within* each state the differences between the ECCP and comparison groups in the percentages of residents with any hospitalization or ED visit are relatively small.

Secondly, the descriptive analyses suggest an overall decrease in both the percentage of residents who were ever hospitalized and those who were ever hospitalized for a potentially avoidable condition in a given year, over the 4-year reporting period among ECCP groups and comparison groups in most states. However, in many comparison groups the magnitude of the reduction was less than that in the respective ECCP group. For example, in Missouri (***Table 2-6***), the ECCP group of facilities, chosen for having high admission rates, started in 2011 with a higher percentage of residents who were hospitalized (36.1 percent overall and 20.3 percent with a potentially avoidable hospitalization) than did the comparison group (30.1 percent overall and 15.6 percent potentially avoidable). A trend of decline in both percentages was observed in both the ECCP group and the comparison group over the subsequent 3 years. However, the decline in the ECCP group was of a larger magnitude than the comparison group. In 2014, the percentages of ECCP residents with any hospitalization and with any potentially avoidable hospitalization decreased 6.3 points and 6.4 points, respectively. The corresponding percentages of residents in the comparison group decreased by a much smaller magnitude over the same period: 0.2 and 1.1 points. In 2014, for these utilization outcomes similar patterns begin to emerge for Alabama, Nebraska, and Pennsylvania to varying degrees. On other measures, the between-group differences and shifts in such differences over the 4-year period follow a less clear-cut pattern than observed in Missouri for the two measures described above.

Relatively few residents have a hospital outpatient observation stay in any given year. In 2014, for example, between 1.3 percent (New York) and 4.1 percent (Alabama) of ECCP residents had an observation stay; the corresponding percentages of comparison group residents ranged from 0.8 percent (New York) to 5.3 percent (Nevada). However, there is a steady increase in the use of observation stays over the 4-year period in virtually all states and all groups.

In ***Table 2-11*** (Alabama) through ***Table 2-17*** (Pennsylvania), we present the rates of utilization, expressed as the total number of events per 1,000 person-days. Overall, the utilization rates follow similar patterns in terms of inter-state variations (which are relatively large) and within-state differences between the ECCP and comparison groups (which are relatively small).

Table 2-4
Medicare utilization: Annual percentage of residents who used each type of service, Alabama

Event	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Any hospitalization (all cause)	34.4	33.9	31.3	30.5	32.6	33.0	30.5	30.6
Any potentially avoidable hospitalization	*17.7*	*17.2*	*14.5*	*13.6*	*17.8*	*17.1*	*15.8*	*15.0*
Any hospitalization in critical access hospitals (all cause)	0.3	0.0	0.4	0.6	0.0	0.0	0.2	0.3
Any potentially avoidable hospitalization in critical access hospitals	*0.2*	*0.0*	*0.1*	*0.2*	*0.0*	*0.0*	*0.1*	*0.1*
Any ED visit (all cause)	28.7	27.2	23.6	23.4	23.7	24.0	22.8	23.5
Any potentially avoidable ED visit	*10.4*	*10.1*	*9.0*	*8.1*	*8.7*	*9.2*	*8.4*	*8.9*
Any observation stay	4.2	3.4	4.0	4.1	2.6	2.9	3.3	3.2
Any potentially avoidable observation stay	*1.3*	*1.2*	*1.3*	*1.4*	*0.8*	*1.0*	*1.1*	*0.9*
Any ED visit or observation stay (combined)	29.0	27.6	23.9	24.0	24.0	24.3	23.1	23.7
Any potentially avoidable ED visit or observation stay (combined)	*10.6*	*10.4*	*9.1*	*8.4*	*8.8*	*9.4*	*8.6*	*9.0*
N (Residents)	3,500	3,579	3,332	3,288	7,130	7,168	7,059	7,038

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-5
Medicare utilization: Annual percentage of residents who used each type of service, Indiana

Event	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Any hospitalization (all cause)	27.8	28.6	27.3	25.2	30.2	27.8	27.6	27.8
Any potentially avoidable hospitalization	*13.3*	*13.7*	*12.1*	*10.2*	*15.7*	*13.5*	*12.9*	*12.6*
Any hospitalization in critical access hospitals (all cause)	0.0	0.0	0.0	0.0	1.1	1.0	0.8	0.7
Any potentially avoidable hospitalization in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*0.6*	*0.5*	*0.4*	*0.4*
Any ED visit (all cause)	21.6	19.1	18.7	18.7	24.5	23.3	22.5	23.0
Any potentially avoidable ED visit	*7.6*	*6.9*	*7.0*	*7.7*	*8.8*	*7.8*	*7.8*	*7.6*
Any observation stay	1.6	2.0	2.4	2.5	2.6	3.3	3.7	4.1
Any potentially avoidable observation stay	*0.4*	*0.5*	*0.6*	*0.7*	*0.9*	*0.9*	*1.2*	*1.3*
Any ED visit or observation stay (combined)	22.0	19.3	18.8	18.9	24.9	23.8	22.9	23.4
Any potentially avoidable ED visit or observation stay (combined)	*7.7*	*6.9*	*7.0*	*7.7*	*9.0*	*8.1*	*8.0*	*7.9*
N (Residents)	2,810	2,970	3,064	2,949	5,718	5,656	5,430	5,335

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-6
Medicare utilization: Annual percentage of residents who used each type of service, Missouri

Event	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Any hospitalization (all cause)	36.1	34.7	30.7	29.8	30.1	30.1	30.0	29.9
Any potentially avoidable hospitalization	*20.3*	*19.0*	*14.7*	*13.9*	*15.6*	*15.1*	*14.5*	*14.5*
Any hospitalization in critical access hospitals (all cause)	0.0	0.0	0.0	0.0	1.7	1.8	1.2	1.3
Any potentially avoidable hospitalization in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*1.1*	*1.2*	*0.7*	*0.7*
Any ED visit (all cause)	22.7	23.7	23.3	19.9	22.6	24.4	24.7	23.3
Any potentially avoidable ED visit	*8.0*	*8.6*	*8.3*	*6.8*	*8.6*	*9.3*	*9.5*	*8.0*
Any observation stay	2.5	3.9	3.7	3.3	2.4	3.5	3.6	4.2
Any potentially avoidable observation stay	*0.6*	*1.5*	*0.9*	*0.9*	*0.7*	*1.1*	*1.0*	*1.3*
Any ED visit or observation stay (combined)	22.8	23.8	23.4	20.1	22.8	24.5	24.9	23.5
Any potentially avoidable ED visit or observation stay (combined)	*8.1*	*8.7*	*8.4*	*6.9*	*8.6*	*9.3*	*9.6*	*8.2*
N (Residents)	2,438	2,316	2,329	2,302	4,828	4,585	4,421	4,380

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-7
Medicare utilization: Annual percentage of residents who used each type of service, Nebraska

Event	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Any hospitalization (all cause)	31.9	30.9	26.7	27.4	27.6	27.3	28.0	26.7
Any potentially avoidable hospitalization	*19.0*	*15.6*	*12.7*	*11.4*	*15.6*	*14.9*	*13.6*	*13.4*
Any hospitalization in critical access hospitals (all cause)	0.3	0.4	0.6	0.8	3.0	3.0	3.2	3.4
Any potentially avoidable hospitalization in critical access hospitals	*0.2*	*0.2*	*0.5*	*0.6*	*2.0*	*2.3*	*2.3*	*2.3*
Any ED visit (all cause)	25.0	23.7	21.2	23.4	22.9	25.1	24.4	24.3
Any potentially avoidable ED visit	*8.9*	*8.1*	*7.3*	*7.8*	*8.4*	*8.8*	*9.2*	*8.7*
Any observation stay	2.1	2.2	2.3	3.0	3.2	4.4	4.2	5.1
Any potentially avoidable observation stay	*0.9*	*0.5*	*0.7*	*0.5*	*1.0*	*1.3*	*1.4*	*1.8*
Any ED visit or observation stay (combined)	25.2	23.8	21.6	23.6	23.3	25.6	24.8	24.8
Any potentially avoidable ED visit or observation stay (combined)	*9.2*	*8.1*	*7.4*	*7.9*	*8.8*	*9.0*	*9.3*	*9.0*
N (Residents)	1,637	1,594	1,555	1,478	3,610	3,375	3,309	3,211

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-8
Medicare utilization: Annual percentage of residents who used each type of service, Nevada

Event	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Any hospitalization (all cause)	28.0	29.1	28.1	27.2	31.7	30.9	28.1	28.7
Any potentially avoidable hospitalization	*12.6*	*12.5*	*11.0*	*11.3*	*14.5*	*14.0*	*11.6*	*11.6*
Any hospitalization in critical access hospitals (all cause)	1.7	1.0	1.3	1.0	1.6	2.4	2.8	2.6
Any potentially avoidable hospitalization in critical access hospitals	*0.7*	*0.8*	*0.8*	*0.8*	*0.8*	*1.7*	*1.8*	*1.6*
Any ED visit (all cause)	17.8	17.8	16.0	19.2	19.9	17.5	19.0	20.2
Any potentially avoidable ED visit	*6.2*	*6.2*	*6.2*	*7.1*	*8.2*	*5.7*	*7.0*	*7.0*
Any observation stay	2.9	3.1	3.1	3.8	3.2	4.3	4.9	5.3
Any potentially avoidable observation stay	*0.7*	*0.7*	*1.0*	*0.9*	*1.3*	*1.3*	*1.3*	*1.4*
Any ED visit or observation stay (combined)	18.0	18.1	16.2	19.4	19.9	17.7	19.1	20.6
Any potentially avoidable ED visit or observation stay (combined)	*6.3*	*6.2*	*6.2*	*7.2*	*8.2*	*5.8*	*7.0*	*7.1*
N (Residents)	3,800	3,889	3,820	3,463	2,075	2,079	2,035	1,955

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-9
Medicare utilization: Annual percentage of residents who used each type of service, New York

Event	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Any hospitalization (all cause)	34.2	32.7	30.9	28.6	32.9	30.9	29.9	28.5
Any potentially avoidable hospitalization	*15.2*	*14.1*	*12.9*	*10.6*	*14.5*	*13.3*	*12.4*	*11.0*
Any hospitalization in critical access hospitals (all cause)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Any potentially avoidable hospitalization in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Any ED visit (all cause)	15.4	15.6	16.4	15.4	14.5	15.0	15.4	15.4
Any potentially avoidable ED visit	*4.8*	*4.9*	*5.2*	*4.8*	*4.6*	*4.6*	*5.2*	*4.9*
Any observation stay	0.1	0.3	0.6	1.3	0.2	0.3	0.6	0.8
Any potentially avoidable observation stay	*0.0*	*0.1*	*0.2*	*0.4*	*0.1*	*0.1*	*0.2*	*0.3*
Any ED visit or observation stay (combined)	15.4	15.6	16.4	15.5	14.5	15.0	15.4	15.4
Any potentially avoidable ED visit or observation stay (combined)	*4.8*	*4.9*	*5.2*	*4.8*	*4.6*	*4.6*	*5.2*	*4.9*
N (Residents)	8,552	7,909	7,643	7,033	13,330	12,895	12,684	11,932

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-10
Medicare utilization: Annual percentage of residents who used each type of service, Pennsylvania

Event	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Any hospitalization (all cause)	32.1	32.0	26.4	24.1	31.0	30.2	27.4	26.0
Any potentially avoidable hospitalization	*17.3*	*15.9*	*12.7*	*10.6*	*15.2*	*14.7*	*12.1*	*11.5*
Any hospitalization in critical access hospitals (all cause)	2.3	1.6	1.8	0.9	0.6	0.4	0.5	0.6
Any potentially avoidable hospitalization in critical access hospitals	*1.5*	*1.2*	*1.1*	*0.4*	*0.3*	*0.3*	*0.3*	*0.3*
Any ED visit (all cause)	24.1	22.6	19.6	20.3	22.0	21.9	21.6	20.8
Any potentially avoidable ED visit	*9.5*	*8.7*	*7.6*	*6.2*	*8.0*	*7.0*	*7.9*	*7.3*
Any observation stay	3.6	3.8	3.5	3.2	2.6	3.1	3.5	3.5
Any potentially avoidable observation stay	*1.3*	*1.3*	*1.2*	*0.8*	*0.6*	*0.6*	*1.0*	*1.0*
Any ED visit or observation stay (combined)	24.3	22.9	19.6	20.4	22.2	22.1	21.6	20.9
Any potentially avoidable ED visit or observation stay (combined)	*9.5*	*8.7*	*7.6*	*6.3*	*8.1*	*7.1*	*7.9*	*7.4*
N (Residents)	2,782	2,721	2,659	2,731	6,336	6,228	6,191	6,240

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-11
Medicare utilization rate: Number of events per 1,000 person-days, Alabama

Events	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
All-cause hospitalizations	2.2	2.2	2.0	1.8	2.1	2.2	2.0	1.9
Potentially avoidable hospitalizations	*0.9*	*0.9*	*0.7*	*0.6*	*0.9*	*0.9*	*0.9*	*0.8*
All-cause hospitalizations in critical access hospitals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Potentially avoidable hospitalizations in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
All-cause ED visits	1.8	1.8	1.5	1.3	1.4	1.5	1.4	1.4
Potentially avoidable ED visits	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*
Observation stays	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1
Potentially avoidable observation stays	*0.1*	*0.1*	*0.1*	*0.1*	*0.0*	*0.0*	*0.1*	*0.0*
ED visits or observation stays (combined)	1.8	1.8	1.5	1.3	1.5	1.5	1.4	1.5
Potentially avoidable ED visits or observation stays (combined)	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*	*0.5*	*0.4*	*0.4*
N (Residents)	3,500	3,579	3,332	3,288	7,130	7,168	7,059	7,038

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-12
Medicare utilization rate: Number of events per 1,000 person-days, Indiana

Events	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
All-cause hospitalizations	2.0	2.0	1.9	1.6	2.1	1.9	1.8	1.9
Potentially avoidable hospitalizations	*0.8*	*0.8*	*0.7*	*0.5*	*0.9*	*0.8*	*0.7*	*0.7*
All-cause hospitalizations in critical access hospitals	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Potentially avoidable hospitalizations in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
All-cause ED visits	1.4	1.3	1.3	1.2	1.6	1.5	1.5	1.5
Potentially avoidable ED visits	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*
Observation stays	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Potentially avoidable observation stays	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*
ED visits or observation stays (combined)	1.4	1.3	1.3	1.2	1.6	1.5	1.5	1.5
Potentially avoidable ED visits or observation stays (combined)	*0.4*	*0.4*	*0.4*	*0.4*	*0.5*	*0.4*	*0.4*	*0.4*
N (Residents)	2,810	2,970	3,064	2,949	5,718	5,656	5,430	5,335

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-13
Medicare utilization rate: Number of events per 1,000 person-days, Missouri

Events	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
All-cause hospitalizations	2.8	2.5	2.1	1.9	2.1	2.0	2.0	2.0
Potentially avoidable hospitalizations	*1.2*	*1.1*	*0.8*	*0.7*	*0.9*	*0.8*	*0.8*	*0.8*
All-cause hospitalizations in critical access hospitals	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Potentially avoidable hospitalizations in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.0*	*0.0*
All-cause ED visits	1.5	1.5	1.4	1.1	1.5	1.5	1.6	1.4
Potentially avoidable ED visits	*0.4*	*0.5*	*0.4*	*0.3*	*0.5*	*0.5*	*0.5*	*0.4*
Observation stays	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Potentially avoidable observation stays	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*
ED visits or observation stays (combined)	1.5	1.5	1.4	1.1	1.5	1.5	1.6	1.5
Potentially avoidable ED visits or observation stays (combined)	*0.4*	*0.5*	*0.4*	*0.3*	*0.5*	*0.5*	*0.5*	*0.4*
N (Residents)	2,438	2,316	2,329	2,302	4,828	4,585	4,421	4,380

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-14
Medicare utilization rate: Number of events per 1,000 person-days, Nebraska

Events	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
All-cause hospitalizations	2.4	2.2	1.8	1.7	1.8	1.8	1.8	1.6
Potentially avoidable hospitalizations	*1.1*	*0.9*	*0.7*	*0.6*	*0.9*	*0.8*	*0.8*	*0.7*
All-cause hospitalizations in critical access hospitals	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
Potentially avoidable hospitalizations in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*
All-cause ED visits	1.7	1.6	1.5	1.6	1.5	1.6	1.5	1.5
Potentially avoidable ED visits	*0.5*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	*0.5*	*0.4*
Observation stays	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Potentially avoidable observation stays	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*
ED visits or observation stays (combined)	1.8	1.6	1.5	1.6	1.5	1.6	1.6	1.5
Potentially avoidable ED visits or observation stays (combined)	*0.5*	*0.4*	*0.4*	*0.4*	*0.5*	*0.4*	*0.5*	*0.5*
N (Residents)	1,637	1,594	1,555	1,478	3,610	3,375	3,309	3,211

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-15
Medicare utilization rate: Number of events per 1,000 person-days, Nevada

Events	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
All-cause hospitalizations	2.2	2.3	2.2	2.1	2.4	2.4	2.1	2.1
Potentially avoidable hospitalizations	*0.9*	*0.8*	*0.7*	*0.7*	*0.9*	*0.9*	*0.7*	*0.7*
All-cause hospitalizations in critical access hospitals	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Potentially avoidable hospitalizations in critical access hospitals	*0.0*	*0.1*	*0.1*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*
All-cause ED visits	1.4	1.4	1.3	1.5	1.4	1.3	1.3	1.4
Potentially avoidable ED visits	*0.4*	*0.4*	*0.4*	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*
Observation stays	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Potentially avoidable observation stays	*0.0*	*0.0*	*0.1*	*0.0*	*0.1*	*0.1*	*0.1*	*0.1*
ED visits or observation stays (combined)	1.4	1.5	1.3	1.5	1.4	1.3	1.3	1.4
Potentially avoidable ED visits or observation stays (combined)	*0.4*	*0.4*	*0.4*	*0.5*	*0.5*	*0.4*	*0.4*	*0.4*
N (Residents)	3,800	3,889	3,820	3,463	2,075	2,079	2,035	1,955

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-16
Medicare utilization rate: Number of events per 1,000 person-days, New York

Events	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
All-cause hospitalizations	2.4	2.2	2.2	1.9	2.3	2.0	1.9	1.8
Potentially avoidable hospitalizations	*0.8*	*0.8*	*0.7*	*0.5*	*0.8*	*0.7*	*0.6*	*0.6*
All-cause hospitalizations in critical access hospitals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Potentially avoidable hospitalizations in critical access hospitals	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
All-cause ED visits	0.9	1.0	1.1	0.9	0.8	0.8	0.9	0.9
Potentially avoidable ED visits	*0.2*	*0.2*	*0.3*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
Observation stays	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Potentially avoidable observation stays	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
ED visits or observation stays (combined)	0.9	1.0	1.1	0.9	0.8	0.8	0.9	0.9
Potentially avoidable ED visits or observation stays (combined)	*0.2*	*0.2*	*0.3*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
N (Residents)	8,552	7,909	7,643	7,033	13,330	12,895	12,684	11,932

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-17
Medicare utilization rate: Number of events per 1,000 person-days, Pennsylvania

Events	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
All-cause hospitalizations	2.1	2.1	1.6	1.4	2.0	1.9	1.7	1.6
Potentially avoidable hospitalizations	*0.9*	*0.9*	*0.6*	*0.5*	*0.8*	*0.8*	*0.6*	*0.6*
All-cause hospitalizations in critical access hospitals	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Potentially avoidable hospitalizations in critical access hospitals	*0.1*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
All-cause ED visits	1.4	1.3	1.2	1.2	1.3	1.3	1.3	1.2
Potentially avoidable ED visits	*0.4*	*0.4*	*0.4*	*0.3*	*0.4*	*0.3*	*0.4*	*0.4*
Observation stays	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
Potentially avoidable observation stays	*0.1*	*0.1*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
ED visits or observation stays (combined)	1.5	1.3	1.2	1.2	1.3	1.3	1.3	1.2
Potentially avoidable ED visits or observation stays (combined)	*0.5*	*0.4*	*0.4*	*0.3*	*0.4*	*0.3*	*0.4*	*0.4*
N (Residents)	2,782	2,721	2,659	2,731	6,336	6,228	6,191	6,240

NOTES: ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

2.10.2 Medicare Expenditures

In ***Table 2-18*** (Alabama) through ***Table 2-24*** (Pennsylvania), we report the average Medicare expenditures incurred per beneficiary, both in total and by subcategories of services covered, averaged over all residents in the ECCP group versus in the comparison group in each year. Averages are across all residents within each group, whether or not they used a service. Although average expenditures for ECCP facility residents are generally similar to those in the comparison group within each state, as expected, more variation is seen in spending across the states. Residents in three states have higher levels of Medicare expenditures than those in the other five: New York, Indiana and Nevada. In 2014, total Medicare expenditure was the highest for residents of ECCP facilities in New York (***Table 2-23***), averaged $29,652 ($26,781 in comparison facilities), followed by $24,754 for residents of ECCP facilities in Indiana ($22,688 in Indiana comparison facilities) (***Table 2-19***) and $23,857 for residents of ECCP facilities in Nevada (***Table 2-22***) ($22,279 in Nevada comparison facilities). Alabama is among the states with lowest average Medicare expenditure per beneficiary, $20,139 for ECCP residents and $19,707 for comparison residents, in 2014 (***Table 2-18***).

Inter-state variation also is seen in Medicare expenditures for hospitalizations and potentially avoidable hospitalizations. In 2014, average Medicare expenditure per beneficiary for all-cause hospitalizations for ECCP residents ranged from $3,782 in Pennsylvania to $8,644 in New York. The group with the highest average expenditure for potentially avoidable hospitalization in 2014 is comparison facility residents in New York ($1,831), while ECCP facility residents in Pennsylvania have the lowest average payments ($1,027). Comparing these two sets of expenditures supports the utilization reported above: a significant proportion of total hospitalization expenditures are for potentially avoidable hospitalizations.

In 2014, we continued to observe high levels of Medicare expenditure on SNF services. Expenditure on SNF services also varied substantially among the states, ranging from an average of $9,920 for SNF services per ECCP facility resident in New York to $4,505 per ECCP facility resident in Missouri. However, despite the wide range in expenditure on SNF services all states had higher average expenditure on SNF services than for average all-cause hospitalizations.

It is likely that much of the SNF-related expenditure we observe is incurred by those residents who were eligible for the Initiative because of no discharge plan. As noted earlier, these are most likely short-stay residents receiving Medicare-covered SNF services. The proportion of such Initiative-eligible residents varies considerably by state (see ***Appendix B***). For example, Nevada facilities have the highest proportion of residents who are eligible for the Initiative because of no discharge plan (33.9 percent in ECCP facilities and 30.8 percent in comparison facilities in 2014. The high proportion of residents who are eligible for the Initiative because of no discharge plan in Nevada likely explains the SNF spending per resident in that state, which was the second highest at $9,717 per ECCP resident ($8,359 per comparison facility resident) in 2014. The subpopulation of residents eligible for the Initiative because of no discharge plan as compared to the true long-stay population is explored in further detail in ***Appendix D***. SNF spending per beneficiary per month in this group is about 10 times as high as that of residents whose stay exceeds 100 days.

Table 2-18
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Alabama

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total Medicare payments	22,319	20,378	19,707	20,139	20,111	19,711	19,424	19,707
	(22,691)	(20,610)	(20,254)	(20,199)	(20,833)	(20,209)	(20,208)	(19,640)
All-cause hospitalizations	4,718	4,345	4,049	3,863	4,115	4,272	4,140	4,020
	(10,767)	(9,337)	(9,079)	(8,347)	(9,301)	(9,328)	(9,490)	(8,854)
Potentially avoidable hospitalizations	*1,551*	*1,548*	*1,236*	*1,118*	*1,551*	*1,577*	*1,454*	*1,339*
	(4,502)	(4,595)	(3,759)	(3,452)	(4,456)	(4,626)	(4,469)	(4,091)
All institutional outpatient services	1,917	1,908	1,961	2,092	1,539	1,582	1,598	1,768
	(3,953)	(4,064)	(4,564)	(4,637)	(3,567)	(3,632)	(3,734)	(3,832)
All-cause ED visits	186	178	155	151	135	146	141	155
	(422)	(446)	(408)	(398)	(344)	(368)	(381)	(419)
Potentially avoidable ED visits	*56*	*54*	*47*	*50*	*43*	*47*	*44*	*49*
	(202)	(205)	(188)	(246)	(173)	(192)	(183)	(211)
All observation stays	44	40	47	67	29	33	43	42
	(240)	(323)	(305)	(442)	(200)	(241)	(350)	(262)
Potentially avoidable observation stays	*12*	*12*	*12*	*22*	*9*	*12*	*12*	*12*
	(117)	(121)	(115)	(217)	(106)	(126)	(121)	(134)

(continued)

Table 2-18 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Alabama

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
ED visits and observation stays combined	191	186	163	177	139	152	150	160
	(431)	(491)	(440)	(546)	(354)	(398)	(466)	(435)
Potentially avoidable ED visits and obs. stays	*57*	*56*	*49*	*55*	*44*	*49*	*46*	*50*
	(204)	(210)	(192)	(270)	(175)	(199)	(188)	(214)
SNF services	7,467	6,306	5,462	5,368	7,115	6,216	5,968	5,924
	(11,376)	(9,537)	(8,687)	(8,906)	(10,921)	(9,559)	(9,297)	(9,205)
Hospice services	1,612	1,618	1,827	2,037	1,563	1,972	1,903	1,805
	(6,443)	(6,580)	(6,960)	(7,470)	(6,329)	(7,559)	(7,242)	(7,238)
Carrier file services	2,491	2,455	2,361	2,417	2,144	2,248	2,246	2,343
	(4,814)	(4,798)	(4,673)	(4,074)	(4,756)	(4,437)	(3,923)	(4,111)
Physician services	1,223	1,182	1,125	1,228	1,171	1,200	1,170	1,179
	(1,851)	(1,947)	(1,579)	(1,915)	(2,886)	(2,325)	(1,740)	(1,843)
Durable medical equipment	251	209	210	203	298	259	210	191
	(1,074)	(972)	(992)	(1,049)	(1,316)	(1,250)	(1,009)	(960)
Part D prescription drugs	3,694	3,506	3,816	4,131	3,272	3,138	3,341	3,631
	(4,989)	(5,316)	(5,892)	(6,928)	(4,467)	(4,549)	(4,992)	(5,575)
N (Residents)	3,482	3,557	3,308	3,273	7,096	7,132	7,026	6,989

NOTES: Numbers in parentheses are standard deviations; ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department; SNF = Skilled Nursing Facility; carrier file services are Part B services such as Physician and laboratory that are submitted as noninstitutional claims; durable medical equipment is in a separate file.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-19
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Indiana

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total Medicare payments	24,590	23,811	22,987	24,754	23,038	21,407	21,462	22,688
	(25,171)	(24,680)	(23,811)	(25,448)	(23,651)	(22,934)	(23,037)	(23,457)
All-cause hospitalizations	4,332	4,721	4,340	4,306	4,092	3,917	3,971	4,121
	(11,332)	(11,860)	(11,256)	(10,740)	(10,031)	(9,752)	(10,279)	(9,979)
Potentially avoidable hospitalizations	*1,380*	*1,616*	*1,223*	*1,235*	*1,461*	*1,329*	*1,195*	*1,262*
	(5,263)	(5,561)	(4,153)	(4,718)	(4,705)	(4,618)	(3,986)	(4,380)
All institutional outpatient services	2,798	2,962	2,754	3,313	2,430	2,732	2,446	2,846
	(4,808)	(4,959)	(4,840)	(5,529)	(4,323)	(4,615)	(4,572)	(4,994)
All-cause ED visits	125	121	132	159	154	165	169	200
	(396)	(354)	(393)	(551)	(386)	(446)	(476)	(597)
Potentially avoidable ED visits	*35*	*38*	*44*	*53*	*48*	*45*	*48*	*57*
	(138)	(172)	(213)	(250)	(189)	(193)	(200)	(282)
All observation stays	27	29	44	49	39	61	74	87
	(308)	(249)	(377)	(362)	(510)	(625)	(691)	(679)
Potentially avoidable observation stays	*4*	*7*	*11*	*14*	*8*	*11*	*15*	*26*
	(62)	(95)	(149)	(193)	(99)	(122)	(158)	(477)
ED visits and observation stays combined	138	123	145	165	168	194	198	225
	(471)	(367)	(517)	(571)	(610)	(739)	(793)	(803)
Potentially avoidable ED visits and obs. stays	*35*	*38*	*46*	*55*	*50*	*48*	*51*	*68*
	(139)	(172)	(225)	(272)	(196)	(203)	(221)	(519)
SNF services	10,431	9,330	9,122	9,149	9,085	7,547	7,397	7,571
	(14,777)	(13,118)	(12,876)	(13,708)	(13,383)	(11,684)	(11,745)	(12,162)

(continued)

Table 2-19 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Indiana

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Hospice services	1,338	1,318	1,253	1,556	1,605	1,686	1,845	1,869
	(6,091)	(6,167)	(5,857)	(6,788)	(6,728)	(6,946)	(7,089)	(7,090)
Carrier file services	2,456	2,527	2,357	2,613	2,344	2,367	2,404	2,545
	(4,778)	(5,038)	(3,842)	(4,797)	(4,811)	(5,110)	(5,018)	(4,978)
Physician services	1,155	1,117	1,072	1,169	1,193	1,175	1,186	1,254
	(1,738)	(1,522)	(1,525)	(2,279)	(1,845)	(1,939)	(1,857)	(1,838)
Durable medical equipment	214	204	159	135	198	191	134	126
	(1,028)	(1,272)	(815)	(834)	(1,052)	(1,083)	(768)	(718)
Part D prescription drugs	2,968	2,720	2,964	3,652	3,253	2,944	3,234	3,589
	(4,584)	(4,565)	(5,273)	(6,864)	(4,565)	(4,232)	(4,830)	(6,344)
N (Residents)	2,790	2,951	3,046	2,927	5,685	5,629	5,399	5,295

NOTES: Numbers in parentheses are standard deviations; ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department; SNF = Skilled Nursing Facility; carrier file services are Part B services such as Physician and laboratory that are submitted as noninstitutional claims; durable medical equipment is in a separate file.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-20
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Missouri

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total Medicare payments	21,498	21,208	19,887	20,533	20,527	20,148	19,847	19,877
	(23,109)	(23,614)	(20,792)	(22,488)	(20,150)	(21,023)	(20,966)	(21,317)
All-cause hospitalizations	5,336	5,538	4,173	4,384	3,823	4,035	4,184	4,145
	(12,494)	(13,684)	(9,809)	(11,025)	(8,845)	(10,183)	(9,976)	(9,870)
Potentially avoidable hospitalizations	*1,955*	*1,925*	*1,403*	*1,384*	*1,412*	*1,436*	*1,447*	*1,392*
	(6,269)	(5,313)	(4,136)	(4,424)	(4,305)	(5,032)	(4,943)	(4,473)
All institutional outpatient services	1,798	1,963	1,837	2,335	2,029	2,060	1,911	2,013
	(3,961)	(4,367)	(4,932)	(7,227)	(4,097)	(4,080)	(4,125)	(4,338)
All-cause ED visits	138	156	152	142	151	184	196	188
	(358)	(400)	(411)	(422)	(404)	(483)	(577)	(528)
Potentially avoidable ED visits	*38*	*47*	*44*	*42*	*49*	*59*	*62*	*56*
	(151)	(187)	(185)	(202)	(200)	(235)	(249)	(249)
All observation stays	38	49	51	55	35	50	60	67
	(353)	(274)	(309)	(369)	(325)	(324)	(450)	(407)
Potentially avoidable observation stays	*6*	*14*	*11*	*13*	*7*	*12*	*13*	*19*
	(84)	(125)	(125)	(153)	(92)	(125)	(155)	(184)
ED visits and observation stays combined	146	162	157	154	161	192	205	196
	(455)	(421)	(428)	(504)	(483)	(527)	(619)	(559)
Potentially avoidable ED visits and obs. stays	*39*	*48*	*44*	*42*	*49*	*60*	*63*	*57*
	(154)	(188)	(187)	(202)	(201)	(235)	(251)	(252)
SNF services	6,541	5,351	5,072	4,505	6,435	5,408	4,914	4,972
	(9,748)	(8,433)	(8,627)	(8,399)	(10,340)	(9,143)	(8,860)	(8,892)

(continued)

Table 2-20 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Missouri

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Hospice services	2,038	2,507	2,702	2,497	3,203	3,444	3,255	2,950
	(7,481)	(8,048)	(8,209)	(7,832)	(9,695)	(9,934)	(9,645)	(9,120)
Carrier file services	2,381	2,436	2,253	2,504	1,783	1,890	1,939	1,943
	(2,967)	(3,264)	(2,658)	(2,960)	(2,360)	(2,509)	(2,918)	(2,508)
Physician services	1,459	1,466	1,264	1,374	1,061	1,100	1,154	1,139
	(2,097)	(2,518)	(1,790)	(1,977)	(1,687)	(1,730)	(2,377)	(1,786)
Durable medical equipment	150	153	103	117	137	146	119	120
	(1,052)	(1,005)	(653)	(725)	(772)	(753)	(740)	(732)
Part D prescription drugs	3,162	3,221	3,715	4,175	3,059	3,140	3,472	3,682
	(5,320)	(6,175)	(6,714)	(7,543)	(4,736)	(5,168)	(5,927)	(7,014)
N (Residents)	2,413	2,291	2,308	2,282	4,787	4,557	4,387	4,342

NOTES: Numbers in parentheses are standard deviations; ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department; SNF = Skilled Nursing Facility; carrier file services are Part B services such as Physician and laboratory that are submitted as noninstitutional claims; durable medical equipment is in a separate file.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-21
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Nebraska

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total Medicare payments	22,247	21,130	21,001	21,257	18,049	17,813	18,890	19,082
	(24,402)	(23,242)	(24,744)	(22,830)	(20,458)	(19,842)	(21,059)	(21,449)
All-cause hospitalizations	4,856	4,757	4,382	4,116	3,827	3,676	4,017	3,783
	(11,469)	(11,063)	(12,742)	(10,233)	(10,154)	(9,046)	(9,532)	(9,826)
Potentially avoidable hospitalizations	*1,993*	*1,580*	*1,213*	*1,165*	*1,532*	*1,348*	*1,409*	*1,339*
	(5,998)	(4,830)	(4,428)	(4,284)	(4,731)	(4,050)	(4,691)	(4,748)
All institutional outpatient services	2,285	2,354	2,322	2,848	1,693	2,053	2,091	2,252
	(4,511)	(4,637)	(4,851)	(5,721)	(3,807)	(4,449)	(4,600)	(4,654)
All-cause ED visits	169	153	177	213	175	225	224	231
	(465)	(436)	(575)	(678)	(568)	(642)	(637)	(648)
Potentially avoidable ED visits	*53*	*44*	*61*	*67*	*56*	*73*	*74*	*79*
	(228)	(210)	(373)	(395)	(278)	(363)	(340)	(359)
All observation stays	30	28	30	47	47	66	72	79
	(259)	(222)	(229)	(317)	(334)	(397)	(467)	(398)
Potentially avoidable observation stays	*9*	*5*	*9*	*9*	*12*	*23*	*22*	*27*
	(112)	(80)	(116)	(145)	(141)	(259)	(218)	(219)
ED visits and observation stays combined	173	156	180	217	185	238	239	242
	(478)	(443)	(578)	(687)	(589)	(675)	(708)	(672)
Potentially avoidable ED visits and obs. stays	*55*	*45*	*61*	*67*	*60*	*76*	*77*	*82*
	(233)	(214)	(374)	(395)	(288)	(372)	(356)	(364)
SNF services	7,741	6,792	6,430	6,607	5,574	4,587	4,974	4,840
	(12,911)	(11,070)	(10,732)	(11,121)	(10,068)	(8,596)	(9,247)	(9,163)

(continued)

Table 2-21 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Nebraska

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Hospice services	2,044	2,050	2,457	2,138	1,549	2,014	2,116	2,199
	(7,330)	(7,020)	(8,457)	(7,272)	(5,685)	(6,750)	(7,137)	(7,540)
Carrier file services	1,873	1,844	1,794	1,793	1,418	1,519	1,580	1,596
	(3,025)	(2,995)	(3,795)	(2,369)	(2,151)	(2,100)	(2,361)	(2,266)
Physician services	1,182	1,199	1,192	1,170	941	1,012	1,059	1,055
	(2,516)	(2,582)	(3,304)	(1,830)	(1,570)	(1,559)	(1,822)	(1,631)
Durable medical equipment	227	202	147	144	244	249	168	146
	(1,045)	(1,065)	(778)	(961)	(3,067)	(2,825)	(2,321)	(2,131)
Part D prescription drugs	3,199	3,099	3,440	3,580	3,719	3,697	3,928	4,255
	(4,781)	(5,382)	(6,647)	(6,054)	(6,152)	(6,603)	(7,502)	(8,371)
N (Residents)	1,622	1,572	1,535	1,458	3,565	3,335	3,262	3,172

NOTES: Numbers in parentheses are standard deviations; ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department; SNF = Skilled Nursing Facility; carrier file services are Part B services such as Physician and laboratory that are submitted as noninstitutional claims; durable medical equipment is in a separate file.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-22
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Nevada

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total Medicare payments	23,879	23,432	22,931	23,857	25,872	22,603	21,684	22,279
	(25,260)	(24,233)	(23,907)	(25,835)	(30,191)	(27,155)	(25,779)	(26,758)
All-cause hospitalizations	4,895	5,540	5,248	5,303	6,166	6,086	5,783	5,780
	(12,233)	(13,584)	(12,507)	(12,523)	(14,946)	(15,555)	(14,546)	(14,218)
Potentially avoidable hospitalizations	*1,470*	*1,588*	*1,286*	*1,401*	*2,006*	*1,567*	*1,332*	*1,371*
	(4,940)	(5,790)	(4,812)	(5,002)	(7,564)	(5,327)	(4,580)	(4,778)
All institutional outpatient services	1,263	1,419	1,213	1,564	1,367	1,569	1,505	1,620
	(3,273)	(3,508)	(3,421)	(4,039)	(3,416)	(4,082)	(3,991)	(3,959)
All-cause ED visits	140	146	160	222	172	196	232	265
	(438)	(488)	(526)	(703)	(501)	(696)	(735)	(777)
Potentially avoidable ED visits	*40*	*43*	*54*	*67*	*64*	*62*	*80*	*77*
	(218)	(244)	(288)	(334)	(298)	(350)	(407)	(378)
All observation stays	56	56	60	87	52	91	114	126
	(561)	(446)	(483)	(550)	(330)	(522)	(616)	(608)
Potentially avoidable observation stays	*9*	*11*	*16*	*17*	*21*	*26*	*29*	*32*
	(109)	(171)	(170)	(209)	(220)	(264)	(279)	(291)
ED visits and observation stays combined	155	156	172	237	172	202	241	272
	(652)	(573)	(645)	(784)	(501)	(716)	(779)	(790)
Potentially avoidable ED visits and obs. stays	*41*	*43*	*55*	*70*	*64*	*62*	*81*	*78*
	(218)	(245)	(289)	(354)	(298)	(350)	(409)	(381)
SNF services	10,996	9,888	9,905	9,717	11,572	8,650	7,951	8,359
	(15,773)	(13,649)	(13,891)	(14,310)	(18,680)	(14,341)	(13,677)	(14,290)

(continued)

Table 2-22 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Nevada

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Hospice services	2,032	1,898	1,689	1,588	1,648	1,602	1,737	1,287
	(8,540)	(8,290)	(7,499)	(7,070)	(7,530)	(7,555)	(7,935)	(6,548)
Carrier file services	2,229	2,387	2,449	2,789	2,551	2,488	2,503	2,707
	(2,994)	(3,408)	(2,938)	(3,601)	(3,402)	(3,318)	(3,354)	(3,345)
Physician services	1,581	1,684	1,692	1,879	1,786	1,749	1,712	1,827
	(2,439)	(2,774)	(2,307)	(2,723)	(2,735)	(2,582)	(2,549)	(2,487)
Durable medical equipment	322	255	191	166	374	278	208	151
	(1,788)	(1,306)	(1,040)	(1,221)	(1,599)	(1,210)	(1,028)	(780)
Part D prescription drugs	2,039	2,004	2,190	2,681	2,094	1,895	1,966	2,311
	(3,613)	(4,003)	(4,474)	(5,679)	(3,668)	(3,436)	(3,847)	(4,663)
N (Residents)	3,718	3,783	3,733	3,387	2,031	2,027	1,989	1,884

NOTES: Numbers in parentheses are standard deviations; ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department; SNF = Skilled Nursing Facility; carrier file services are Part B services such as Physician and laboratory that are submitted as noninstitutional claims; durable medical equipment is in a separate file.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-23
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), New York

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total Medicare payments	29,003	28,128	29,555	29,652	27,462	25,646	26,651	26,781
	(36,338)	(36,704)	(37,401)	(36,250)	(35,259)	(33,770)	(33,870)	(33,473)
All-cause hospitalizations	10,082	9,697	9,833	8,644	9,593	8,685	8,693	8,254
	(24,064)	(24,244)	(24,154)	(21,701)	(24,282)	(22,046)	(21,828)	(20,577)
Potentially avoidable hospitalizations	*2,551*	*2,468*	*2,289*	*1,831*	*2,457*	*2,139*	*2,124*	*1,852*
	(9,251)	(8,517)	(8,609)	(6,841)	(9,503)	(7,878)	(8,129)	(6,777)
All institutional outpatient services	1,293	1,522	1,505	1,878	1,243	1,447	1,425	1,542
	(3,992)	(4,309)	(4,583)	(5,104)	(4,079)	(4,337)	(4,603)	(4,384)
All-cause ED visits	87	103	117	124	83	91	99	119
	(281)	(349)	(375)	(418)	(274)	(309)	(313)	(411)
Potentially avoidable ED visits	*25*	*31*	*35*	*36*	*23*	*25*	*30*	*34*
	(137)	(176)	(191)	(186)	(131)	(135)	(156)	(187)
All observation stays	1	3	9	22	2	6	11	14
	(25)	(70)	(129)	(206)	(57)	(130)	(232)	(172)
Potentially avoidable observation stays	*0*	*1*	*3*	*7*	*1*	*1*	*3*	*4*
	(17)	(44)	(75)	(108)	(29)	(40)	(62)	(86)
ED visits and observation stays combined	87	103	117	125	83	92	102	119
	(281)	(349)	(375)	(419)	(274)	(311)	(372)	(411)
Potentially avoidable ED visits and obs. stays	*25*	*31*	*35*	*36*	*23*	*25*	*30*	*34*
	(137)	(176)	(191)	(186)	(131)	(135)	(156)	(187)
SNF services	9,048	8,506	9,505	9,920	8,998	8,010	8,910	9,191
	(15,563)	(15,380)	(16,310)	(16,683)	(14,930)	(13,822)	(15,040)	(15,527)

(continued)

Table 2-23 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), New York

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Hospice services	1,028	1,136	1,200	1,268	580	696	741	687
	(5,979)	(6,208)	(6,060)	(6,759)	(4,386)	(4,842)	(5,016)	(5,026)
Carrier file services	3,592	3,470	3,592	3,712	3,637	3,592	3,539	3,624
	(5,220)	(4,787)	(4,541)	(4,761)	(5,371)	(5,133)	(4,768)	(4,474)
Physician services	2,506	2,382	2,432	2,551	2,473	2,432	2,391	2,397
	(4,178)	(3,564)	(3,284)	(3,441)	(3,937)	(3,806)	(3,463)	(3,030)
Durable medical equipment	423	393	303	251	395	366	267	229
	(1,617)	(1,595)	(1,241)	(1,122)	(1,591)	(1,492)	(1,084)	(1,024)
Part D prescription drugs	3,292	3,329	3,589	3,955	2,949	2,801	3,012	3,226
	(5,863)	(6,708)	(6,896)	(9,099)	(4,870)	(4,912)	(5,449)	(6,745)
N (Residents)	8,457	7,844	7,571	6,964	13,224	12,789	12,583	11,837

NOTES: Numbers in parentheses are standard deviations; ECCP = Enhanced Care and Coordination Providers; ED = Emergency Department; SNF = Skilled Nursing Facility; carrier file services are Part B services such as Physician and laboratory that are submitted as noninstitutional claims; durable medical equipment is in a separate file.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

Table 2-24
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Pennsylvania

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total Medicare payments	22,681	22,301	20,459	20,709	23,123	21,768	21,115	21,073
	(22,914)	(23,361)	(22,460)	(21,819)	(24,010)	(22,543)	(22,437)	(23,148)
All-cause hospitalizations	4,471	4,982	4,037	3,782	4,737	4,478	4,268	4,226
	(10,782)	(11,975)	(11,618)	(10,829)	(11,233)	(10,501)	(10,787)	(11,231)
Potentially avoidable hospitalizations	*1,549*	*1,784*	*1,323*	*1,027*	*1,556*	*1,480*	*1,280*	*1,156*
	(4,820)	(6,515)	(5,068)	(3,923)	(5,055)	(4,686)	(4,880)	(4,214)
All institutional outpatient services	2,940	3,156	2,781	3,052	2,601	2,867	2,554	2,879
	(4,425)	(4,942)	(4,536)	(4,514)	(4,252)	(4,524)	(4,158)	(4,606)
All-cause ED visits	165	158	159	163	154	170	169	169
	(424)	(410)	(479)	(502)	(423)	(509)	(472)	(500)
Potentially avoidable ED visits	*58*	*51*	*57*	*42*	*50*	*46*	*50*	*50*
	(255)	(209)	(249)	(204)	(220)	(243)	(219)	(234)
All observation stays	45	54	58	54	33	42	54	56
	(279)	(563)	(371)	(342)	(234)	(290)	(331)	(347)
Potentially avoidable observation stays	*19*	*15*	*19*	*12*	*8*	*9*	*13*	*16*
	(199)	(147)	(177)	(143)	(102)	(121)	(150)	(170)
ED visits and observation stays combined	170	170	165	169	160	173	172	175
	(442)	(650)	(521)	(521)	(445)	(513)	(487)	(522)
Potentially avoidable ED visits and obs. stays	*61*	*52*	*57*	*44*	*51*	*47*	*52*	*52*
	(280)	(210)	(249)	(214)	(222)	(246)	(229)	(246)
SNF services	6,932	6,049	5,475	5,584	7,469	6,270	6,186	5,961
	(11,230)	(9,908)	(9,356)	(9,883)	(11,952)	(10,229)	(9,891)	(9,967)

(continued)

Table 2-24 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations), Pennsylvania

Category	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Hospice services	1,243	1,234	1,253	1,186	1,545	1,595	1,517	1,305
	(5,756)	(5,653)	(5,824)	(5,423)	(6,386)	(6,267)	(6,263)	(5,773)
Carrier file services	2,570	2,588	2,449	2,390	2,368	2,347	2,287	2,311
	(4,466)	(4,621)	(4,621)	(3,594)	(4,150)	(3,795)	(3,621)	(3,477)
Physician services	1,628	1,606	1,538	1,514	1,466	1,426	1,406	1,419
	(2,269)	(2,030)	(2,226)	(2,107)	(2,404)	(1,941)	(1,974)	(2,066)
Durable medical equipment	230	221	168	160	185	203	166	139
	(1,020)	(948)	(776)	(791)	(931)	(1,173)	(895)	(764)
Part D prescription drugs	4,262	4,057	4,282	4,538	4,188	3,989	4,120	4,235
	(5,859)	(6,176)	(6,852)	(7,531)	(6,734)	(7,024)	(7,850)	(8,834)
N (Residents)	2,752	2,694	2,630	2,704	6,286	6,190	6,144	6,189

NOTES: Numbers in parentheses are standard deviations; ECCP = Enhanced Care and Coordination Providers;
ED = Emergency Department; SNF = Skilled Nursing Facility; carrier file services are Part B services such as Physician and laboratory that are submitted as noninstitutional claims; durable medical equipment is in a separate file.

SOURCE: RTI analysis of Medicare claims data (RTI program: nhpah186b).

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2.10.3 MDS-Based Quality Outcomes

The annual measure scores related to MDS-based quality outcomes are summarized for each state, by ECCP and comparison facilities, in ***Table 2-25*** (Alabama) through ***Table 2-31*** (Pennsylvania). The scores for most measures varied substantially across states. For example, in New York in 2014, self-report of moderate to severe pain was indicated in 3.2 percent of observed quarters for the residents in the ECCP facilities and 3.1 percent of observed quarters for the residents in the comparison facilities. The scores were 14.3 percent for the ECCP facilities and 13.4 percent for the comparison facilities in Nebraska. Large inter-state variation was also seen for the depression symptom measure. In 2014, depression symptoms were present in about 1.5 percent of observed quarters for residents in the ECCP facilities in Alabama and about 1.9 percent of observed quarters for residents in the comparison facilities. The scores were 14.6 percent for the ECCP facilities and 9.0 percent for the comparison facilities in Indiana. The inter-state variation may indicate the variation in quality of care, but could also be caused by cross-state differences in recognizing and assessing residents' symptoms.

For many measures, the scores differed across the ECCP and the comparison facilities within the same states. For example, in 2014, the score for "experienced one or more falls with injury" was about 13 percent higher (indicating poorer quality of care) in the comparison facilities than the ECCP facilities in Nebraska. On the other hand, the score was about 39 percent lower (indicating better quality of care) in the comparison facilities than the ECCP facilities in Nevada. The difference in scores between the ECCP and the comparison facilities is somewhat expected because the set of comparison facilities was not matched on every individual measure of quality of care. Our multivariate analysis uses a difference-in-difference design and controls for a comprehensive list of covariates (which addresses the baseline differences between the ECCP and the comparison facilities) and allows for the examination of the effect of the ECCP intervention on MDS-based quality outcomes.

From 2011 to 2014, some measures showed overall quality improvement in both the ECCP and the comparison facilities in all the states with minimal fluctuations, such as use of physical restraints and antipsychotic medications. Other measures increased in some states, declined in some, and fluctuated in others. For example, the experiencing falls with injury increased (indicating possible quality decline) in Indiana, fluctuated (increased from 2011 to 2012, decreased from 2012 to 2013, and increased from 2013 to 2014) in Missouri, and decreased (indicating possible quality improvement) in Alabama ECCP facilities, except for an increase from 2011 to 2012, which can be understood as fluctuation in the Base Year(s). The effect of the ECCP on MDS-based quality outcomes, adjusting for resident and facility characteristics, is examined in detail in Section 2.11, Multivariate Regression Results.

Table 2-25
MDS-based quality outcomes: Percent of observed quarters with each outcome, Alabama

Measure	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Assessed and appropriately given the seasonal flu vaccine	95.0	94.9	95.4	93.3	91.9	93.3	93.1	92.8
Assessed and appropriately given the pneumococcal vaccine	97.3	96.7	95.8	93.3	86.9	89.4	92.8	93.2
Have/had a catheter inserted and left in bladder	3.3	3.4	3.3	2.6	3.3	3.1	2.9	2.8
Were physically restrained	0.6	0.6	0.5	0.4	1.1	1.1	0.8	0.6
Received an antipsychotic medication	28.0	25.5	21.8	21.6	28.9	27.3	23.9	22.9
Experienced one or more falls with injury	10.3	11.4	11.3	10.9	10.5	10.9	11.4	11.8
Self-report moderate to severe pain	10.2	6.6	8.6	7.7	7.9	7.1	5.8	5.8
Pressure ulcers of high-risk residents only[1]	3.9	3.7	3.6	4.0	5.0	4.6	4.8	4.2
Need for help with Activities of Daily Living has increased	13.6	13.2	14.6	13.4	15.0	14.0	13.8	13.7
Urinary tract infection	4.3	4.1	4.5	3.7	4.7	4.8	4.9	4.6
With depressive symptoms	3.0	2.3	1.6	1.5	2.9	2.5	1.8	1.9
Lost control of bowel or bladder of low-risk residents only[2]	36.9	40.5	36.9	42.3	36.5	39.8	36.5	42.3
Lost too much weight	6.6	6.7	6.6	6.7	7.3	7.8	7.3	8.2
Receiving hospice care	5.3	5.5	6.5	8.4	5.1	6.4	6.2	7.0
With oral/dental problems[3]	14.7	13.5	13.9	17.3	17.6	16.4	17.8	17.4
With swallowing disorder[4]	6.4	4.0	3.8	4.5	9.4	7.3	7.5	7.9
N (Residents)	3,517	3,583	3,337	3,280	7,152	7,172	7,066	7,019

NOTES: The outcomes are reported for residents included in the measure denominators (see ***Appendix D*** of the 2014 annual report for the specifications for denominators and exclusions). The N reflects total number of Initiative-eligible residents in annual analytic samples.

[1] High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

[2] Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

[3] With oral/dental problems on the last observable MDS assessment.

[4] With swallowing disorder on at least one observed MDS assessment.

SOURCE: RTI analysis of MDS assessment data (RTI program: nb24_new/qm_means_2014_by_state).

Table 2-26
MDS-based quality outcomes: Percent of observed quarters with each outcome, Indiana

Measure	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Assessed and appropriately given the seasonal flu vaccine	84.0	80.1	83.9	92.1	89.6	87.0	86.6	90.8
Assessed and appropriately given the pneumococcal vaccine	87.8	86.7	88.7	92.6	87.3	88.4	86.6	88.6
Have/had a catheter inserted and left in bladder	3.7	4.3	4.3	3.8	5.4	4.8	3.8	3.4
Were physically restrained	1.2	0.7	0.6	0.5	0.7	0.5	0.4	0.5
Received an antipsychotic medication	21.7	20.7	17.5	15.9	21.9	20.9	18.3	16.7
Experienced one or more falls with injury	11.1	12.1	12.2	13.8	11.5	12.6	13.2	13.8
Self-report moderate to severe pain	9.1	8.2	7.4	6.1	8.9	8.8	8.3	7.4
Pressure ulcers of high-risk residents only[1]	7.2	5.1	5.9	5.7	6.2	5.6	4.9	4.9
Need for help with Activities of Daily Living has increased	21.4	18.0	15.5	14.9	20.4	18.3	15.5	15.6
Urinary tract infection	4.9	4.2	4.7	3.5	5.9	5.0	5.4	4.0
With depressive symptoms	4.1	4.8	7.3	14.6	5.7	5.4	7.8	9.0
Lost control of bowel or bladder of low-risk residents only[2]	50.3	53.3	50.3	58.4	55.8	56.0	55.8	59.3
Lost too much weight	9.1	7.1	9.1	8.3	7.3	7.1	7.3	7.2
Receiving hospice care	4.6	4.2	4.4	6.1	5.2	5.6	6.2	7.6
With oral/dental problems[3]	7.2	5.1	7.3	7.9	5.6	7.4	8.8	9.2
With swallowing disorder[4]	10.3	5.4	5.5	5.6	5.7	5.0	3.9	4.1
N (Residents)	2,815	2,970	3,071	2,938	5,721	5,658	5,431	5,320

NOTES: The outcomes are reported for residents included in the measure denominators (see ***Appendix D*** of the 2014 annual report for the specifications for denominators and exclusions). The N reflects total number of Initiative-eligible residents in annual analytic samples.

[1] High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

[2] Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

[3] With oral/dental problems on the last observable MDS assessment.

[4] With swallowing disorder on at least one observed MDS assessment.

SOURCE: RTI analysis of MDS assessment data (RTI program: nb24_new/qm_means_2014_by_state).

Table 2-27
MDS-based quality outcomes: Percent of observed quarters with each outcome, Missouri

Measure	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Assessed and appropriately given the seasonal flu vaccine	86.2	90.7	93.0	95.6	92.3	91.8	92.5	92.1
Assessed and appropriately given the pneumococcal vaccine	86.5	83.2	84.4	89.8	88.7	91.3	90.3	89.6
Have/had a catheter inserted and left in bladder	4.0	3.0	2.2	2.7	3.2	3.4	2.4	2.8
Were physically restrained	2.7	1.7	1.2	0.9	1.5	0.9	0.6	0.4
Received an antipsychotic medication	18.5	18.6	17.1	15.2	24.2	24.1	21.6	19.5
Experienced one or more falls with injury	13.2	16.5	14.6	16.7	14.8	15.5	13.9	15.6
Self-report moderate to severe pain	12.6	11.5	9.7	7.5	13.5	11.6	11.0	10.9
Pressure ulcers of high-risk residents only[1]	7.5	6.7	5.2	5.2	6.9	6.8	6.0	6.0
Need for help with Activities of Daily Living has increased	13.3	14.2	13.7	13.6	14.3	14.2	14.6	13.5
Urinary tract infection	8.4	7.7	7.7	7.4	8.0	8.5	6.9	6.5
With depressive symptoms	6.5	4.7	4.0	2.6	7.0	6.4	4.9	3.2
Lost control of bowel or bladder of low-risk residents only[2]	38.5	36.1	38.5	36.9	36.0	36.7	36.0	34.0
Lost too much weight	6.6	6.3	6.6	6.4	7.4	7.0	7.4	7.6
Receiving hospice care	6.5	8.4	8.3	10.3	11.1	11.5	11.2	11.9
With oral/dental problems[3]	6.5	5.7	6.7	4.7	16.1	13.0	13.8	11.5
With swallowing disorder[4]	9.7	8.7	7.4	7.3	11.4	10.0	10.0	8.6
N (Residents)	2,441	2,320	2,332	2,296	4,849	4,589	4,430	4,366

NOTES: The outcomes are reported for residents included in the measure denominators (see ***Appendix D*** of the 2014 annual report for the specifications for denominators and exclusions). The N reflects total number of Initiative-eligible residents in annual analytic samples.

[1] High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

[2] Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

[3] With oral/dental problems on the last observable MDS assessment.

[4] With swallowing disorder on at least one observed MDS assessment.

SOURCE: RTI analysis of MDS assessment data (RTI program: nb24_new/qm_means_2014_by_state).

Table 2-28
MDS-based quality outcomes: Percent of observed quarters with each outcome, Nebraska

Measure	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Assessed and appropriately given the seasonal flu vaccine	88.9	92.8	89.5	90.1	93.6	93.3	92.9	91.1
Assessed and appropriately given the pneumococcal vaccine	82.7	82.6	82.2	84.8	92.1	93.6	94.3	93.6
Have/had a catheter inserted and left in bladder	5.5	5.1	4.2	3.9	7.1	5.9	5.2	5.5
Were physically restrained	0.6	0.5	0.1	0.0	0.9	0.4	0.3	0.1
Received an antipsychotic medication	20.8	20.9	19.5	20.1	25.2	24.9	25.7	24.7
Experienced one or more falls with injury	11.3	10.8	11.4	11.8	14.6	13.9	13.4	13.3
Self-report moderate to severe pain	16.5	13.8	12.8	14.3	16.0	14.5	14.4	13.4
Pressure ulcers of high-risk residents only[1]	6.0	5.2	5.8	4.6	4.5	4.3	3.2	4.2
Need for help with Activities of Daily Living has increased	15.9	16.6	16.7	18.3	15.4	16.0	15.9	16.1
Urinary tract infection	7.8	8.0	7.0	6.2	8.4	7.8	7.0	6.1
With depressive symptoms	8.5	7.1	6.2	5.3	9.4	8.0	7.6	7.6
Lost control of bowel or bladder of low-risk residents only[2]	42.8	51.7	42.8	52.0	41.9	42.8	41.9	44.7
Lost too much weight	7.3	6.2	7.3	5.3	6.3	7.3	6.3	6.4
Receiving hospice care	7.3	7.6	8.1	10.2	7.1	8.3	8.4	12.4
With oral/dental problems[3]	17.6	17.3	16.6	18.4	15.4	15.8	16.5	13.9
With swallowing disorder[4]	14.6	10.3	8.5	6.3	16.6	15.8	12.3	12.8
N (Residents)	1,641	1,594	1,557	1,477	3,616	3,375	3,311	3,202

NOTES: The outcomes are reported for residents included in the measure denominators (see ***Appendix D*** of the 2014 annual report for the specifications for denominators and exclusions). The N reflects total number of Initiative-eligible residents in annual analytic samples.

[1] High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

[2] Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

[3] With oral/dental problems on the last observable MDS assessment.

[4] With swallowing disorder on at least one observed MDS assessment.

SOURCE: RTI analysis of MDS assessment data (RTI program: nb24_new/qm_means_2014_by_state).

Table 2-29
MDS-based quality outcomes: Percent of observed quarters with each outcome, Nevada

Measure	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Assessed and appropriately given the seasonal flu vaccine	81.7	78.4	86.1	84.1	94.0	90.1	90.9	89.8
Assessed and appropriately given the pneumococcal vaccine	85.5	82.4	83.1	77.6	93.5	93.5	94.7	91.9
Have/had a catheter inserted and left in bladder	7.0	6.3	6.0	5.2	8.3	8.6	7.5	6.9
Were physically restrained	0.8	1.4	1.0	0.5	4.1	1.8	0.9	0.9
Received an antipsychotic medication	21.7	20.8	19.6	19.0	22.8	23.9	22.6	19.8
Experienced one or more falls with injury	10.3	9.9	10.1	11.4	12.3	9.2	7.2	7.0
Self-report moderate to severe pain	11.9	12.0	11.6	13.2	15.2	13.2	12.7	10.2
Pressure ulcers of high-risk residents only[1]	7.2	6.7	6.0	6.9	9.2	8.9	7.4	6.7
Need for help with Activities of Daily Living has increased	18.5	17.0	17.0	16.4	21.3	18.9	16.9	16.7
Urinary tract infection	8.7	7.8	6.7	5.9	9.3	7.5	5.5	5.6
With depressive symptoms	4.2	4.3	4.3	3.5	3.6	5.1	4.8	2.9
Lost control of bowel or bladder of low-risk residents only[2]	54.3	55.1	54.3	61.7	47.3	48.4	47.3	47.9
Lost too much weight	7.2	7.3	7.2	6.5	6.7	6.6	6.7	5.5
Receiving hospice care	6.5	6.3	5.6	5.6	5.4	5.5	5.1	4.4
With oral/dental problems[3]	8.7	9.9	8.6	11.2	18.3	14.1	13.8	11.2
With swallowing disorder[4]	10.1	10.9	10.8	11.4	10.8	6.8	4.7	4.8
N (Residents)	3,826	3,902	3,830	3,428	2,110	2,091	2,045	1,949

NOTES: The outcomes are reported for residents included in the measure denominators (see ***Appendix D*** of the 2014 annual report for the specifications for denominators and exclusions). The N reflects total number of Initiative-eligible residents in annual analytic samples.

[1] High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

[2] Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

[3] With oral/dental problems on the last observable MDS assessment.

[4] With swallowing disorder on at least one observed MDS assessment.

SOURCE: RTI analysis of MDS assessment data (RTI program: nb24_new/qm_means_2014_by_state).

Table 2-30
MDS-based quality outcomes: Percent of observed quarters with each outcome, New York

Measure	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Assessed and appropriately given the seasonal flu vaccine	89.6	92.4	93.0	95.1	94.1	94.1	92.9	94.7
Assessed and appropriately given the pneumococcal vaccine	96.6	95.8	95.0	94.3	96.6	96.6	96.7	96.6
Have/had a catheter inserted and left in bladder	3.2	3.4	3.4	3.5	2.8	2.8	2.6	2.7
Were physically restrained	1.4	1.4	1.2	1.2	1.4	1.3	1.1	1.0
Received an antipsychotic medication	20.8	19.2	16.5	15.7	21.8	21.0	18.3	17.6
Experienced one or more falls with injury	8.1	7.9	7.6	7.7	6.4	6.3	6.8	6.3
Self-report moderate to severe pain	4.8	3.8	4.0	3.2	4.9	3.7	3.3	3.1
Pressure ulcers of high-risk residents only[1]	8.8	8.2	8.7	8.7	8.7	7.9	8.1	7.6
Need for help with Activities of Daily Living has increased	12.3	12.6	12.1	11.9	13.9	13.8	13.2	12.9
Urinary tract infection	5.5	4.7	4.5	4.3	5.1	5.4	5.0	5.1
With depressive symptoms	6.2	10.0	8.2	8.6	8.1	13.4	13.7	11.3
Lost control of bowel or bladder of low-risk residents only[2]	43.1	43.0	43.1	55.1	38.9	38.5	38.9	42.1
Lost too much weight	6.4	6.7	6.4	6.8	5.9	5.6	5.9	5.9
Receiving hospice care	2.6	3.0	3.0	4.1	1.5	1.8	2.0	2.3
With oral/dental problems[3]	10.4	8.7	9.4	7.6	16.1	17.3	15.7	15.3
With swallowing disorder[4]	8.3	7.5	5.7	4.4	6.4	4.5	4.0	3.8
N (Residents)	8,601	7,928	7,656	6,986	13,360	12,927	12,709	11,845

NOTES: The outcomes are reported for residents included in the measure denominators (see ***Appendix D*** of the 2014 annual report for the specifications for denominators and exclusions). The N reflects total number of Initiative-eligible residents in annual analytic samples.

[1] High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

[2] Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

[3] With oral/dental problems on the last observable MDS assessment.

[4] With swallowing disorder on at least one observed MDS assessment.

SOURCE: RTI analysis of MDS assessment data (RTI program: nb24_new/qm_means_2014_by_state).

Table 2-31
MDS-based quality outcomes: Percent of observed quarters with each outcome, Pennsylvania

Measure	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Assessed and appropriately given the seasonal flu vaccine	88.4	90.8	88.0	90.4	89.9	94.5	94.4	94.7
Assessed and appropriately given the pneumococcal vaccine	96.7	96.1	95.9	92.6	93.9	94.6	94.5	91.5
Have/had a catheter inserted and left in bladder	5.0	4.5	3.6	3.8	3.9	3.9	3.9	4.1
Were physically restrained	2.5	1.8	1.4	1.2	3.0	2.6	2.2	2.0
Received an antipsychotic medication	25.9	24.5	23.8	21.5	27.4	26.9	24.9	22.3
Experienced one or more falls with injury	12.3	12.8	13.3	12.0	10.1	9.9	11.4	10.9
Self-report moderate to severe pain	13.9	12.3	12.0	12.0	12.1	12.0	11.2	10.5
Pressure ulcers of high-risk residents only[1]	7.4	5.9	6.0	6.4	5.5	5.3	5.0	4.8
Need for help with Activities of Daily Living has increased	20.1	18.9	16.7	16.9	19.3	18.7	18.5	18.9
Urinary tract infection	6.8	5.5	5.8	5.5	4.9	5.2	5.1	4.2
With depressive symptoms	6.7	4.9	3.9	4.8	5.0	5.3	5.2	5.6
Lost control of bowel or bladder of low-risk residents only[2]	59.5	62.4	59.5	61.4	56.4	56.2	56.4	55.1
Lost too much weight	7.5	7.3	7.5	7.2	6.9	6.4	6.9	5.9
Receiving hospice care	4.0	4.2	4.5	5.2	4.6	5.1	4.9	5.5
With oral/dental problems[3]	13.9	15.0	16.7	13.1	13.8	13.3	14.9	14.1
With swallowing disorder[4]	15.1	12.7	11.5	12.0	10.3	8.1	6.7	6.1
N (Residents)	2,784	2,721	2,659	2,718	6,340	6,228	6,193	6,208

NOTES: The outcomes are reported for residents included in the measure denominators (see ***Appendix D*** of the 2014 annual report for the specifications for denominators and exclusions). The N reflects total number of Initiative-eligible residents in annual analytic samples.

[1] High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

[2] Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

[3] With oral/dental problems on the last observable MDS assessment.

[4] With swallowing disorder on at least one observed MDS assessment.

SOURCE: RTI analysis of MDS assessment data (RTI program: nb24_new/qm_means_2014_by_state).

2.10.4 Facility Staffing and Inspection Deficiencies

In ***Table 2-32*** (Alabama) through ***Table 2-38*** (Pennsylvania) we present selected facility-level measures of direct-care staffing and inspection survey deficiencies, which are aggregated to the ECCP group and comparison group level per state per year.

For the most part, direct-care staffing levels in terms of total RN, LPN, and CNA hours per resident day (HPRD) are similar in ECCP and comparison facilities within each state. However, there are greater differences among the states. For example, average RN staffing in 2014 ranges from 0.37 HPRD in ECCP facilities and 0.26 HPRD in comparison facilities in Missouri (***Table 2-34***) to 1.23 HPRD in ECCP facilities and 0.55 HPRD in comparison facilities in New York (***Table 2-37***). ECCP Facilities in New York experienced a dramatic increase in the both the average RN (from 0.59 to 1.23) and LPN (0.66 to 1.27) staffing HPRD, which turns out to be driven by just one ECCP facility, the Rivington House, which discharged nearly all residents in anticipation of closure in 2014 but still maintained substantial staffing before the facility eventually closed in November 2014. As a result, the staff-to-resident ratio in that facility, as captured in its last available annual inspection survey, increased considerably in 2014 from previous years. The second highest RN staffing rates occur in Nevada (***Table 2-36***), 0.63 HPRD in ECCP facilities and 0.94 HPRD in comparison facilities. The relatively high level of RN staffing in Nevada facilities is consistent with the fact that Nevada facilities have the highest proportion of residents who are eligible for the Initiative because of no discharge plan (see ***Appendix B***). The majority of such residents are likely Medicare covered post-acute patients and facilities focusing on these patients typically have relatively higher RN staffing levels. There are some yearly fluctuations in all types of staffing but most are not substantial.

Similarly, the scope-severity weighted health-related deficiency scores, both overall and by subtypes (in the quality of care or qualify of life domains), are relatively similar across the ECCP and comparison groups within each state. However, consistent with prior national analyses, they vary substantially both across the states and over time. For example, in 2014 the average total health-related deficiency score among ECCP facilities ranges between 11.5 in New York and 66.0 in Nevada; for comparison facilities in the same year, the score is between 15.2 in New York and 49.4 in Nevada. This pattern is as expected given known discrepancies in state inspection survey practices and the level of stringency state survey agencies apply in interpreting and enforcing federal regulations. It should also be noted that with both the ECCP and comparison groups there are almost always some facilities in any given year that are cited with a severe type of deficiency (Grade G or above) that caused actual harm or immediate jeopardy to resident health or safety. ECCP facilities in both Nebraska (***Table 2-35***) and Nevada appear especially prone to receive a severe deficiency citation in all 4 years (involving between 2 and 3 out of 15 and between 3 and 7 out of 24 facilities, respectively).

Table 2-32
Facility-level staffing and quality indicators: Means (standard deviations) or percentages, Alabama

Characteristic	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total RN hours per resident day	0.36	0.36	0.40	0.41	0.32	0.35	0.35	0.40
	(0.15)	(0.16)	(0.19)	(0.17)	(0.14)	(0.15)	(0.16)	(0.16)
Total LPN hours per resident day	1.02	1.00	1.00	0.99	1.01	1.03	1.03	0.98
	(0.36)	(0.38)	(0.32)	(0.32)	(0.22)	(0.36)	(0.37)	(0.22)
Total CNA hours per resident day	2.70	2.57	2.23	2.58	2.52	2.49	2.45	2.50
	(0.68)	(0.78)	(1.17)	(0.73)	(0.44)	(0.49)	(0.66)	(0.55)
Health inspection score, scope-severity weighted	22.6	22.1	31.3	28.2	21.1	23.4	26.4	25.1
	(23.1)	(20.2)	(23.2)	(19.7)	(21.3)	(23.6)	(25.7)	(20.5)
Health inspection score for quality of care deficiency citations, scope-severity weighted	3.8	4.7	6.1	5.7	3.7	4.3	5.4	4.2
	(4.3)	(5.5)	(5.5)	(6.9)	(5.6)	(6.8)	(8.1)	(7.8)
Health inspection score for quality of life deficiency citations, scope-severity weighted	0.9	2.8	1.7	3.0	1.1	2.1	1.9	2.6
	(2.1)	(4.4)	(2.6)	(3.2)	(2.2)	(3.2)	(3.9)	(3.8)
Percentage with any severe (Grade G+) deficiency	4.3	0.0	0.0	8.7	2.2	4.3	13.0	4.3
N (Facilities)	23	23	23	23	46	46	46	46

NOTES: Numbers in parentheses are standard deviations for continuous variables.

ECCP = Enhanced Care and Coordination Providers; RN = Registered Nurse; LPN = Licensed Practical Nurse; CNA = Certified Nurse Aide.

SOURCE: RTI analysis of CASPER data (RTI program: nhpah186b).

Table 2-33
Facility-level staffing and quality indicators: Means (standard deviations) or percentages, Indiana

Characteristic	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total RN hours per resident day	3.52 [a]	0.46	0.41	0.51	0.99	0.41	0.41	0.48
	(7.40)	(0.19)	(0.19)	(0.18)	(3.84)	(0.28)	(0.24)	(0.26)
Total LPN hours per resident day	4.62 [a]	1.03	1.08	0.96	1.55	1.00	0.99	1.00
	(8.63)	(0.24)	(0.29)	(0.24)	(3.75)	(0.51)	(0.25)	(0.27)
Total CNA hours per resident day	5.44 [a]	2.01	2.30	2.29	2.61	1.97	2.10	2.27
	(8.27)	(0.42)	(0.54)	(0.38)	(3.58)	(0.48)	(0.51)	(0.52)
Health inspection score, scope-severity weighted	25.1	31.8	34.9	32.8	47.7	27.5	29.9	33.8
	(31.2)	(23.3)	(22.8)	(15.4)	(58.9)	(26.6)	(30.8)	(26.4)
Health inspection score for quality of care deficiency citations, scope-severity weighted	5.9	8.0	8.0	8.0	12.6	9.2	9.3	8.5
	(8.0)	(8.3)	(7.9)	(7.9)	(21.1)	(13.1)	(12.8)	(9.3)
Health inspection score for quality of life deficiency citations, scope-severity weighted	2.1	2.7	4.0	4.4	2.4	2.1	3.1	4.2
	(5.6)	(3.8)	(4.2)	(4.0)	(5.8)	(3.3)	(5.8)	(5.5)
Percentage with any severe (Grade G+) deficiency	5.3	10.5	10.5	5.3	18.4	7.9	7.9	7.9
N (Facilities)	19	19	19	19	38	38	38	38

NOTES: Numbers in parentheses are standard deviations for continuous variables.

ECCP = Enhanced Care and Coordination Providers; RN = Registered Nurse; LPN = Licensed Practical Nurse; CNA = Certified Nurse Aide.

[a] The average HPRD is improbably high, driven by three outlier facilities in 2011. The three facilities are owned by the same organization. All of them reported having two residents in 2011 but their resident census jumped to over 100 in 2012 and 2013. Thus, in 2011 their high staffing HPRD resulted from having an extremely small number of residents in the denominator. Available information shows that all three facilities are new, which opened in 2011. They possibly first filled in with full staffing and later with residents.

SOURCE: RTI analysis of CASPER data (RTI program: nhpah186b).

Table 2-34
Facility-level staffing and quality indicators: Means (standard deviations) or percentages, Missouri

Characteristic	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total RN hours per resident day	0.27	0.28	0.34	0.37	0.23	0.21	0.24	0.26
	(0.13)	(0.12)	(0.18)	(0.17)	(0.14)	(0.12)	(0.13)	(0.19)
Total LPN hours per resident day	0.57	0.59	0.68	0.59	0.66	0.63	0.70	0.68
	(0.15)	(0.14)	(0.23)	(0.18)	(0.19)	(0.19)	(0.25)	(0.24)
Total CNA hours per resident day	2.07	2.20	2.57	2.30	2.05	2.01	2.04	1.98
	(0.26)	(0.46)	(0.78)	(0.37)	(0.40)	(0.42)	(0.36)	(0.37)
Health inspection score, scope-severity weighted	32.0	29.0	32.0	30.5	30.8	31.9	38.1	30.6
	(17.5)	(22.5)	(16.9)	(24.0)	(18.1)	(22.3)	(31.7)	(28.8)
Health inspection score for quality of care deficiency citations, scope-severity weighted	9.3	8.3	8.8	8.0	9.4	10.1	11.6	8.6
	(10.8)	(9.8)	(8.5)	(7.6)	(9.3)	(11.8)	(12.4)	(10.0)
Health inspection score for quality of life deficiency citations, scope-severity weighted	1.8	2.5	3.5	2.8	2.1	2.9	2.4	2.5
	(3.6)	(4.1)	(4.4)	(3.2)	(3.5)	(4.7)	(4.2)	(4.6)
Percentage with any severe (Grade G+) deficiency	6.3	6.3	0.0	6.3	9.4	12.5	9.4	3.1
N (Facilities)	16	16	16	16	32	32	32	32

NOTES: Numbers in parentheses are standard deviations for continuous variables.

ECCP = Enhanced Care and Coordination Providers; RN = Registered Nurse; LPN = Licensed Practical Nurse; CNA = Certified Nurse Aide.

SOURCE: RTI analysis of CASPER data (RTI program: nhpah186b).

Table 2-35
Facility-level staffing and quality indicators: Means (standard deviations) or percentages, Nebraska

Characteristic	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total RN hours per resident day	0.35	0.39	0.43	0.46	0.52	0.53	0.55	0.56
	(0.17)	(0.17)	(0.20)	(0.26)	(0.41)	(0.41)	(0.37)	(0.48)
Total LPN hours per resident day	0.84	0.87	0.81	0.80	0.85	0.90	0.87	0.81
	(0.29)	(0.29)	(0.25)	(0.17)	(0.60)	(0.63)	(0.54)	(0.55)
Total CNA hours per resident day	2.05	2.12	2.00	2.20	1.99	1.96	1.99	1.90
	(0.38)	(0.29)	(0.35)	(0.37)	(0.82)	(0.87)	(0.82)	(1.00)
Health inspection score, scope-severity weighted	66.4	85.1	59.5	56.3	48.4	39.2	38.9	38.3
	(41.3)	(77.9)	(52.2)	(45.8)	(40.4)	(36.9)	(34.0)	(29.3)
Health inspection score for quality of care deficiency citations, scope-severity weighted	16.8	23.7	18.7	14.9	12.3	8.7	10.8	10.1
	(15.9)	(33.7)	(20.8)	(15.9)	(13.2)	(10.0)	(18.7)	(14.5)
Health inspection score for quality of life deficiency citations, scope-severity weighted	8.8	6.7	7.2	9.1	4.8	5.2	5.3	6.1
	(6.1)	(5.4)	(5.1)	(6.3)	(6.1)	(5.2)	(5.4)	(4.5)
Percentage with any severe (Grade G+) deficiency	20.0	20.0	20.0	13.3	13.3	3.3	10.0	13.8
N (Facilities)	15	15	15	15	30	30	30	29

NOTES: Numbers in parentheses are standard deviations for continuous variables.

ECCP = Enhanced Care and Coordination Providers; RN = Registered Nurse; LPN = Licensed Practical Nurse; CNA = Certified Nurse Aide.

SOURCE: RTI analysis of CASPER data (RTI program: nhpah186b).

Table 2-36
Facility-level staffing and quality indicators: Means (standard deviations) or percentages, Nevada

Characteristic	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total RN hours per resident day	0.50	0.59	0.69	0.63	0.84	0.82	0.94	0.94
	(0.24)	(0.31)	(0.32)	(0.26)	(0.57)	(0.64)	(0.77)	(0.74)
Total LPN hours per resident day	0.64	0.65	0.65	0.80	0.82	0.87	0.94	0.83
	(0.27)	(0.29)	(0.25)	(0.46)	(0.42)	(0.43)	(0.46)	(0.35)
Total CNA hours per resident day	1.53	1.85	2.04	1.95	1.97	2.08	2.05	2.25
	(1.02)	(0.93)	(0.72)	(0.95)	(1.24)	(1.04)	(0.97)	(0.68)
Health inspection score, scope-severity weighted	48.6	59.4	79.6	66.0	49.0	40.8	48.6	49.4
	(29.5)	(34.4)	(48.5)	(54.1)	(30.1)	(26.3)	(27.1)	(32.2)
Health inspection score for quality of care deficiency citations, scope-severity weighted	14.4	12.7	19.3	20.3	14.5	11.4	13.1	16.2
	(17.1)	(11.1)	(17.8)	(16.2)	(15.9)	(11.5)	(11.0)	(13.6)
Health inspection score for quality of life deficiency citations, scope-severity weighted	5.7	3.8	8.2	6.5	5.0	2.9	4.6	5.9
	(6.7)	(3.6)	(9.9)	(9.3)	(4.5)	(4.6)	(5.4)	(6.2)
Percentage with any severe (Grade G+) deficiency	16.7	12.5	20.8	29.2	19.0	14.3	9.5	15.8
N (Facilities)	24	24	24	24	21	21	21	19

NOTES: Numbers in parentheses are standard deviations for continuous variables.

ECCP = Enhanced Care and Coordination Providers; RN = Registered Nurse; LPN = Licensed Practical Nurse; CNA = Certified Nurse Aide.

SOURCE: RTI analysis of CASPER data (RTI program: nhpah186b).

Table 2-37
Facility-level staffing and quality indicators: Means (standard deviations) or percentages, New York

Characteristic	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total RN hours per resident day	0.72	0.57	0.59	1.23 [a]	0.47	0.47	0.50	0.55
	(0.81)	(0.27)	(0.31)	(3.33)	(0.26)	(0.25)	(0.29)	(0.30)
Total LPN hours per resident day	0.79	0.67	0.66	1.27 [a]	0.66	0.68	0.70	0.71
	(0.81)	(0.30)	(0.27)	(2.87)	(0.27)	(0.27)	(0.30)	(0.33)
Total CNA hours per resident day	2.61	2.26	2.40	2.89 [a]	2.33	2.35	2.56	2.41
	(2.01)	(0.56)	(0.55)	(4.03)	(0.57)	(0.62)	(2.24)	(0.68)
Health inspection score, scope-severity weighted	18.9	15.6	27.7	11.5	28.1	18.2	16.3	15.2
	(19.1)	(14.2)	(58.6)	(12.5)	(95.7)	(15.4)	(18.7)	(23.7)
Health inspection score for quality of care deficiency citations, scope-severity weighted	3.5	2.9	7.5	2.4	6.9	3.3	2.7	4.1
	(5.0)	(3.3)	(19.9)	(4.1)	(26.3)	(4.7)	(4.0)	(9.3)
Health inspection score for quality of life deficiency citations, scope-severity weighted	3.9	2.4	2.5	1.7	4.3	1.8	2.7	1.7
	(5.9)	(4.0)	(3.7)	(4.5)	(13.7)	(3.9)	(5.4)	(4.0)
Percentage with any severe (Grade G+) deficiency	0.0	0.0	3.3	0.0	3.3	3.3	0.0	5.0
N (Facilities)	30	30	30	30	60	60	60	60

NOTES: Numbers in parentheses are standard deviations for continuous variables.

ECCP = Enhanced Care and Coordination Providers; RN = Registered Nurse; LPN = Licensed Practical Nurse; CNA = Certified Nurse Aide.

[a] The sudden hike in average staffing HPRD appears to be caused by one outlier, Rivington House. The resident census in this facility dropped abruptly from 163 in 2013 to just 2 residents in 2014 before the facility eventually closed in November 2014. Meanwhile, the facility still maintain 7.5 FTE RNs (down from 17 in 2013), 6 FTE LPNs (down from 15 in 2013), and 13 FTE CNAs (down from 59 in 2013). The substantial staff still available for just two residents translated into improbably high staffing levels in this facility right before its closure. This resulted in the substantial increase in ECCP-wide facility average staffing HPRD in 2014.

SOURCE: RTI analysis of CASPER data (RTI program: nhpah186b).

Table 2-38
Facility-level staffing and quality indicators: Means (standard deviations) or percentages, Pennsylvania

Characteristic	ECCP				Comparison			
	2011	2012	2013	2014	2011	2012	2013	2014
Total RN hours per resident day	0.42	0.44	0.47	0.44	0.43	0.43	0.46	0.48
	(0.13)	(0.11)	(0.15)	(0.19)	(0.19)	(0.18)	(0.21)	(0.22)
Total LPN hours per resident day	0.91	0.82	1.02	0.76	0.87	0.83	0.88	0.87
	(0.34)	(0.26)	(1.16)	(0.23)	(0.20)	(0.18)	(0.25)	(0.23)
Total CNA hours per resident day	1.89	1.98	2.07	1.82	2.10	2.13	2.16	2.18
	(0.89)	(0.57)	(0.29)	(0.65)	(0.58)	(0.53)	(0.40)	(0.48)
Health inspection score, scope-severity weighted	20.8	24.2	20.6	42.5	23.7	24.6	24.4	28.4
	(17.9)	(17.4)	(18.0)	(40.9)	(18.7)	(23.4)	(20.4)	(25.6)
Health inspection score for quality of care deficiency citations, scope-severity weighted	5.9	5.5	4.6	12.2	8.5	6.9	7.5	10.5
	(6.8)	(6.1)	(5.9)	(11.0)	(9.5)	(9.1)	(8.1)	(16.9)
Health inspection score for quality of life deficiency citations, scope-severity weighted	2.3	0.8	2.9	3.4	2.6	2.0	2.7	2.3
	(3.8)	(2.1)	(3.7)	(4.5)	(4.0)	(4.0)	(4.7)	(4.1)
Percentage with any severe (Grade G+) deficiency	5.3	0.0	0.0	5.3	13.2	5.3	0.0	5.3
N (Facilities)	19	19	19	19	38	38	38	38

NOTES: Numbers in parentheses are standard deviations for continuous variables.

ECCP = Enhanced Care and Coordination Providers; RN = Registered Nurse; LPN = Licensed Practical Nurse; CNA = Certified Nurse Aide.

SOURCE: RTI analysis of CASPER data (RTI program: nhpah186b).

2.11 Multivariate Regression Results

In determining the effects of the Initiative we analyzed the data for each ECCP implementation separately. Although there are commonalities in the interventions, major differences exist. There are also differences in the regulatory environment and utilization patterns in the states that make pooling undesirable. In this section, for each state, we describe the multivariate analysis results on key utilization, spending, and MDS-based quality outcomes. In multivariate regression analyses, we are primarily interested in estimating the effect of an ECCP intervention on a given outcome for residents in intervention facilities, relative to the outcome for residents in comparison facilities during an Initiative year accounting for Base Year differences. Statistical estimation of the strength of the effects of the predictors are made using a set of observations that characterize each resident in the study. Some of the predictors are risk adjusters, such as medical conditions of the residents and some facility characteristics. Other predictor variables account for the year of the observation, whether the resident is in one of the ECCP facilities and whether the observation is for a resident who is in an ECCP facility in an Initiative year. This last variable captures the ECCP effect of interest: the change in the outcome not shared with the comparisons after accounting for Base Year outcome differences between ECCP facilities and comparisons and for changes that apply to all facilities over time.

The evaluation assessed differences between each ECCP and their matched comparison group on selected Medicare utilization, expenditure, and MDS-based quality outcomes in an Initiative year relative to the Base Year 2012. In this report, we focus on the effect of ECCP intervention in 2014, the first year during which the Initiative was mostly, if not fully, implemented in all seven ECCP participating states, as compared to 2012. We report marginal effect estimates in meaningful units instead of raw regression coefficients. The term "statistically significant," where cited in the summary, refers to a p value of 0.10 or lower (better) for an estimated effect. This p value means a 10 percent probability of observing an estimate of at least that magnitude by chance. When many estimates are generated and tested, the probability of observing some estimates this large by chance is greater than 10 percent.

A detailed description of the findings for the Initiative in each state is provided below. Within each state, results are presented and summarized for outcomes in the following order: utilization probabilities, utilization counts, Medicare expenditures, and MDS-based quality outcomes. In each table, effect estimates that are statistically significant ($p < 0.10$) are bolded. Effect estimates with a negative sign signal reductions, which are desired for the outcomes measured in this analysis. The estimates reported are the intervention effects in 2014 using 2012 as the Base Year.

Although the primary qualitative findings for this report include updates from Project Year 3 (presented in Section 3), the multivariate quantitative results concern the intervention effects in 2014. Thus, some contextual information from the qualitative findings in Project Year 2, or 2014, are also included before each state's quantitative results.

Following the state-by-state narrative of main analysis results in Section 2.11.1 through Section 2.11.7, a brief discussion of results from subpopulation analyses is given in Section 2.11.8. We conclude the entire section by a brief summary and discussion of major quantitative analysis findings regarding the impact of ECCP intervention thus far, in Section 2.12.

2.11.1 Summary of Findings: Alabama

The Alabama Quality Assurance Foundation's (AQAF) Nursing Facility Initiative (NFI) is an education-only model in which RNs provide training and support to staff within 23 participating nursing facilities. Primary components include INTERACT tools, morning huddles, medication management, advance care planning, consistent staffing, and quality assurance and performance improvement (QAPI). Through 2014 staff turnover among the AQAF RNs persisted, and a floating RN position was created to serve as a temporary substitute to ensure continuation of the NFI goals in facilities experiencing AQAF RN turnover. RNs continued to focus primarily on building relationships and trust with facility staff and leadership, which was said to be a critical first step in rolling out various components of the Initiative. Because relationship development and trust-building took several months, many of the components of the NFI had not been rolled out as of 2014. Most facilities had introduced INTERACT and medication management, but use of these tools varied widely across facilities. Newer components (e.g., morning huddles, advance care planning, consistent staffing, and quality improvement/QAPI) were still in the early stages of implementation, not yet widespread across facilities. Both AQAF NFI leadership and facility staff indicated that the model remains promising toward the goal of reducing avoidable hospitalizations, but because roll-out was slower than planned, additional time would be needed to see significant changes in hospitalization rates.

In Alabama, the multivariate regression estimates of the effect of the ECCP intervention on the probability of having a given type of utilization outcome in 2014 are summarized in ***Table 2-39***. There are negative signs on the intervention effects for all the outcomes. This suggests that the ECCP intervention worked in the desired direction of reducing utilization. However, the effect size is small, and not statistically significant (at the 0.10 significance level), for all-cause or potentially avoidable hospitalizations. The effect is moderate and statistically significant for all-cause and potentially avoidable ED visits. Specifically, the ECCP intervention is associated with 3.5 percentage points ($p = 0.025$) lower probability of having any ED visit, on average, which represent a 13.8 percent reduction in the overall percentage of residents who had any ED visits in 2012; it is associated with 1.8 percentage points ($p = 0.046$) lower probability of having any potentially avoidable ED visit, or an 18.8 percent reduction from the overall probability in 2012.

Table 2-39
Effect of ECCP intervention on probability of any utilization outcome: Multivariate regression results, 2011-2014, Alabama

Probability of having at least one:	Mean, 2012 (percent)	Effect (percentage points)	*p*-value	Effect (% of mean)
All-cause hospitalization	33.4	-1.2	0.373	-3.6%
Potentially avoidable hospitalization	17.3	-1.0	0.322	-5.8%
All-cause ED visit	**25.4**	**-3.5**	**0.025**	**-13.8%**
Potentially avoidable ED visit	**9.6**	**-1.8**	**0.046**	**-18.8%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah192).

The effect patterns are similar for the utilization count outcomes, as summarized in ***Table 2-40***. (The mean count of events per person is less than one.)The ECCP intervention was associated with 0.077 fewer all-cause ED visits per resident ($p = 0.008$), on average, or a 20.1 percent reduction from the average count per resident in 2012, which was 0.384. For the count of potentially avoidable ED visits, the ECCP intervention resulted in 0.027 fewer visits per resident ($p = 0.018$), on average, or a 24.1 percent decrease from the average count per resident in 2012, which was 0.111. There is no significant effect of ECCP intervention on the count of all-cause hospitalizations or potentially avoidable hospitalizations.

Table 2-40
Effect of ECCP intervention on count of utilization outcomes: Multivariate regression results, 2011-2014, Alabama

Count of events per resident	Mean, 2012	Effect	*p*-value	Effect (% of mean)
All-cause hospitalizations	0.519	-0.023	0.414	-4.4%
Potentially avoidable hospitalizations	0.222	-0.012	0.450	-5.4%
All-cause ED visits	**0.384**	**-0.077**	**0.008**	**-20.1%**
Potentially avoidable ED visits	**0.111**	**-0.027**	**0.018**	**-24.1%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah193).

The results for the estimated effect of ECCP intervention on Medicare expenditures are reported in ***Table 2-41***. The estimate has a negative sign, meaning a reduction in spending, for five of the seven types of expenditures, including total Medicare spending and expenditures for all-cause hospitalizations, potentially avoidable hospitalizations, all-cause ED visits, and potentially avoidable ED visits. It has a positive sign, suggesting an increase in spending, for expenditures on physician services and SNF services. However, the effect is statistically significant only for the expenditure for all-cause ED visits, where the ECCP intervention was associated with an estimated $29 ($p = 0.027$) lower spending per resident in 2014, on average, which amounts to a 18.5 percent reduction from the average expenditure of $155 for all-cause ED visits in 2012.

Table 2-41
Effect of ECCP intervention on expenditure outcomes: Multivariate regression results, 2011-2014, Alabama

Medicare expenditure	Mean, 2012 ($)	Effect ($)	95% CI		*p*-value	Effect (% of mean)
Total	19,825	-107	-1,823	1,610	0.903	-0.5%
All-cause hospitalizations	4,274	-82	-620	456	0.766	-1.9%
Potentially avoidable hospitalizations	1,559	-128	-354	99	0.269	-8.2%
All-cause ED visits	**155**	**-29**	**-54**	**-3**	**0.027**	**-18.5%**
Potentially avoidable ED visits	49	-7	-19	6	0.312	-13.4%
Physician services	1,188	87	-43	218	0.190	7.4%
SNF services	6,212	10	-1,033	1,052	0.986	0.2%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect ($) is the marginal effect of the intervention in 2014.

ECCP = Enhanced Care and Coordination Provider; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program nb24_new/coeff_table_nb24 and coeff_table_nb24_mcare).

Overall, these results suggest a slight reduction in utilization and expenditures in Alabama from 2012 to 2014 attributable to the ECCP intervention, although the effect estimates are not consistently statistically significant. In particular, there is no evidence of a significant ECCP impact on reducing hospitalizations or expenditures associated with hospitalizations, which are among the major drivers for Medicare spending among nursing facility residents.

Table 2-42 summarizes the effect of the ECCP intervention on MDS-based quality outcomes in Alabama. The intervention demonstrates no definitive effect, with signs of the intervention effect indicating both improvement and worsening of quality; only one measure is statistically significant at a 0.1 level of confidence.

The estimated effect on one or more falls with injury has a negative sign, indicating that the ECCP intervention was associated with a reduction of 1.9 percentage points ($p = 0.023$) in the percent of average observed quarters per resident with such falls. This percentage point reduction corresponds to a reduction of 17.0 percent of the mean rate in 2012, which was 11.0 percent.

With no systematic effect observed at this point, we consider the effect of the ECCP intervention on these MDS-based quality measures ambiguous in direction and too small to be measured at this stage.

Table 2-42
Effect of ECCP intervention on MDS-based quality outcomes (percent of observed quarters per resident with event): Multivariate regression results, 2011-2014, Alabama

MDS-based quality outcomes	Mean, 2012 (percent)	Effect (percentage points)	95% CI		*p*-value	Effect (% of mean)
One or more falls with injury	**11.0**	**-1.9**	**-3.5**	**-0.3**	**0.023**	**-17.0%**
Self-report moderate to severe pain	7.5	1.9	-2.0	5.8	0.350	24.9%
Urinary tract infection	5.6	-0.3	-1.7	1.2	0.735	-4.5%
Decline in ADLs	13.8	0.4	-1.8	2.6	0.720	2.9%
Depressive symptoms	2.4	0.0	-1.6	1.7	0.964	1.6%
Antipsychotic medication use	29.4	-0.7	-4.0	2.7	0.698	-2.2%
Pressure ulcers Stage II or higher	4.2	0.1	-1.0	1.2	0.850	2.6%
Catheter inserted and left in bladder	4.8	-0.5	-1.4	0.4	0.302	-10.0%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ADL = Activities of Daily Living; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of MDS assessments data (RTI program nb24_new/coeff_table_nb24).

2.11.2 Summary of Findings: Indiana

Indiana University (IU) Geriatrics Department's Optimizing Patient Transfers, Impacting Medical Quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC) design remained largely unchanged in 2014, operating in 19 facilities. The project places highly trained RNs in each facility to provide direct clinical support, education, and training to nursing facility staff. Seven OPTIMISTIC NPs support the OPTIMISTIC RN and provide evaluation and care needs. The degree of implementation of the model in facilities was impacted by a range of issues. A lack of clarity regarding the role of OPTIMISTIC staff in the facilities impacted the degree of acceptance and integration into facility life. A coaching model was established to assist the OPTIMISTIC RNs in addressing implementation challenges, including those that were facility specific. Nursing facility staff turnover, although anticipated, proved to be a formidable challenge requiring continual rebuilding of relationships and re-education of front-line staff. The rollout and facility acceptance of tools such as the Stop and Watch, SBAR (Situation, Background, Assessment, and Recommendation), and Care Paths varied across facilities. This was complicated by facility concerns regarding the time required to train/re-train facility staff in OPTIMISTIC's suite of tools, dementia issues, and other clinical and end-of-life issues. This concern resulted in modifications to OPTIMISTIC training efforts. Transition visits accounted for a large portion of the ECCP NPs' time, and as a result, the number of Collaborative Care Reviews completed went from an expected two per week to one per week. Some of the primary care physicians required the ECCP NPs to contact them before writing orders, presenting a barrier to use and efficiency of NP time. Lastly, data collection challenges, including timely identification and correction of data entry errors, resulted in increased utilization of OPTIMISTIC staff time that otherwise could have been devoted to other OPTIMISTIC model components.

The Indiana ECCP was associated with reductions in almost all utilization and expenditure outcomes measured, although most of the effects were not statistically significant. ECCP-associated reductions in the probability and count of potentially avoidable hospitalizations, the count of and level of expenditure on all-cause hospitalizations, and expenditure on all-cause ED visits were statistically significant.

Regression estimates of the effect of the Indiana ECCP intervention on the probability of experiencing a given type of hospital utilization event in 2014 are listed in ***Table 2-43***. The marginal effects on all-cause hospitalizations, potentially avoidable hospitalizations, and all-cause ED visits are negative, suggesting the intervention was associated with a reduction in the probability of experiencing at least one of those types of events, while the marginal effect on potentially avoidable ED visits was positive. However, the only marginal effect that was statistically significant from zero was that on potentially avoidable hospitalizations ($p < 0.01$). The intervention was associated with a 3.4 percentage point drop in the probability of being hospitalized with a potentially avoidable condition, a 24.8 percent decrease from the probability in 2012 of such a hospitalization. The estimated reductions in the probability of all-cause hospitalizations and all-cause ED visits were not statistically significant. The intervention was associated was an increase in potentially avoidable ED visits, but the effect is not statistically significant.

Table 2-43
Effect of ECCP intervention on probability of any utilization outcome: Multivariate regression results, 2011-2014, Indiana

Probability of having at least one:	Mean, 2012 (percent)	Effect (percentage points)	*p*-value	Effect (% of mean)
All-cause hospitalization	28.1	-4.6	0.373	-16.4%
Potentially avoidable hospitalization	**13.7**	**-3.4**	**0.007**	**-24.8%**
All-cause ED visit	22.1	-1.4	0.575	-6.3%
Potentially avoidable ED visit	7.6	0.4	0.805	5.3%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah192).

The ECCP was associated with decreases in the numbers of all types of utilization in 2014, although only the effects on hospitalizations (all-cause and potentially avoidable) were statistically significant (***Table 2-44***). The intervention was associated with 0.092 fewer hospitalizations per resident and 0.051 fewer potentially avoidable hospitalizations per resident, a 21.2 percent and 29.3 percent reduction from the 2012 rates, respectively (p-values < 0.10). There were reductions on all-cause ED visits and potentially avoidable ED visits, but they were not statistically significant.

Evidence of an intervention effect on the number of hospitalizations but not the probability of hospitalization would be consistent with an intervention that has a more pronounced effect on sicker residents than on healthier residents. Sicker patients experiencing

many hospitalizations would have fewer hospitalizations with the intervention than without, but they would likely not stop being hospitalized altogether. Thus, the intervention would have an effect on the hospitalization count but not probability. By contract, an intervention with an effect on healthier residents who only experience, say, one hospitalization might reduce a resident's hospitalizations from one to zero, thus changing the probability of hospitalization.

The only statistically significant effects on expenditures were for all-cause hospitalizations and ED visits, although almost all effects were estimated to be reductions in expenditures (***Table 2-45***). The intervention was associated with a decrease of $1,368 on all-cause hospitalizations (an 18.9 percent reduction from 2012 expenditures, $p < 0.05$) and $46 on all-case ED visits (a 30.9 percent reduction, $p < 0.01$). The ECCP was also associated with reductions in total Medicare expenditures as well as expenditures on potentially avoidable hospitalizations, potentially avoidable ED visits, and physician services, but they were not statistically significant.

Table 2-44
Effect of ECCP intervention on count of utilization outcomes: Multivariate regression results, 2011-2014, Indiana

Count of events per resident	Mean, 2012	Effect	*p*-value	Effect (% of mean)
All-cause hospitalizations	**0.433**	**-0.092**	**0.004**	**-21.2%**
Potentially avoidable hospitalizations	**0.174**	**-0.051**	**0.001**	**-29.3%**
All-cause ED visits	0.318	-0.037	0.441	-11.6%
Potentially avoidable ED visits	0.086	-0.001	0.960	-1.2%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah193).

Table 2-45
Effect of ECCP intervention on expenditure outcomes: Multivariate regression results, 2011-2014, Indiana

Medicare expenditure	Mean, 2012 ($)	Effect ($)	95% CI		*p*-value	Effect (% of mean)
Total	22,115	-1,368	-3,001	265	0.101	-6.2%
All-cause hospitalizations	**4,171**	**-788**	**-1,509**	**-67**	**0.032**	**-18.9%**
Potentially avoidable hospitalizations	1,420	-236	-560	88	0.154	-16.6%
All-cause ED visits	**149**	**-46**	**-81**	**-11**	**0.009**	**-30.9%**
Potentially avoidable ED visits	42	-11	-28	5	0.178	-26.8%
Physician services	1,149	-101	-287	85	0.286	-8.8%
SNF services	8,116	60	-1,099	1,220	0.919	0.7%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect ($) is the marginal effect of the intervention in 2014.

ECCP = Enhanced Care and Coordination Provider; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program nb24_new/coeff_table_nb24 and coeff_table_nb24_mcare).

Table 2-46 summarizes the effect of the ECCP intervention on MDS-based quality outcomes in Indiana, indicating no definitive effect. The direction of estimated effect signs were both positive and negative, indicating both worsening and improvement of quality. Only one measure had a statistically significant adverse effect.

The estimated effect on pressure ulcers Stage II or higher was associated with an increase of 1.8 percentage points ($p = 0.018$) in the average percent of observed quarters per resident with those pressure ulcers. This corresponds to an increase of 33.5 percent of the mean rate in 2012, which was 5.5 percent.

Given the lack of a systematic pattern, we cannot attribute this observed effect to the ECCP intervention.

Table 2-46
Effect of ECCP intervention on MDS-based quality outcomes (percent of observed quarters per resident with event): Multivariate regression results, 2011-2014, Indiana

MDS-based quality outcomes	Mean, 2012 (percent)	Effect (percentage points)	95% CI		*p*-value	Effect (% of mean)
One or more falls with injury	12.5	-0.4	-3.0	2.2	0.755	-3.4%
Self-report moderate to severe pain	9.4	-0.5	-3.7	2.7	0.773	-5.0%
Urinary tract infection	5.7	0.5	-2.1	3.0	0.729	8.1%
Decline in ADLs	18.2	1.0	-2.7	4.6	0.605	5.3%
Depressive symptoms	5.2	1.5	-4.2	7.1	0.611	28.1%
Antipsychotic medication use	23.1	-1.8	-4.8	1.2	0.232	-7.8%
Pressure ulcers Stage II or higher	**5.5**	**1.8**	**0.3**	**3.4**	**0.018**	**33.5%**
Catheter inserted and left in bladder	6.5	1.3	-0.6	3.1	0.180	19.5%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ADL = Activities of Daily Living; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of MDS assessments data (RTI program nb24_new/coeff_table_nb24).

2.11.3 Summary of Findings: Missouri

In 2014, all 16 of the Missouri Quality Initiative facilities remained in the Initiative. Project staff stabilized early in Project Year 2. A FTE Database Coordinator was added to assist facility staff and Missouri Quality Initiative for Nursing Homes (MOQI) Advanced Practice Registered Nurses (APRNs) in data collection and report generation. The ECCP maintained overall fidelity to the model with some modifications and intensified efforts in the APRN, quality improvement, advance directives, and health information technology (HIT) components. Staff at nearly all of the facilities reported anecdotal evidence that the MOQI is reducing some of their hospitalizations. The use of INTERACT, particularly Stop and Watch and SBAR became routine in some facilities. APRNs identified goals for educating staff on clinical preventive measures (hydration, urinary continence, and mobility) to reduce risks for hospitalization and increased focus on advance directives. In addition, APRNs increased focus on root cause

analysis and met monthly with the Project Coordinator to review each facility transfer. The APRNs created customized reports on transfers in the project's Qualtrics database and used the information to target education and work with facility quality improvement committees. Family and physician demands for hospital transfers remained a major barrier to reducing hospitalizations in many nursing facilities. A new Health Insurance Portability and Accountability Act–related requirement contributed to delays in the HIT component. Data available from the MOQI reports and interviews indicated that the Initiative components are slowly gaining a foothold in most of the facilities despite HIT challenges and facility and APRN turnover.

In Missouri, the multivariate regression estimates of the effect of the ECCP intervention on the probability of having a given type of utilization outcome in 2014 are summarized in ***Table 2-47***. There are negative signs on the intervention effects for all four of the outcomes. This suggests that the ECCP intervention worked in the desired direction of reducing utilization of hospitalizations and ED visits. The effect size is moderate to large and statistically significant (at the 0.02 significance level or better), for all-cause and potentially avoidable hospitalizations and ED visits. Specifically, the ECCP intervention was associated with a 5.9 percentage point decrease (p=0.001) in the probability of having an all-cause hospitalization, on average, which represents an 18.6 percent reduction in the overall percentage of residents who had a hospitalization in 2012; it was also associated with a reduced probability of having a potentially avoidable hospitalization of a nearly equal amount, 5.5 percentage points ($p = 0.002$), or a 33.3 percent reduction from the overall probability in 2012. The ECCP intervention was associated with decreased probability of having any ED visit of 5 percentage points ($p = 0.009$), on average, which represents a 20.5 percent reduction in the overall percentage of residents who had any ED visits in 2012; it was further associated with a 3.3 percentage point ($p = 0.046$) reduction in the probability of having any potentially avoidable ED visit, on average, or a 35.9 percent reduction from the overall probability in 2012.

It may be noted that in Missouri, the admission rates and spending on hospitalizations in the ECCP group were noticeably higher in the base period than in the comparison group. The comparison group was matched on facility characteristics, not outcomes. However, the selection criteria for ECCP participants in Missouri were based on poor performance on such outcomes, according to MOQI. If so, it is possible that an intervention could reduce a large performance gap significantly, while the effects of the intervention on groups that were less extreme might be harder to discern.

Table 2-47
Effect of ECCP intervention on probability of any utilization outcome: Multivariate regression results, 2011-2014, Missouri

Probability of having at least one:	Mean, 2012 (percent)	Effect (percentage points)	*p*-value	Effect (% of mean)
All-cause hospitalization	**31.7**	**-5.9**	**0.001**	**-18.6%**
Potentially avoidable hospitalization	**16.5**	**-5.5**	**0.002**	**-33.3%**
All-cause ED visit	**24.4**	**-5.0**	**0.009**	**-20.5%**
Potentially avoidable ED visit	**9.2**	**-3.3**	**0.017**	**-35.9%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah192).

The effect patterns are similar for the utilization count outcomes, as summarized in ***Table 2-48***. The effect size was similar to that seen for expenditures and significant for each outcome. The ECCP intervention was associated with a decrease in the count of all-cause hospitalizations by 0.105 per resident ($p = 0.001$), on average, or a 21.4 percent reduction from the average count per resident in 2012, which was 0.491. For the count of potentially avoidable hospitalizations, the ECCP intervention correlated with 0.071 fewer visits per resident ($p = 0.001$), on average, or a 34.5 percent decrease from the average count per resident in 2012, which was 0.206.

The ECCP intervention was also associated with a decrease in the count of all-cause ED visits by 0.098 per resident ($p = 0.001$), on average, or a 27.9 percent reduction from the average count per resident in 2012, which was 0.351. For the count of potentially avoidable ED visits, the ECCP intervention correlated with 0.041 fewer visits per resident ($p = 0.005$), on average, or a 39.1 percent decrease from the average count per resident in 2012, which was 0.105.

Table 2-48
Effect of ECCP intervention on count of utilization outcomes: Multivariate regression results, 2011-2014, Missouri

Count of events per resident	Mean, 2012	Effect	*p*-value	Effect (% of mean)
All-cause hospitalizations	**0.491**	**-0.105**	**0.001**	**-21.4%**
Potentially avoidable hospitalizations	**0.206**	**-0.071**	**0.001**	**-34.5%**
All-cause ED visits	**0.351**	**-0.098**	**0.001**	**-27.9%**
Potentially avoidable ED visits	**0.105**	**-0.041**	**0.005**	**-39.0%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah193).

The results for the estimated effect of ECCP intervention on Medicare expenditures are reported in ***Table 2-49***. The estimates each have a negative sign, meaning a reduction in spending, for all seven types of expenditures. The effect is not statistically significant for total expenditures or for physician and SNF services. It is significant for the other four types of expenditures. The ECCP intervention was associated with decreased spending on all-cause hospitalizations by an estimated $729 ($p = 0.019$) per resident in 2014, on average, which amounts to a reduction of about 16.2 percent from the average expenditure of $4,503 in 2012. The effect on potentially avoidable hospitalizations was smaller in magnitude at $456 (p=0.010) per resident in 2014, on average, or about 28.8 percent less than the average expenditure of $1,587 in 2012. The ECCP intervention similarly was associated with reduced expenditures on all-cause and potentially avoidable ED visits. Expenditures on all-cause ED visits were about 30.6 percent or $53 (p=0.002) lower, on average, in 2014 than the average of $173 in 2012 while expenditures on potentially avoidable ED visits were about 28.0 percent or $15 (p=0.002) lower, on average, in 2014 than the average of $55 in 2012. It is interesting that the total Medicare expenditures were so weakly reduced while some components were significantly reduced. This is partly because of the increases in physician and SNF and there may have been increases in components of Medicare spending that are not in the sentinel group tracked here.

Overall, these results suggest reduced utilization and expenditures in Missouri from 2012 to 2014 are associated with the ECCP intervention. The effect estimates are mostly statistically significant, specifically for all measures of hospitalizations and ED visits, which are among the major drivers for Medicare spending among nursing facility residents.

Table 2-49
Effect of ECCP intervention on expenditure outcomes: Multivariate regression results, 2011-2014, Missouri

Medicare expenditure	Mean, 2012 ($)	Effect ($)	95% CI		*p*-value	Effect (% of mean)
Total	20,345	-92	-2,098	1,914	0.928	-0.5%
All-cause hospitalizations	**4,503**	**-729**	**-1,340**	**-118**	**0.019**	**-16.2%**
Potentially avoidable hospitalizations	**1,587**	**-456**	**-805**	**-108**	**0.010**	**-28.8%**
All-cause ED visits	**173**	**-53**	**-86**	**-20**	**0.002**	**-30.6%**
Potentially avoidable ED visits	**55**	**-15**	**-33**	**2**	**0.080**	**-28.0%**
Physician services	1,213	6	-150	162	0.943	0.5%
SNF services	5,348	136	-978	1,250	0.811	2.5%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect ($) is the marginal effect of the intervention in 2014.

ECCP = Enhanced Care and Coordination Provider; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program nb24_new/coeff_table_nb24 and coeff_table_nb24_mcare).

Table 2-50 summarizes the effect of the ECCP intervention on MDS-based quality outcomes in Missouri, for which we observed no overall pattern. As with other states, the estimated effects in Missouri indicated both improvement and worsening of quality.

The only significant estimated effect was on catheter inserted and left in bladder, which indicated that the ECCP intervention was associated with an increase of 1.3 percentage points ($p = 0.091$) in the average percent of observed quarters per resident with a catheter, an adverse outcome. This percentage point increase corresponds to an increase of 23.5 percent of the 2012 mean rate, which was 5.4 percent.

As only one MDS-based quality outcome had a statistically significant estimated effect at a 0.10 significance level, it cannot be definitively attributed to the ECCP intervention.

Table 2-50
Effect of ECCP intervention on MDS-based quality outcomes (percent of observed quarters per resident with event): Multivariate regression results, 2011-2014, Missouri

MDS-based quality outcomes	Mean, 2012 (percent)	Effect (percentage points)	95% CI		*p*-value	Effect (% of mean)
One or more falls with injury	15.8	-1.8	-5.8	2.2	0.375	-11.3%
Self-report moderate to severe pain	12.8	-0.1	-3.2	3.1	0.974	-0.4%
Urinary tract infection	9.2	2.3	-0.9	5.5	0.164	24.7%
Decline in ADLs	14.4	2.3	-2.7	7.3	0.365	16.1%
Depressive symptoms	5.8	2.2	-2.5	6.9	0.365	37.4%
Antipsychotic medication use	26.2	-2.4	-6.0	1.3	0.201	-9.0%
Pressure ulcers Stage II or higher	5.0	-1.1	-2.6	0.5	0.177	-21.2%
Catheter inserted and left in bladder	**5.4**	**1.3**	**-0.2**	**2.7**	**0.091**	**23.5%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ADL = Activities of Daily Living; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of MDS assessments data (RTI program nb24_new/coeff_table_nb24).

2.11.4 Summary of Findings: Nebraska

The Alegent ECCP placed six NPs in 15 nursing facilities in 2014, although one facility left the Initiative in September. This ECCP has four major components: integration of NPs into participating facilities, dental hygiene, improved communication, and education. In 2014, the ECCP continued to expand each of these interventions, although their primary focus was on placing NPs in participating facilities and empowering those NPs to act in the best interest of residents. Although ECCP NPs provided informal mentorship to facility staff, the ECCP did not roll out the first in-service on INTERACT communication tools until May and June 2014. Additionally, facility staff still were largely unaware of the ECCP's 24-hour call service. Consequently, the ECCP NPs attended to emergent conditions only when they were in the facility; residents' primary care physicians still sent their patients to the emergency room when emergent conditions arose at other times. However, 2014 was a year in which the ECCP made significant strides in gaining the trust and support of these physicians. Compared with the first year, physicians increasingly allowed the ECCP NP to write orders for their patients who were enrolled in the Initiative. Finally, the ECCP increased the hours of supporting clinical staff in 2014. They hired a second dental hygienist, which allowed them to assess all enrolled residents

every 6 months and conduct cleanings on those residents with teeth. They also increased the hours of the consulting pharmacist from 10 to 16 hours per week, a reflection on the ECCP's focus reducing polypharmacy and decreasing the use of unnecessary psychotropic medications.

The multivariate regression estimates of the effect of Nebraska's ECCP on the probability of having a given type of utilization outcome in 2014 are summarized in ***Table 2-51***. Our findings indicate that the ECCP intervention had no effect on the probability of having a given type of utilization outcome that was statistically significantly different from zero (at the 0.10 significance level) in 2014. Despite the lack of statistical significance, we provide comment on the directionality of these effects. As illustrated in ***Table 2-51***, the effect estimates for both all-cause and potentially avoidable hospitalizations have negative signs. This suggests that the ECCP intervention may have worked in the desired direction for those two utilization outcomes, reducing utilization. In contrast, the effect estimates had positive signs for both the probability of having an all-cause ED visit and having a potentially avoidable ED visit, indicating that being in the ECCP intervention may have caused increased utilization.

Table 2-51
Effect of ECCP intervention on probability of any utilization outcome: Multivariate regression results, 2011-2014, Nebraska

Probability of having at least one:	Mean, 2012 (percent)	Effect (percentage points)	p-value	Effect (% of mean)
All-cause hospitalization	28.5	-2.6	0.203	-9.1%
Potentially avoidable hospitalization	15.2	-2.7	0.227	-17.8%
All-cause ED visit	24.8	1.3	0.570	5.2%
Potentially avoidable ED visit	8.7	0.5	0.735	5.7%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah192).

The effect patterns are similar for the utilization count outcomes, as summarized in ***Table 2-52***. Here again, the effect of the ECCP intervention is in the desired direction for both all-cause and potentially avoidable hospitalizations and in the undesirable direction for both all-cause and potentially avoidable ED visits. There is no statistically significant effect of Nebraska's ECCP intervention on the count per resident of all-cause hospitalizations, potentially avoidable hospitalizations, all-cause ED visits, or potentially avoidable ED visits.

Table 2-52
Effect of ECCP intervention on count of utilization outcomes: Multivariate regression results, 2011-2014, Nebraska

Count of events per resident	Mean, 2012	Effect	*p*-value	Effect (% of mean)
All-cause hospitalizations	0.428	-0.046	0.253	-10.7%
Potentially avoidable hospitalizations	0.189	-0.036	0.241	-19.0%
All-cause ED visits	0.366	0.029	0.445	7.9%
Potentially avoidable ED visits	0.099	0.010	0.556	10.1%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah193).

The results for the estimated effect of ECCP intervention on Medicare expenditures are reported in ***Table 2-53***. The effect estimates for both all-cause ED visits and potentially avoidable ED visits were in the undesirable direction; however, these estimates were not statistically significant. The effect estimates for the remaining five of the seven types of expenditures, however, were in the desired direction. These five types of expenditure outcomes include total Medicare spending and expenditures for all-cause hospitalizations, potentially avoidable hospitalizations, physician services, and SNF services. Two of these expenditure outcomes, all-cause hospitalizations and potentially avoidable hospitalizations, were statistically significant. In 2014, the ECCP intervention reduced spending on all-cause hospitalizations by an estimated $971 per resident ($p = 0.007$), which amounts to a reduction of about 24.5 percent from the average expenditure for all-cause hospitalizations in 2012 ($3,972). Similarly, for potentially avoidable hospitalizations, the ECCP intervention reduced an estimated 33.9 percent or $477 per resident from the average expenditure per resident in 2012, $1,404 ($p = 0.020$). In this case the estimates of weak improvements in probabilities and counts of hospitalizations are associated with a stronger drop in spending for the remaining hospitalizations. It is possible that the diagnosis-related groups coded on the remaining admissions are less expensive to Medicare.

Table 2-53
Effect of ECCP intervention on expenditure outcomes: Multivariate regression results, 2011-2014, Nebraska

Medicare expenditure	Mean, 2012 ($)	Effect ($)	95% CI		*p*-value	Effect (% of mean)
Total	18,640	-1,475	-4,051	1,101	0.262	-7.9%
All-cause hospitalizations	**3,972**	**-971**	**-1,679**	**-263**	**0.007**	**-24.5%**
Potentially avoidable hospitalizations	**1,404**	**-477**	**-879**	**-74**	**0.020**	**-33.9%**
All-cause ED visits	199	54	-23	131	0.173	26.9%
Potentially avoidable ED visits	63	16	-20	51	0.380	25.0%
Physician services	1,059	-30	-155	95	0.637	-2.8%
SNF services	5,227	-247	-1,293	798	0.643	-4.7%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect ($) is the marginal effect of the intervention in 2014.

ECCP = Enhanced Care and Coordination Provider; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program nb24_new/coeff_table_nb24 and coeff_table_nb24_mcare).

Overall, despite a lack of statistical significance in all utilization outcomes, the negative effect estimates coupled with the statistically significant reductions in expenditures for both all-cause and potentially avoidable hospitalizations indicate that there may be some reduced utilization and expenditure for those two variables associated with the ECCP in Nebraska from 2012 to 2014. In contrast, the effects of the intervention on both all-cause and potentially avoidable ED visits, although not statistically significant, indicated that the ECCP intervention may have resulted in increased spending and utilization on those services. We will continue to monitor these patterns in the remaining years of the Initiative.

Table 2-54 reports the effect of the ECCP intervention on MDS-based quality outcomes in Nebraska, and suggests no overall meaningful effect on quality. The mixture of positive and negative signs of the estimated effect indicated both quality decline and improvement.

The only statistically significant effect had a positive sign, indicating that the ECCP intervention was associated with an adverse increase of 3.9 percentage points ($p = 0.045$) in the average percent of observed quarters per resident with decline in ADLs. This corresponds to an increase of 23.9 percent of the mean rate in of 2012, which was 16.2 percent.

Given that there were no other significant effects, the ECCP intervention did not demonstrate an overall impact on MDS-based quality outcomes in Nebraska.

Table 2-54
Effect of ECCP intervention on MDS-based quality outcomes (percent of observed quarters per resident with event): Multivariate regression results, 2011-2014, Nebraska

MDS-based quality outcomes	Mean, 2012 (percent)	Effect (percentage points)	95% CI		*p*-value	Effect (% of mean)
One or more falls with injury	13.0	0.9	-3.2	5.0	0.672	6.8%
Self-report moderate to severe pain	15.8	1.8	-3.0	6.6	0.463	11.4%
Urinary tract infection	8.8	-0.6	-3.1	2.0	0.655	-6.6%
Decline in ADLs	**16.2**	**3.9**	**0.1**	**7.6**	**0.045**	**23.9%**
Depressive symptoms	7.7	-0.4	-4.8	3.9	0.843	-5.7%
Antipsychotic medication use	28.9	-3.2	-7.8	1.3	0.165	-11.2%
Pressure ulcers Stage II or higher	4.4	-0.4	-2.0	1.2	0.595	-9.9%
Catheter inserted and left in bladder	10.2	-1.0	-2.8	0.8	0.289	-9.5%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ADL = Activities of Daily Living; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of MDS assessments data (RTI program nb24_new/coeff_table_nb24).

2.11.5 Summary of Findings: Nevada

Nevada's Admissions and Transitions Optimization Program (ATOP) provides clinical support, training, and education to 24 participating facilities. In 2014, ECCP facility-based APRN and RN turnover was approximately 50 percent. Consequently, instead of one APRN or physician assistant and two RNs rotating among four to five nursing facilities in each of five pods (groups of facilities), as was their model, ECCP clinical staff rotated among five to nine facilities. The ECCP continued training and promoting the use of INTERACT tools and focused on the SBAR, Stop and Watch, and quality improvement tools. Adoption varied widely, depending upon support of facility leadership, facility-staff turnover, the facility's own corporate systems, and integration of ECCP clinical staff. In facilities in which they were fully integrated, ECCP staff were involved in quality improvement and QAPI meetings as well as residents' care conferences. To improve trust and integration, ECCP staff offered trainings, tailored to the needs of each facility; for example, skills trainings, such as IV insertion, and condition-specific trainings, such as recognition of dehydration. Other trainings, conducted by the ECCP, were open to both participating and non-participating facilities. The ECCP, which is a QIO, believes in improving quality of care in all facilities in the state and, therefore, invites all facilities to its group trainings. Topics of these include INTERACT tools and the Physician Orders for Life-Sustaining Treatment (POLST). The comparison group is every eligible non-ECCP long-term care nursing facility in the state and has fewer facilities than the ECCP group. There are relatively few facilities in the state. In other states, the comparison group is about twice as large as the ECCP group. This does not preclude finding Initiative effects in Nevada, but the sample difference should be recognized.

The multivariate regression estimates of the effect of Nevada's ECCP on the probability of having a given type of utilization outcome in 2014 are summarized in ***Table 2-55***. Our

findings indicate that in 2014, the ECCP intervention had no effect on the probability of having a given type of utilization outcome that was significantly different from zero (at the 0.10 significance level). Two measures, all-cause hospitalizations and potentially avoidable ED visits, are marginally significant, but the latter is in the undesired direction. Despite the relatively low statistical significance, we provide comment on the directionality of these effects. As illustrated in ***Table 2-55***, the effect estimates for both all-cause and potentially avoidable hospitalizations have negative signs. This suggests that the ECCP intervention may have worked in the desired direction, reducing utilization. In contrast, the effect estimates had positive signs for both all-cause ED visits and having a potentially avoidable ED visit, indicating that being in the ECCP intervention may have caused an increase in these outcomes. It is possible that ED visits with observation days are being used as substitutes for hospital admissions. The numbers for observation stays are too small to be sure. Our primary data collection has not found any evidence for this.

Table 2-55
Effect of ECCP intervention on probability of any utilization outcome: Multivariate regression results, 2011-2014, Nevada

Probability of having at least one:	Mean, 2012 (percent)	Effect (percentage points)	*p*-value	Effect (% of mean)
All-cause hospitalization	29.9	-4.1	0.121	-13.7%
Potentially avoidable hospitalization	13.2	-0.8	0.619	-6.1%
All-cause ED visit	18.0	0.3	0.893	1.7%
Potentially avoidable ED visit	6.2	2.2	0.131	35.5%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah192).

The effect patterns are similar for the utilization count outcomes, as summarized in ***Table 2-56***. However, here we did find effects of the ECCP intervention that were statistically significant in both all-cause hospitalizations and potentially avoidable ED visits. The ECCP intervention was associated with a decrease in the count of all-cause hospitalizations by an average of 0.074 per resident or 17.5 percent from the average count per resident in 2012 (0.423) ($p = 0.100$). For the count of potentially avoidable ED visits, the ECCP intervention was associated with an average *increase* of 0.049 visits per resident, or 70.0 percent from the count per resident in 2012 (0.070) ($p = 0.015$). We note that although the percent increase in count per resident for potentially avoidable ED visits is large, this is related to the relatively low count of ED visits per resident in 2012; a relatively small increase in the number of visits could result in a large percentage increase. No evidence suggests that this increase was the result of substituting ED visits for potentially avoidable hospitalizations because only a small decline in the latter was observed. There is no statistically significant effect of ECCP intervention on the count of potentially avoidable hospitalizations or all-cause ED visits. The opposing effects that are statistically significant do not present a consistent pattern.

Table 2-56
Effect of ECCP intervention on count of utilization outcomes: Multivariate regression results, 2011-2014, Nevada

Count of events per resident	Mean, 2012	Effect	*p*-value	Effect (% of mean)
All-cause hospitalizations	**0.423**	**-0.074**	**0.100**	**-17.5%**
Potentially avoidable hospitalizations	0.155	-0.008	0.691	-5.2%
All-cause ED visits	0.251	0.020	0.610	8.0%
Potentially avoidable ED visits	**0.070**	**0.049**	**0.015**	**70.0%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah193).

The results for the estimated effect of the ECCP on Medicare expenditures are reported in ***Table 2-57***. The estimate of the effect of the intervention has a negative sign, indicating a possible reduction in spending, for five of the seven types of expenditures: total Medicare expenditure, all-cause hospitalizations, potentially avoidable hospitalizations, Physician services, and SNF services. This reduction in spending is statistically significant for only two of these five types of expenditures—total Medicare spending and spending on SNF services. In 2014, the ECCP intervention was associated with a reduction in total Medicare expenditure of an estimated $2,919 per resident, or 13.0 percent from the average total Medicare expenditure per resident in 2012 ($22,530) ($p = 0.096$). However, the reduction in total Medicare expenditure appears to be driven in large part by the reduction in average SNF expenditure per resident. Average SNF expenditure per resident was reduced by an estimated $2,759 per resident or 30.0 percent from the 2012 average of $9,206 ($p = 0.004$). As discussed in Section 2.10.2*,* Medicare Expenditure, Nevada is the state that has highest proportion of residents enrolled in the Initiative because of no active discharge plan. It is likely that much of the SNF spending we observe is attributable to those residents who are enrolled because of no active discharge plan. Although the proportion of residents eligible for the Initiative because of no discharge plan did decrease in the ECCP group from 2013 to 2014, a similar, only slightly smaller, decrease was seen in the comparison group (see ***Appendix B***). This comparative decrease could be one factor in the reduction in SNF spending per resident associated with the ECCP intervention in 2014.

As ***Table 2-57*** illustrates, in the remaining two outcomes, all-cause ED visits and potentially avoidable ED visits, the estimated ECCP effects have positive signs, suggesting that the ECCP intervention may have resulted in increased spending for these outcomes. However, only one of these expenditure outcomes, potentially avoidable ED visits, was statistically significant. The ECCP intervention was associated with an increase of $49 per resident per potentially avoidable ED visit, which is an increase of 102 percent from the 2012 average of $48 per resident ($p = 0.055$). Again, we note that the large percent increase in spending per resident on potentially avoidable ED visits is made possible by the relatively low expenditure per resident in 2012.

Table 2-57
Effect of ECCP intervention on expenditure outcomes: Multivariate regression results, 2011-2014, Nevada

Medicare expenditure	Mean, 2012 ($)	Effect ($)	95% CI		*p*-value	Effect (% of mean)
Total	**22,530**	**-2,919**	**-6,352**	**514**	**0.096**	**-13.0%**
All-cause hospitalizations	5,579	-748	-1,879	383	0.195	-13.4%
Potentially avoidable hospitalizations	1,539	-104	-601	393	0.682	-6.8%
All-cause ED visits	159	57	-21	136	0.152	36.1%
Potentially avoidable ED visits	**48**	**49**	**-1**	**100**	**0.055**	**102.2%**
Physician services	1,661	-131	-443	180	0.408	-7.9%
SNF services	**9,206**	**-2,759**	**-4,648**	**-870**	**0.004**	**-30.0%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect ($) is the marginal effect of the intervention in 2014.

ECCP = Enhanced Care and Coordination Provider, ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program nb24_new/coeff_table_nb24 and coeff_table_nb24_mcare).

Overall, these results do not illustrate a clear pattern in the effects of the ECCP intervention on utilization and expenditure from 2012 to 2014. Although our findings did show that the effect of the ECCP intervention was in the desired direction for many utilization and expenditure outcomes there was, for the most part, a lack of statistical significance for these variables. Furthermore, both utilization and expenditure outcomes indicated that the ECCP intervention may result in an increase in all-cause and potentially avoidable ED visits. Finally, although total Medicare expenditures per resident were statistically significantly reduced, this appears to be largely attributable to the reduction in spending for SNF services.

Table 2-58 reports the effect of the ECCP intervention on MDS-based quality outcomes in Nevada. Although three measures had statistically significant estimated effects at a 0.10 significant level, their signs indicated both improvement and worsening of quality.

The estimated effect on catheter inserted and left in bladder indicated that the ECCP intervention was associated with a reduction of 2.2 percentage points ($p = 0.072$) in the average percent of observed quarters per resident with a catheter, which corresponds to a beneficial reduction of 20.6 percent of the mean rate of catheter use in 2012. However, the estimated effect on both "one or more falls with injury" and "antipsychotic medication use" had a positive sign, indicating that the ECCP intervention may be associated with an increase of these adverse outcomes. One or more falls with injury was associated with an increase of 6.3 percentage points ($p = 0.007$), and antipsychotic medication use was associated with an increase of 4.2 percentage points ($p = 0.070$) in the average percent of observed quarters per resident with each respective outcome. These correspond to an increase of 64.5 and 18.1 percent of the mean rate in 2012, respectively, which was 9.7 percent for one or more falls with injury and 23.4 percent for antipsychotic medication use.

With conflicting effects observed, we consider the effect of the ECCP intervention on MDS-based quality outcomes in Nevada inconclusive.

Table 2-58
Effect of ECCP intervention on MDS-based quality outcomes (percent of observed quarters per resident with event): Multivariate regression results, 2011-2014, Nevada

MDS-based quality outcomes	Mean, 2012 (percent)	Effect (percentage points)	95% CI		*p*-value	Effect (% of mean)
One or more falls with injury	**9.7**	**6.3**	**1.7**	**10.8**	**0.007**	**64.5%**
Self-report moderate to severe pain	15.4	2.2	-5.9	10.3	0.588	14.5%
Urinary tract infection	9.8	2.5	-1.9	6.9	0.257	25.8%
Decline in ADLs	17.9	2.2	-1.4	5.9	0.234	12.5%
Depressive symptoms	4.6	2.0	-3.0	7.0	0.431	43.3%
Antipsychotic medication use	**23.4**	**4.2**	**-0.4**	**8.8**	**0.070**	**18.1%**
Pressure ulcers Stage II or higher	8.5	2.1	-0.7	4.8	0.139	24.1%
Catheter inserted and left in bladder	**10.9**	**-2.2**	**-4.7**	**0.2**	**0.072**	**-20.6%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ADL = Activities of Daily Living; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of MDS assessments data (RTI program nb24_new/coeff_table_nb24).

2.11.6 Summary of Findings: New York

This ECCP is entirely education focused. The RN Care Coordinators (RNCCs) in the New York Reducing Avoidable Hospitalizations (NY-RAH) initiative do not provide clinical care to residents but focus on increasing each facility's capacity to (1) identify root causes for potentially avoidable hospitalizations and (2) review and modify its policies and procedures to prevent such hospitalizations. In 2014, the ECCP continued training on INTERACT Tools, palliative care education, and implementing electronic solutions for nursing facilities. Training on the INTERACT Tools and palliative care education was the primary focus of 2014, whereas training on other the Medical Order for Life Sustaining Treatment (MOLST) form and the implementation of direct messaging mailboxes was only in the early stages as of late 2014. Facility leadership and ownership changes had a direct impact on facility adoption of the intervention tools and delays for the intervention implementation timelines. ECCP leadership and subcontract changes also occurred, contributing to some intervention implementation delays. These changes included a new medical and clinical director and the termination of a subcontracted organization that was assisting with the implementation of facility-based electronic solutions. Aside from the ongoing staffing and management challenges, ECCP leadership and facilities reported increased buy in from facility staff for the initiative overall and wider adoption of the SBAR and Stop and Watch tools, although this adoption varied across the facilities. At the end of 2014, one participating NY-RAH facility closed, reducing the number of participating facilities to 29 from 30.

In New York, the multivariate regression estimates of the effect of the ECCP intervention on the probability of having a given type of utilization outcome in 2014 are summarized in ***Table 2-59***. There are negative signs on the intervention effects for all four of the outcomes, which

suggests that the ECCP intervention worked in the desired direction of reducing the probability of utilization. However, the effect sizes are small, and are only statistically significant (at the 0.10 significance level) for the probability of experiencing an all-cause hospitalization. The ECCP intervention is associated with a 2.4 percentage point lower probability of having an all-cause hospitalization ($p = 0.089$), on average. This represents a 7.6 percent reduction in the overall probability of residents having an all-cause hospitalization based on the probability in 2012, which was 31.7 percent.

Table 2-59
Effect of ECCP intervention on probability of any utilization outcome: Multivariate regression results, 2011-2014, New York

Probability of having at least one:	Mean, 2012 (percent)	Effect (percentage points)	*p*-value	Effect (% of mean)
All-cause hospitalization	**31.7**	**-2.4**	**0.089**	**-7.6%**
Potentially avoidable hospitalization	13.7	-1.2	0.215	-8.8%
All-cause ED visit	15.3	-0.7	0.547	-4.6%
Potentially avoidable ED visit	4.8	-0.6	0.363	-12.5%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah192).

The multivariate regression estimates of the effect of the ECCP intervention on the mean count of utilization events per person in 2014 are summarized in ***Table 2-60***. Similar to the probability estimates, there are negative signs on the intervention effects for all outcomes, which suggests that the ECCP intervention worked in the desired direction of reducing the mean count of utilization events. However, the effect sizes are small, and are only statistically significant (at the 0.10 significance level) for the mean count of potentially avoidable hospitalizations. The intervention is associated with a 0.026 lower mean count of potentially avoidable hospitalizations per resident ($p = 0.071$), on average. This represents a 15.1 percent decrease from the average count per resident in 2012, which was 0.172. This result on counts is slightly different from that on probabilities; the all-cause hospitalization effect was stronger in the probability model.

Table 2-60
Effect of ECCP intervention on count of utilization outcomes: Multivariate regression results, 2011-2014, New York

Count of events per resident	Mean, 2012	Effect	*p*-value	Effect (% of mean)
All-cause hospitalizations	0.505	-0.047	0.209	-9.3%
Potentially avoidable hospitalizations	**0.172**	**-0.026**	**0.071**	**-15.1%**
All-cause ED visits	0.215	-0.016	0.441	-7.4%
Potentially avoidable ED visits	0.054	-0.006	0.429	-11.1%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah193).

The results for the estimated effect of ECCP intervention on Medicare expenditures are reported in ***Table 2-61***. The estimates have a negative sign, indicating a reduction in spending, for all seven types of expenditures measured. However, none of the effects are statistically significant (at the 0.10 significance level).

Table 2-61
Effect of ECCP intervention on expenditure outcomes: Multivariate regression results, 2011-2014, New York

Medicare expenditure	Mean, 2012 ($)	Effect ($)	95% CI		*p*-value	Effect (% of mean)
Total	26,371	-1,204	-4,728	2,320	0.503	-4.6%
All-cause hospitalizations	8,995	-798	-2,035	439	0.206	-8.9%
Potentially avoidable hospitalizations	2,246	-271	-678	137	0.193	-12.1%
All-cause ED visits	95	-12	-33	9	0.273	-12.5%
Potentially avoidable ED visits	27	-3	-12	5	0.475	-11.4%
Physician services	2,393	-90	-420	239	0.591	-3.8%
SNF services	8,131	-272	-1,738	1,195	0.716	-3.3%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect ($) is the marginal effect of the intervention in 2014.

ECCP = Enhanced Care and Coordination Provider; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program nb24_new/coeff_table_nb24 and coeff_table_nb24_mcare).

These results suggest an overall trend of reduced utilization and expenditures in New York from 2012 to 2014 attributable to the ECCP intervention, although the effect estimates are not consistently statistically significant. There is no evidence of a statistically significant ECCP effect on reducing the probability of potentially avoidable hospitalizations or reducing expenditures associated with hospitalizations. The effects on both hospitalization spending outcomes have significance levels that are encouraging for the future.

Table 2-62 reports the effect of the ECCP intervention on MDS-based quality outcomes in New York. There were no statistically significant effect on quality, although the signs for most outcomes were negative, indicating potential quality improvement. However, we consider the ECCP effect on quality too small to be measured at this stage and unclear in direction.

Table 2-62
Effect of ECCP intervention on MDS-based quality outcomes (percent of observed quarters per resident with event): Multivariate regression results, 2011-2014, New York

MDS-based quality outcomes	Mean, 2012 (percent)	Effect (percentage points)	95% CI		*p*-value	Effect (% of mean)
One or more falls with injury	6.9	-0.2	-1.8	1.4	0.775	-3.3%
Self-report moderate to severe pain	4.4	-0.7	-1.6	0.3	0.155	-15.2%
Urinary tract infection	6.4	-0.5	-1.8	0.7	0.405	-8.4%
Decline in ADLs	13.4	1.4	-1.3	4.1	0.319	10.3%
Depressive symptoms	12.2	-1.6	-5.7	2.6	0.463	-12.8%
Antipsychotic medication use	24.0	-1.9	-4.9	1.2	0.227	-7.8%
Pressure ulcers Stage II or higher	7.6	1.2	-0.4	2.8	0.156	15.2%
Catheter inserted and left in bladder	4.6	-0.2	-1.0	0.6	0.640	-4.3%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ADL = Activities of Daily Living; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of MDS assessments data (RTI program nb24_new/coeff_table_nb24).

2.11.7 Summary of Findings: Pennsylvania

The University of Pittsburgh Medical Center (UPMC) Community Provider Services Program to Reduce Avoidable Hospitalizations using Evidence-based Interventions for Nursing Facilities (UPMC-RAVEN) is anchored around Certified Registered Nurse Practitioners (CRNPs) providing resident care in the facilities; these CRNPs are very popular, and their work is appreciated. During Project Year 2, all participating UPMC-RAVEN facilities reported being committed to the Initiative, including facilities that changed ownership. There were isolated reports of very resistant physicians who did not allow their residents to participate in the Initiative, but most physicians supported the program. RAVEN CRNPs can assess, write orders, and provide direct care under a collaborative practice agreement (CPA) in all facilities; CPAs are also required for providing on-call support for telemedicine. With the exception of CRNPs work, the delays in implementing all other UPMC-RAVEN components continued well into the second year. Facility location, especially if remote and rural, posed some recruitment and retention as well as long-distance travel challenges to UPMC-RAVEN staff, altering the role of some lead NPs into visiting and supporting facilities where facility-based NPs could not be hired. Facilities reported using Stop and Watch and SBAR, with several facilities modifying the tools to better suit their needs or to correct perceived tool defects. However, the uptake of INTERACT tools varied widely across facilities and largely depended on the administration's commitment and willingness to enforce their use, as well as pre-existing practices in the facilities. Telemedicine was fully implemented by the end of the Project Year 2 and appeared to have a slow start with

some delays and multiple challenges. The number of telemedicine consults was reported to be very small; however, it appeared that the use of telemedicine was gaining ground and may be ramping up by year 3.

In Pennsylvania, there was strong evidence for the beneficial effect of the ECCP intervention across most utilization and expenditure outcomes. ***Table 2-63*** summarizes the effect of the ECCP intervention on the probability of a given type of utilization. All intervention effects are negative, with statistically significant effects (at the 0.03 significant level or better) for all-cause hospitalization, potentially avoidable hospitalization, and potentially avoidable ED visit. This suggests the ECCP intervention was associated with reducing utilizations for these outcomes. More specifically, the ECCP intervention decreased the probability of having a hospitalization by 6.8 percentage points ($p = 0.001$), representing a reduction of 21.9 percent relative to the overall percentage of residents who had any hospitalizations in 2012. In addition, the intervention decreased the probability of a potentially avoidable hospitalization by 3.7 percentage points ($p = 0.030$), a 24.3 percent reduction from the overall probability in 2012; it also decreased the probability of a potentially avoidable ED visit by 3.1 percentage points ($p = 0.001$), a 40.8 percent reduction from the overall probability in 2012. The statistical significance of the effect on all-cause ED visits is on the margin but does not improve on the measures below.

Table 2-63
Effect of ECCP intervention on probability of any utilization outcome: Multivariate regression results, 2011-2014, Pennsylvania

Probability of having at least one:	Mean, 2012 (percent)	Effect (percentage points)	*p*-value	Effect (% of mean)
All-cause hospitalization	**31.0**	**-6.8**	**0.001**	**-21.9%**
Potentially avoidable hospitalization	**15.2**	**-3.7**	**0.030**	**-24.3%**
All-cause ED visit	22.3	-3.1	0.144	-13.9%
Potentially avoidable ED visit	**7.6**	**-3.1**	**0.001**	**-40.8%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah192).

The pattern of ECCP intervention effects is very similar for the utilization count outcome, summarized in ***Table 2-64***. All intervention effects are negative, with statistically significant effects (at the 0.014 level or better) for an identical set of outcomes: all-cause hospitalizations, potentially avoidable hospitalizations, and potentially avoidable ED visits. The ECCP intervention reduced the count of all-cause hospitalizations by 0.490 per resident ($p = 0.001$) on average, a reduction of 25.9 percent compared to the average count per resident in 2012. Potentially avoidable hospitalizations were reduced by 0.192 per resident ($p = 0.014$), a 27.8 percent reduction from the 2012 average resident count. Potentially avoidable ED visits also decreased by 0.090 visits per resident ($p = 0.004$), a 40.0 percent reduction from the 2012 average resident count. The significance level for the count of all-cause ED visits is weaker than for the probability.

Table 2-64
Effect of ECCP intervention on count of utilization outcomes: Multivariate regression results, 2011-2014, Pennsylvania

Count of events per resident	Mean, 2012	Effect	*p*-value	Effect (% of mean)
All-cause hospitalizations	**0.490**	**-0.127**	**0.001**	**-25.9%**
Potentially avoidable hospitalizations	**0.198**	**-0.055**	**0.014**	**-27.8%**
All-cause ED visits	0.328	-0.035	0.355	-10.7%
Potentially avoidable ED visits	**0.090**	**-0.036**	**0.004**	**-40.0%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect is the marginal effect of the intervention in 2014.

ED = Emergency Department; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of Medicare claims data (RTI program nhpah193).

Consistently beneficial effects of the ECCP intervention are also indicated on expenditure outcomes, as summarized in ***Table 2-65***. All estimates are negative, suggesting a reduction in spending associated with the ECCP intervention, with all outcomes except all-cause ED visits statistically significant (at the 0.003 significance level or better). The ECCP intervention decreased the total Medicare expenditure by $3,662 per resident in 2014 ($p <. 001$), on average, or a reduction of 16.8 percent from the average total expenditure of $21,771 in 2012. The magnitude of effect on all-cause hospitalizations and potentially avoidable hospitalizations was even stronger, with all-cause hospitalizations reduced by $1,423 ($p <. 0001$) and potentially avoidable hospitalizations reduced by $472 ($p = 0.003$), or relative to 2012 average resident expenditures, about 31.0 and 30.3 percent lower, respectively. Potentially avoidable ED visits demonstrated a similar effect, with a $17 reduction ($p = 0.034$), or a 35.5 percent decrease relative to the 2012 average of $47. The effect of the ECCP intervention on physician services and SNF services was also strong, with physician services reduced by $387 ($p <. 0001$) and SNF services reduced by $1,220 ($p = 0.004$), which relative to the 2012 average resident expenditures for each outcome, represented a 26.3 percent and 19.8 percent decrease, respectively.

Table 2-65
Effect of ECCP intervention on expenditure outcomes: Multivariate regression results, 2011-2014, Pennsylvania

Medicare expenditure	Mean, 2012 ($)	Effect ($)	95% CI		*p*-value	Effect (% of mean)
Total	**21,771**	**-3,662**	**-5,543**	**-1,782**	**<.001**	**-16.8%**
All-cause hospitalizations	**4,597**	**-1,423**	**-2,050**	**-797**	**<.001**	**-31.0%**
Potentially avoidable hospitalizations	**1,561**	**-472**	**-782**	**-162**	**0.003**	**-30.3%**
All-cause ED visits	165	-14	-59	31	0.532	-8.7%
Potentially avoidable ED visits	**47**	**-17**	**-32**	**-1**	**0.034**	**-35.5%**
Physician services	**1,470**	**-387**	**-556**	**-219**	**<.001**	**-26.3%**
SNF services	**6,158**	**-1,220**	**-2,058**	**-381**	**0.004**	**-19.8%**

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect ($) is the marginal effect of the intervention in 2014.

ECCP = Enhanced Care and Coordination Provider; ED = Emergency Department.

SOURCE: RTI analysis of Medicare claims data (RTI program nb24_new/coeff_table_nb24 and coeff_table_nb24_mcare).

Overall, these results suggest a strong pattern of reduced utilization and expenditures in Pennsylvania, which, given the consistent direction and magnitude of effects, points to the effectiveness of the ECCP intervention. In particular, the effect estimates for reduced hospitalizations and potentially avoidable hospitalizations, defined by probability and count of utilization, as well as utilization-related expenditures, are highly statistically significant. These represent a major driver of Medicare spending among nursing facility residents. In addition, another large component of Medicare spending, SNF services, demonstrates a reduction associated with the ECCP intervention. Since Medicare SNF services are linked to prior hospital stays, the reduction in hospitalizations could have a strong effect on SNF use.

Table 2-66 summarizes the effect of the ECCP intervention on MDS-based quality outcomes in Pennsylvania, indicating an overall lack of definitive effect. The signs of the estimated effect indicated both quality improvement and decline, with only one statistically significant effect.

The estimated effect on decline in ADLs indicated that the ECCP intervention was associated with a reduction of 3.4 percentage points ($p = 0.012$) in the average percent of observed quarters per resident with decline in ADLs, an adverse outcome. This corresponds to a reduction of 17.9 percent of the mean rate in 2012, which was 18.8 percent.

Overall, with only one significant effect, we consider the overall effect of the intervention on these MDS-based quality measures too small to be systematically measured at this stage.

Table 2-66
Effect of ECCP intervention on MDS-based quality outcomes (percent of observed quarters per resident with event): Multivariate regression results, 2011-2014, Pennsylvania

MDS-based quality outcomes	Mean, 2012 (percent)	Effect (percentage points)	95% CI		*p*-value	Effect (% of mean)
One or more falls with injury	10.8	-1.3	-3.5	0.9	0.242	-12.3%
Self-report moderate to severe pain	12.9	-0.2	-4.3	3.8	0.909	-1.9%
Urinary tract infection	6.0	0.0	-1.6	1.6	0.989	-0.2%
Decline in ADLs	**18.8**	**-3.4**	**-6.0**	**-0.7**	**0.012**	**-17.9%**
Depressive symptoms	5.2	-2.0	-5.1	1.1	0.213	-38.2%
Antipsychotic medication use	30.4	-1.4	-4.9	2.1	0.434	-4.6%
Pressure ulcers Stage II or higher	5.3	0.4	-0.9	1.7	0.513	7.9%
Catheter inserted and left in bladder	6.7	-0.5	-1.8	0.8	0.439	-7.8%

NOTE: The 2012 mean is the unadjusted mean across all Initiative-eligible residents in that year. Effect (percentage points) is the marginal effect of the intervention in 2014.

ADL = Activities of Daily Living; ECCP = Enhanced Care and Coordination Provider.

SOURCE: RTI analysis of MDS assessments data (RTI program nb24_new/coeff_table_nb24).

2.11.8 Estimating ECCP-Wide Reductions or Increases in Medicare Spending and Utilization Counts

In ***Appendix J*** we extend the analysis of individual-level average marginal effects to ECCP-wide aggregate estimates of the total Initiative effect on spending and utilization counts for the entire ECCP eligible population. For total Medicare spending, we also compute estimates of the net savings or costs of the Initiative by accounting for the total payments granted to each ECCP for implementation of the Initiative. In this Appendix, we describe the methodology and present the spending estimate results, including total Medicare spending and subcategory spending on all-cause and potentially avoidable hospitalizations and ED visits, followed by estimated reductions or increases in utilization counts. We also summarize some key findings and provide guidance on interpreting the results. The statistical significance of the individual-level marginal effects in reducing spending determines the statistical significance of the ECCP total changes, though the total changes are obviously larger.

2.11.9 Subpopulation Analyses

In addition to the quantitative analyses measuring the Initiative effect on utilization, spending, and MDS-based quality measures for the full population of residents meeting the criteria for inclusion in the Initiative, we also tested whether there were differential effects for certain resident subpopulations of interest. In particular, we were able this year to test whether the effects were different for the age 65 and over versus age <65 groups, for residents with severe mental illness versus those without, and for residents with dementia versus those without. We present these analyses separately from the overall impact analysis as the issue is narrower and has a meaning different from the Initiative effect as a whole. The measures of differential impacts for a given subgroups did not have a consistent direction. The impacts within a state

often had the same direction but poor statistical significance. In this analysis, poor statistical significance is not a bad finding because we do not have a prior hypothesis as to whether the effects should differ and which subgroup's Initiative effect should be comparatively stronger. A differential effect that is not statistically different from zero just means that the ECCP effect was the same for both subgroups. As in all the quantitative analyses, isolated findings of statistical significance are a weak indicator of Initiative effects compared to a pattern of similar findings.

The information used to define these groups was:

Age Groups. The age/sex variables in the model were used to define the two age cohorts. Residents whose age is less than 65 (< 65) are the subpopulation eligible for Medicare because of disability. The differential effect of the intervention on the < 65 group compared to the aged is estimated.

Mental Illness. The HCC comorbidity variables in the model HCC 54 (schizophrenia) and HCC 55 (major depressive, bipolar, and paranoid disorders) were taken from the CMS risk-adjustment data that populates the HCC diagnosis groups from hospital inpatient, hospital outpatient, and physician and other clinician claims for 100 percent of the Medicare population. These were treated as one mental illness group.

Dementia. The marker for dementia was derived from the MDS assessment immediately prior to the first Initiative-eligible episode in each year.

The method used to determine the differential effects was to include in each model a term similar to the interaction term of ECCP*YR2014 that reports the difference-in-difference effect of the full intervention group in 2014 compared to the comparison group from Base Year 2012. For this analysis an interaction of the form ECCP*YR2014*Subgroup was added, where Subgroup is an indicator variable marking membership in the < 65, mental illness or dementia subgroups. Other variables of the form YR2014*Subgroup and ECCP*Subgroup capture the comparison population differential change for the subgroup and the initial difference in the Base Year so that the effect term is a difference-in-difference estimate.

The three-way interaction terms are not the overall Initiative effect on the subgroups. They capture a differential impact on each subgroup beyond the Initiative effect on the residents not in the subgroup. The Initiative effects on the test subpopulation could have positive or negative signs. Negative signs on the effects indicate incrementally stronger reductions in utilization and positive signs indicate weaker reductions or even increases in the effect on the target measure. An effect that is not statistically significant means the effect is essentially the same as it is for residents not in the subgroup. Overall effects on the entire population are reported in the sections above. For these analyses we are reporting the differential effects on Medicare spending for various categories of service. We estimated differential impacts for

- Total Medicare Expenditures
- Spending for all-cause hospitalizations

- Spending for potentially avoidable hospitalizations
- Spending for all-cause ED visits
- Spending for potentially avoidable ED visits
- Spending for physician services
- Spending for SNF services

In general there is no consistent pattern for differential effects either for a particular ECCP or for a particular measure. There are cases for which there is statistical significance for a differential or more than one. When statistical significance is described, a p-value of 0.10 or below is considered "acceptable". A value slightly greater than this is marginal and larger values than 0.20 are considered weak. There are many estimates with very weak p-values, greater than 0.50. As with other measures, causality is more questionable when results are not consistent for related measures. The detailed findings for each of these findings by state are in tables in ***Appendix E***. A brief discussion by state is below.

Alabama

In the overall findings there was an indication of reduced ED use but other effects on utilization and spending were not reasonably significant. The differential analysis shows:

Spending—< 65 versus aged. There was no indication of a differential effect on any of the spending categories between the groups.

Spending—with mental illness diagnosis versus without. There was an indication of a differential effect for ED visits and physician services. The Initiative effect for those with mental illness was a relative spending reduction for the ED visits and a relative spending increase for physician spending. Other spending categories also showed an increased relative spending but had low statistical significance.

Spending—with dementia diagnosis versus without. Residents with dementia had an increase in total spending relative to those without dementia. None of the individual spending categories had significant differential effects, but most were relative increases.

Indiana

In Indiana the overall population effects point to evidence of a reduction in hospital utilization and lesser evidence of reductions in ED use. The intervention effect on total spending was a marginally significant reduction. The differential analysis shows:

Spending—< 65 versus aged. For the < 65 there was a relative increase in total spending compared to the aged. The individual components of total spending also were in the same direction, although not with high statistical significance.

Spending—with mental illness diagnosis versus without. Although most of the differential effects between the groups were relative increases for residents with mental illness, only one category of spending had good statistical significance. The physician spending effect was a relative increase for residents with mental illness. The effect on total expenditures was in the same direction, although of marginal significance.

Spending—with dementia diagnosis versus without. For those with a dementia diagnoses there was a relative reduction in all spending categories. The relative reduction for this group was statistically significant for total spending and was marginally significant for ED visits and SNF spending.

Missouri

The overall population analysis for Missouri showed ECCP utilization reductions in almost all categories of services and spending. Only physician spending and total spending did not show reductions. (Included in the total spending are service categories in addition to the categories deemed a main interest for analysis.)

Spending—< 65 versus aged. There are no substantive differential effects between the two groups.

Spending—with mental illness diagnosis versus without. Preventable ED visit spending showed a relative decrease for those coded as mentally ill as did SNF spending. The total spending and other spending categories showed the same pattern, but had poor significance levels. SNF spending differential is particularly difficult to interpret as it is driven mainly by the residents deemed eligible for the Initiative because they have no indicator of having a discharge plan. These are mainly short-stay SNF patients.

Spending—with dementia diagnosis versus without. Residents with dementia had a relative decrease in total spending compared to those without dementia. The differential effect for hospital spending was similar, but of marginal statistical significance. The other categories had much poorer significance.

Nebraska

The ECCP effects on the full sample were weak and varied in direction for utilization. However, for the all-cause and potentially avoidable hospitalizations the spending effects were reductions. Some differential effects were observed:

Spending—< 65 versus aged. There were no strongly significant effects between the groups. There were relative reductions in all the spending categories for the < 65 compared to the aged. The categories with marginal significance levels were for hospitalizations and potentially avoidable ED visits.

Spending—with mental illness diagnosis versus without. Spending on hospitalizations and the subgroup of potentially avoidable hospitalizations was reduced more strongly for those with mental illness in this comparison. Alegent+Creighton has been stressing reduction of psychotropic drug use in their polypharmacy activities, but it is not absolutely clear how this

would affect hospitalizations. A general reduction of polypharmacy would not have a differential effect. The other differential effects were in the same direction but statistically weak.

Spending—with dementia diagnosis versus without. The differential effects had both positive and negative signs for the residents with dementia. The strongest, and statistically significant, relative reduction for the dementia group was for potentially avoidable hospitalizations. All-cause hospitalizations had only a weak differential effect in the same direction that was not statistically significant.

Nevada

The evaluation in Nevada is a bit problematic, as described previously, because there are relatively few comparison facilities in the state and there were changes in the ECCP and comparison groups. In the full population we observed weak effects in directions of both decrease and increase in utilization measures. There was a statistically significant reduction in the count of all-cause hospitalizations and an increase in the count of potentially avoidable hospitalizations. The latter increase was reflected in the spending measure as well. Total spending did reflect a statistically significant decrease, but a large part of that may have been from the SNF component, which is large in Nevada. The differential effects were not notable:

Spending—< 65 versus aged. The signs of the differential effects are negative except for total spending and SNF spending. None of the magnitudes are strongly statistically significant but are weak evidence for some difference in the intervention effect in the two groups.

Spending—with mental illness diagnosis versus without. For these two subpopulations there is no strong differential effect in spending in any of the categories. The effects vary in sign.

Spending—with dementia diagnosis versus without. There is no evidence of differential effects.

New York

In New York, for the full population, there was an ECCP effect reducing the probability of an all-cause hospitalization and the count of potentially avoidable hospitalizations. The other utilization measures were in the same direction but were quite weak statistically. The spending measures had the same pattern but were not significant at a reasonable level. The same service categories were closer to being statistically significant.

Spending—< 65 versus aged. The signs of the differential effects were mixed, with total spending and physician spending showing relative reductions for the < 65 group relative to the aged. The other signs were in the opposite direction. None of the differentials reached a reasonable level of statistical significance.

Spending—with mental illness diagnosis versus without. Total spending indicated a greater relative reduction for the mental illness group with a marginally acceptable level of significance. The indications of relative reduction were present in the other categories but statistical significance was poor.

Spending—with dementia diagnosis versus without. The differential effects of the intervention indicated relative spending increases for the dementia group compared with the nondementia group. There are differential estimates with acceptable statistical significance for total spending, spending for ED visits, and spending for physician services.

Pennsylvania

The ECCP effects for the full population in Pennsylvania were consistent in direction across the utilization and spending measures. The effects for probability of use and counts of use indicated a reduction in utilization. They were statistically significant for all the measures but all-cause ED visits. The spending measures showed the same pattern.

Spending—< 65 versus aged. The differentials in spending are of mixed sign with only the potentially avoidable ED visits having good significance and indicating the < 65 have a relative increase for this measure, but not generally.

Spending—with mental illness diagnosis versus without. Although the differential effects mostly indicate a relative increase for the mentally ill subpopulation, none of the estimated effects have reasonable statistical significance.

Spending—with dementia diagnosis versus without. The dementia subgroup has mostly relative reductions in all measures compared to the subgroup without dementia. However, the potentially avoidable ED visits are the only measure with a statistically significant differential.

Discussion of Subpopulation Effects

Generalizing by subpopulations there are mixed results. There is no evidence of a notable differential between the < 65 and aged although there are a few statistically significant estimates. There are mixed results for the mental illness subgroup with relative reduction in some states and relative increases in others. For the dementia subgroup the directions are also mixed. The Initiative as a whole does not indicate a significant differential effect on these population subgroups. Viewed within states, there is no consistent statistically significant relative differential, in brief:

The < 65 versus aged differential. Alabama had no significant differences; Indiana had some relative increase for the < 65; Missouri had no difference; Nebraska had no significant differences; Nevada had weak significance for some relative reduction for < 65; New York had no significant differences; and Pennsylvania had mixed signs and possible relative increase for one measure.

The mental illness group differential. Alabama had two significant measures of opposite sign; Indiana had weak relative increases for most measures; Missouri had some evidence for relative decreases; Nebraska had some evidence of relative reductions for this subgroup; Nevada had mixed signs, nothing significant; New York had weak evidence for relative reductions; and Pennsylvania had weak evidence for relative increases for the group.

The dementia subgroup differential. Alabama had weak evidence for relative increase; Indiana had evidence for a relative decrease; Missouri had mixed signs but total spending

showed a relative decrease; Nevada had no evidence of differential; New York had evidence for relative increases; and Pennsylvania had weak evidence for relative reductions.

Each measure can be looked at on its own, but we cannot discern a clear pattern of relative differences in the effect of the interventions on each subgroup of residents compared with the rest of the residents.

2.12 Discussion of Quantitative Findings

The 2014 data indicate much more clearly than data in the transition year (Base Project Year) that there are positive Initiative effects on many of the measures and some more consistent patterns of effects for a few of the ECCPs. In Pennsylvania and Missouri there are strong patterns indicating intervention effects reducing utilization and spending. The measures are not all significant, but most are. Other ECCPs, in Alabama, Indiana, and New York, show mostly consistent indications of reductions, but few measures are statistically strong. The ECCP effects in Nebraska and Nevada are mixed in sign. Inconsistencies in directions of effects weaken the evidence. Statistical significance indicates the probability that an effect could be observed by chance. As large numbers of statistical estimates are made, we observe more chance occurrences of large effects. A consistent pattern of substantive estimated effects is stronger evidence for a causal relationship. It is possible that an increase in ED visits with observation is compatible with a decrease in hospital admissions, but the statistical evidence is weak, and we have no primary data indicating that ECCPs are trying to create this care pattern.

The MDS-based quality measures do not show any pattern of change related to the Initiative. If the concentration is more on avoiding hospitalizations and ED use related to resident changes in condition, the effects of the interventions on the broad range of MDS-based quality measures may be very limited. However, there seems to be some improvement, although very small and not statistically significant in most states, on some MDS-based quality outcomes considered associated with risk of hospitalizations and ED utilization, such as falls with injuries and antipsychotic medication use.

In the context of the qualitative findings from our site visits, phone interviews, and surveys in the summer of 2014, we know that the interventions were still maturing throughout 2014. They were certainly more developed than in 2013, but were still being refined and components were being rolled out throughout the year. It also became clear that personal relationships among all the stakeholders matter as well as the technical forms of interventions. Staff turnover in the ECCPs and facilities complicates matters. With the implementations varied and still not complete, quantitative conclusions are not firm. It is also not possible to tease out what is working among the intervention components. The primary data collection has shown how much variation there is in implementation of what may appear to be a component of the intervention. However, the numbers in the multivariate analyses are pointing in the desired direction and savings, if they are maintained, will not be insignificant.

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SECTION 3
PRIMARY DATA COLLECTION: PROJECT YEAR 3

3.1 Primary Data Collection

Section 3 reports on all primary data collection activities undertaken by RTI for the period of July 1, 2014 through August 1, 2015. Note that we are reporting findings from Project Year 2 (i.e., analysis from survey waves 1 and 2) and the beginning of Project Year 3 (i.e., site visits and telephone interviews). The complete set of findings from Project Year 3, including all remaining site visits and phone interviews for each ECCP, will be included in the separate narrative ECCP reports. These 25-30 page reports cover each ECCP following a standard outline and serve as a summary of all site visit and phone interview findings. These reports are not RTI formal deliverables, therefore they are submitted to CMS after each cycle of data collection is complete and all qualitative data are analyzed in NVivo. The timing of the primary data collection is reasonable for collecting information for a calendar year, but not ideal for full analysis by our annual report deadline.

The primary data collection (PDC) schedule cycle is out of sync with the schedule of RTI deliverables and lags a few months behind. There are several reasons for these delays. In the base project year, most states were still in the process of rolling out their Initiatives. In each ECCP, the Initiative was implemented in cohorts, with some facilities starting as late as August 2013. Site visits were conducted through late spring and summer of that year, allowing enough time for at least the first cohort of facilities in each ECCP to launch some model components. The decision, approved by CMS, was to only visit and interview facilities that have implemented the Initiative for at least 3 months. As a result, RTI was only able to include preliminary PDC findings in the first annual report as the phone interview and survey tasks were not yet complete. As a result, PDC for the base project year spilled over to the next year; we submitted the first batch of ECCP narrative reports and survey findings in winter 2013-2014. Subsequent project years have retained the same schedule. The PDC collection schedule is outlined below:

- Site visits May-July
- Phone interviews August –September
- Qualitative Data Analysis September-October
- ECCP Narrative report development November-December.

As seen from this schedule, the annual reports for each project year, which are due in August-September, are due too early to include most of the PDC findings for the year.

3.2 Research Questions

Qualitative data collected from ECCPs and participating facilities is intended to answer the following five research questions:

1. What changes did participating ECCPs implement?

a. How long did it take to implement these changes? Did all the nursing facility partners implement at the same rate and in the same way?

b. What challenges did the ECCPs face in implementing these changes? What lessons were learned from these experiences?

2. What facilitates a smooth transition to hospital from the nursing facility (or vice versa)?

   a. What model features facilitate these improvements in transitions?

   b. Do the improvements in transitions vary by nursing facility? Are specific nursing facility characteristics associated with the change? Why?

3. What features of the ECCPs' administration and structure account for the successes or failures of their model implementation?

4. Were Learning Community activities effective in preparing ECCPs to succeed?

   a. Were ECCPs amenable to participating in Learning Community activities? To what extent did varying participation in Learning Community activities impact the success of individual ECCPs? What type of staff participated in these activities?

   b. Did instruction networks successfully identify and influence the spread of best practices?

   c. Did Learning Community activities influence changes in the intervention to increase likelihood of success?

   d. Which characteristics of the learning system were most successful and least successful? Were there certain information dissemination methods or activities that were more successful than others?

5. What unintended consequences are observed, if any, at the state, ECCP, nursing facility, and nursing facility resident level?

3.3 Site Visit Schedule

Site visits in all seven ECCPs were completed for Project Year 3 as of August 8, 2015. In addition, as of this report submission date, RTI has begun the task of conducting the telephone interviews with facility staff across ECCP facilities that were not visited in person. The primary data collection efforts included the following ECCP models (presented by site visit date):

- HealthInsight Nevada Admissions and Transitions Optimization Program (ATOP)
  - Site visit dates: May 4, 2015 to May 8, 2015

- New York Reducing Avoidable Hospitalizations (NY-RAH) Project of the Greater New York Hospital Association (GNYHA) Foundation
  - Site visit dates: June 8, 2015 to June 12, 2015

- Nebraska Alegent + Creighton Health program (Alegent + Creighton)
  - Site visit dates: June 15, 2015 to June 19, 2015
- The University of Missouri, Sinclair School of Nursing Missouri Quality Initiative for Nursing Homes (MOQI)
  - Site visit dates: July 13, 2015 to July 17, 2015
- University of Pittsburgh Medical Center (UPMC) Community Provider Services Program to Reduce Avoidable Hospitalizations using Evidence-based Interventions for Nursing Facilities (UPMC-RAVEN)
  - Site visit dates: July 20, 2015 to July 24, 2015
- Alabama Quality Assurance Foundation Nursing Facility Initiative (AQAF-NFI): Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents
  - Site visit dates: August 3, 2015 to August 7, 2015
- Indiana University (IU) Geriatrics Department, Optimizing Patient Transfers, Impacting Medical Quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC)
  - Site visit dates: August 3, 2015 to August 7, 2015

3.4 Facility Site Visit and Telephone Interview Task Overview

All site visits for Program Year 3 are staffed by RTI, with two- or three-person teams assigned to each ECCP. Choosing nursing facilities for site visits was based on a purposive selection to ensure that the final sample represented the range of participating facilities. Most teams selected one or two facilities for revisit and two or three facilities that had not been visited in a prior year; actual facilities visited varied based on facility ability to accommodate the site visit. Based on the data collected on site visits and phone interviews during the Base Year and Project Year 2, we identified and included facilities that were potential candidates for best practices in terms of implementing the Initiative or those having experienced major barriers to implementation. In addition, sample criteria included facility bed size, ownership, urban/rural status, 5-star quality rating, deficiency history, and practical travel logistics.

For Project Year 3, the interview protocols did not change significantly, although the focus shifted slightly to cover topics from the perspective of continued progress and any changes implemented. As in prior years, we streamlined some language, revised some questions to be more targeted and focused, and added topics related to lasting effects of the initiatives and sustainability. The revised interview protocol was resubmitted for approval to the RTI Institutional Review Board (IRB) prior to going into the field. Both in-person and telephone interviews were conducted according to standard qualitative evaluation practice, guaranteeing respondents anonymity and confidentiality. All in-person interviewees received a one-page summary of the main project activities and a one-page confidentiality statement, and telephone interviewees received the same documents ahead of the interview via e-mail. At the start of each

in-person or telephone interview, interviewers reiterate the project activities and confidentiality statement aloud. We also have developed a protocol for facilities who have withdrawn from the Initiative.

All Project Year 3 site visits were completed by early August 2015. Each site visit lasted 5 business days and included two components: (1) *ECCP component*—a visit and interviews with key ECCP leadership and other staff, and (2) *facility component*—a visit to four participating facilities to interview facility staff and, in some cases, the facility's ECCP Nurse. For the ECCP component, some topics of conversation carried into Project Year 3 from previous project years, such as maintaining and improving data collection processes. Other topics focused more on project progress and any changes that have been made since Project Year 2, including new components that may have been rolled out or modifications made to improve existing Initiative efforts. We also discussed desired developments or expansions, challenges encountered to date, and long-range sustainability and lessons learned from the prior years of the project. For the facility component, we focused on Project Year 3 activities, the continuing role of ECCP RNs or NPs and program acceptance, as well as other facility-related issues such as ongoing trainings and ECCP work on advance directives and medication management. Detailed notes were taken during all interviews to capture the findings and then coded with NVivo qualitative data analysis software.

We are progressing with telephone interviews with facilities not visited in person in Project Year 3. Telephone interviews are conducted following a shortened interview guide that touches on the main domains covered in the site visit interviews. Telephone interviewees are the facility staff identified as most appropriate by RTI ECCP leads based on site visit experience. The facility staff targeted for telephone interviews were either the most knowledgeable about or clinically involved with the Initiative. The type of facility staff interviewed included, but was not limited to, Director of Nursing (DON), Charge Nurse, Nursing Facility Administrator, and the ECCP RN or NP.

Table 3-1 displays the status of the primary data collection activities in Project Year 3 to date.

Table 3-1
Primary data collection activities in Project Year 3 as of September 30, 2015

ECCP	# of participating NFs	# of NFs site visited	# of NFs interviewed by phone	# of interviews scheduled but not completed	# of NFs nonresponders to phone interviews
Alabama (AQAF-NFI)	23	4	13	0	6
Indiana (OPTIMISTIC)	19	4	10	0	5
Nebraska (Alegent + Creighton)	14	4	7	0	3
Missouri (MOQI)	16	4	11	0	1
Nevada (ATOP)	24	4	14	0	6
New York (NY-RAH)	29	4	18	0	7
Pennsylvania (UPMC-RAVEN)	19	4	11	0	4
Total	144	28	84	0	32

NOTE: NF = Nursing Facility.

This table reflects the number of facilities in the Initiative as of September 1, 2015. The numbers of ECCP facilities in our 2014 data analysis in Nebraska and New York are 15 and 30, respectively. The facilities Montclair (NE) and Rivington House (NY) dropped out late in the year and are not expected to make a large difference in our analysis, so they remain in the 2014 data. Our data include records from those two facilities only through Q3 2014, shortly before they dropped out.

3.5 Site Visit Summary Findings

During the ECCP interviews in the spring and summer of 2015, RTI staff gathered information regarding the ECCP initiatives with particular interest in interventions or tools that had changed or that had been introduced since our last visit. In some ECCPs, we found new interventions that had been added; others were progressing according to the original ECCP design; and still other interventions were not being implemented as planned. Below is a summary of these findings by ECCP. A full set of findings will be included in the narrative ECCP annual reports once the remaining phone interviews are completed.

3.5.1 Alabama Quality Assurance Foundation Nursing Facility Initiative (AQAF-NFI): Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents

Continuing through 2015 (Project Year 3), the AQAF-NFI team is working toward implementing the features described in the original operations manual; use of INTERACT tools, morning huddles, medication management, advance care planning, consistent staffing, and quality improvement/QAPI varies across the 23 participating facilities. Although none of the facilities have finished implementing all components, the AQAF-NFI leadership team remains confident that the model is having a positive effect on facility-wide resident health and well-being, as well as on facility staff and leadership. Because this model focuses on AQAF-to-staff knowledge transfer and facility culture change, rather than direct care, the AQAF-NFI leadership team has described this Initiative as being incredibly cost-effective and sustainable. To that end, local stakeholders have applauded the Initiative, in turn creating statewide interest among even non-participating facilities. AQAF, a QIO, has supported this interest and is encouraging use of

AQAF-NFI components, trainings, and tools for interested facilities across the state in the hopes of reducing avoidable hospitalizations beyond just AQAF-NFI facilities. As noted below, there are obstacles related to facility culture in the state.

Because the model is education-only, numerous interviewees explained the importance of the relationship between the AQAF-NFI nurses and facility staff and leadership. This process of developing trust and communication has taken a significant amount of time, such that many facility interviewees felt as though they are only just beginning to address key issues that may lead to a reduction in potentially avoidable hospitalizations. Among the components of the Initiative that are still in the process of being rolled out are consistent staffing (defined as no more than 12 caregivers for any one resident within a 28-day period), reduction of antipsychotic use and polypharmacy, and quality improvement. The AQAF-NFI leadership team has recognized the importance of these components and is training facilities to develop teams of staff to address each of these topics: staff stability, medication management, and QAPI. In addition, each facility will have a designated team to address hospitalizations, specifically avoiding unnecessary hospitalization of residents.

One new focus for the final year of the project targets increased involvement of facility leadership and corporate owners. Up to this point, the facilities with the most perceived success with the Initiative seemed to have more cooperation between leadership, including administrators, DONs, and other key staff, as well as the AQAF Initiative nurses. These facilities have been able to roll out and sustain more components of the Initiative compared to facilities with inconsistent or unsupportive facility leadership and high rates of turnover among AQAF nurses. (AQAF nurse turnover was an issue through Year 2 but is largely resolved.) Similarly, inclusion of corporate leaders was found to be critical to implementing all aspects of the model, as nearly all participating facilities are corporate-owned. Because the local culture within the state has been described by both the facility staff and AQAF-NFI leadership team as change averse and leery of state or federal oversight, corporate support for the Initiative seems to help encourage participation and build trust in the Initiative. Some corporations have bought into the Initiative so thoroughly that they are deploying aspects of the Initiative (e.g., INTERACT tools, QAPI team) even to their non-AQAF-NFI facilities.

For the final year of the project, facilities will continue to encourage participation in all aspects of the Initiative, especially development of the four facility staff teams (staff stability, medication management, QAPI, and hospitalizations). The AQAF-NFI leadership team will continue to encourage and support facility leadership and corporations by offering various training opportunities that include both theoretical and clinical components, while also providing facility reports regarding quarterly hospitalization rates. Ongoing partnerships with B&F consulting (staff stability) and Samford University's McWhorter School of Pharmacy (medication management) will provide additional education opportunities for facility staff through the final year of the project. One lingering concern pertains to staff retention in the remaining months of the Initiative, as some AQAF nurses already have expressed concern about their own job stability. The AQAF-NFI leadership team hopes to offer retention bonuses to these nurses and also looks forward to the possibility of CMS extending the project for additional years. Numerous interviewees across facilities and from AQAF indicated that extending the

Initiative would allow the momentum built during the prior years to continue, likely resulting in greater reductions in potentially avoidable hospitalizations.

3.5.2 Indiana University (IU), Optimizing Patient Transfers, Impacting Medical Quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC)

In 2015 (Project Year 3), the OPTIMISTIC team continued efforts initiated in the first two project years with no major changes to the core components of the model. The program continues its focus on improved medical and palliative care through intensive review by ECCP clinical staff during transition and acute change in condition visits, the collaborative care review (CCR) process,[12] use of INTERACT tools, and training of facility staff. In the time that remains for the Initiative, the OPTIMISTIC team aims both to ensure the complete implementation of the core components of the model and to make changes that strengthen those components.

Facility-based ECCP staff includes eight NPs spread across 6.6 FTEs and supervised by the Clinical Lead (FTE: 0.5). Allocation of the NPs has been modified to allow two full-time NPs to focus on completing polypharmacy CCRs. The RN FTE is 17.35, plus an RN supervisor FTE of 1.25. There was little turnover among OPTIMISTIC facility staff; however, the ECCP noted it may be difficult to retain staff when nearing the end of a time-limited project. To address this issue, OPTIMISTIC has instituted retention bonuses.

OPTIMISTIC has made several changes to strengthen core components of the model. For example, NPs have increased the number of times they assess residents who were readmitted to the hospital within 30 days of being released back to the facility. In addition to the assessment that occurs within 48 hours for all residents transferring back to the facility from the hospital, a minimum of four additional visits are required at specified intervals during the first 5 to 6 weeks. Also in 2015, polypharmacy, defined as 12 or more medications, was identified as a criterion to prioritize residents selected for the CCR process. After being pilot-tested in two facilities, the "polypharmacy CCR" will be rolled out, one facility at a time, starting in July 2015.

Furthermore, while ECCP RNs continue to report on hospitalizations and INTERACT tool use during monthly facility quality improvement meetings, OPTIMISTIC hopes to expand their contribution to the facility quality improvement processes. OPTIMISTIC is currently administering a pilot program with the purpose of strengthening the skills of the ECCP RNs in development, implementation, and reporting of quality improvement data. Seven ECCP RNs are currently enrolled in the pilot program, which will be rolled out for the remaining RNs if the pilot proves successful.

OPTIMISTIC temporarily suspended the distribution of monthly data reports to participating facilities (which began in Project Year 2) while the report structure was being modified. A new effort report is being shared monthly with the facilities, which shows the approximate amount of time that ECCP RNs and NPs spend on different categories of activities

[12] Previously called "Comprehensive Care Reviews" in original OPTIMISTIC Project Operations Manual (November 29, 2012).

such as education or quality improvement. This report is also reviewed by supervisors of the RNs and NPs.

With the goal of full implementation in mind, the OPTIMISTIC team completed an audit of Advanced Care Planning (ACP) activities including the Indiana Physician Orders for Scope of Treatment (POST) and *Respecting Choices* discussions. This audit took place in the early spring of 2015. To address any difficulty or discomfort with ACP activities, the OPTIMISTIC team has plans to create two new positions to support OPTIMISTIC field staff with their ACP activities: a palliative care coach, to be staffed by one of the current facility-based ECCP RNs (time will be reallocated), and a palliative care physician, who will hold office hours. A follow-up audit is planned for winter 2015.

Providing training to increase dementia care expertise among ECCP RNs and nursing facility staff also was a focus in Project Year 3. In the fall of 2014, OPTIMISTIC held an off-site training on medical and behavioral aspects of dementia, which was attended by both OPTIMISTIC nurses and select nursing facility staff members, 4 hours per week for 6 weeks. OPTIMISTIC opted not to continue the nurse coaching program initiated in Project Year 2 because the effectiveness of the program did not strongly favor continuation.

Finally, in spring 2015, the OPTIMISTIC team was awarded an 18-month planning grant from the John A Hartford Foundation in the amount of $621,697.00 to continue work on the model.

3.5.3 University of Missouri, Sinclair School of Nursing Missouri Quality Initiative for Nursing Homes (MOQI)

In Project Year 3, implementation of the MOQI model continues to mature, and most components have been implemented as originally planned. The program is firmly established in all visited facilities, and interviewees have been extremely positive in describing the Initiative. The facility staff's recognition and acceptance of the MOQI program has increased since last year, especially with respect to buy in from physicians, recognition of the value of quality improvement strategies, and more consistent implementation of the INTERACT tools by facility care staff. As in prior years, the most valued component of the program continues to be the NP role in reducing avoidable hospitalizations. The NPs' impact has been accomplished through focused staff education to increase clinical staff assessment skills and confidence, provision of direct care, and collaboration with facility leadership staff to implement all components of the model. The MOQI NPs reported being well integrated, extensively used, and positively received at all facilities. In addition to providing direct care and education to the clinical staff, the NPs are integral to the facilities' quality improvement programs and are the primary data collectors of Initiative data. The MOQI ECCP staff have established a coalition comprised of state nursing organizations and consumers working with the Missouri legislature to enact legislation that would enable NPs to establish collaborative practice agreements with their physician colleagues. The ECCP staff also have developed their own program relational database. Reports are generated on each home including resident diagnoses and reason for hospitalization.

All visited nursing facilities have reduced their hospitalization rates and attribute this success to both the consistent presence of the NP and to more consistent use of tools to achieve

their targeted number of monthly hospitalizations. A major strategy introduced in 2015 by the ECCP staff, in collaboration with facility staff, was root cause analysis of reasons for hospitalizations in targeted facilities struggling to reduce their rates. In all visited facilities, written Stop and Watch forms are used to inform the licensed nursing staff of a change in condition. Incentive programs have continued in some form at all sites to sustain this improvement. Licensed nursing staff have become more skilled in using medical record documented SBAR information to communicate a resident's change in condition, which has become highly valued by facility physicians. Facilities have continued to work collaboratively with their referring hospitals to improve the exchange of resident information during care transitions. In some cases, the INTERACT Transition of Care and Care Path tools have been adapted to fit the unique needs of the facility.

Numerous quality improvement initiatives are underway in all visited sites. Improvement strategies have focused on reducing falls, urinary tract infections, and use of antipsychotic medications; increasing hydration; and addressing end-of-life issues, particularly advance care directives. An area for further development in all of the visited facilities is the implementation of health information technology to improve communication and accuracy of resident information. The adoption of Care Mail and Care View continues to be slow for a variety of reasons. The presence of EPIC, a complimentary form of hospital-based patient portal, has been well received by facilities that take advantage of it. At all sites, facility staff expressed the desire to keep their nurse practitioner after the Initiative ends but expressed concern about how the NP would be financed. All facilities indicated that the use of Stop and Watch, SBAR, and their staff's increased clinical skills will likely continue when the program ends, even if the NPs are no longer in place.

3.5.4 Nebraska Alegent + Creighton Health Program (Alegent + Creighton)

In 2015, the Alegent ECCP has become increasingly important in the facilities in which it operates, while continuing to administer most of the planned components of the Initiative with fidelity. Components of the Alegent ECCP include: direct care, medication management, dental assessments and cleanings, improved communication, and education. The ECCP continues to focus primarily on the medication management and direct care components, with the NPs taking an active role in the management of enrolled residents' care. The Alegent ECCP faced staffing challenges in 2015, as they experienced some turnover of ECCP NPs, and several key staff members took maternity leave. The ECCP reassigned NPs to maintain full coverage during this period, and nursing facility leadership uniformly reported that handoffs between ECCP NPs were handled in such a way that they felt confident that the new NP could maintain the same services and relationships.

Two notable changes occurred in 2015. First, the ECCP decided to discontinue its original plan to lead quarterly in-service trainings in participating facilities. These trainings, including the most recent one on urinary tract infections, were developed by ECCP staff based on the needs of participating nursing facilities and were well received by facility staff. In addition to developing and implementing the trainings, the ECCP also had trainings videotaped and certified so that attendees and future viewers could receive Continuing Education Units (CEUs) for attending. However, the ECCP had been holding these trainings less frequently than originally planned, as they found that creating the customized trainings required a significant

investment of time and effort. Instead, they intend to dedicate the same amount of resources to giving select staff in each participating facility access to NICHE (Nurses Improving Care for Healthsystem Elders) training. These trainings are targeted to nurses in geriatric settings and provide CEUs to those who complete the courses. The ECCP expects that the nurses who complete the program will share what they have learned with colleagues in their facilities.

The second aspect that has evolved in 2015 is how the facility staff perceive and utilize the ECCP NPs. Increasingly, facilities report that the NPs are an integral part of their facilities, rather than an enhancement. Facility staff regularly relied on the NPs to take a central role in caring for the residents. While the ECCP NPs coordinate with medical directors in all participating facilities, facility leadership in several facilities have started to call the ECCP NPs before calling their own medical directors when faced with emergent situations. Many facility administrators and leadership staff reported that they were not sure how their facility would function to the same standard if they did not have a nurse practitioner available to care for residents. However, facilities also reported that their own budgets would not support the maintenance of an NP in an ongoing similar role.

Other components of the ECCP have remained consistent since 2014. The two dental hygienists assess all eligible residents twice a year and provide education to CNAs on proper cleaning. The pharmacist continues to have an active role in the Initiative, collaborating with the NPs on regular medication reviews and contributing her expertise to the development of educational materials.

3.5.5 HealthInsight Nevada Admissions and Transitions Optimization Program (ATOP)

In 2015, ATOP facility-based staff continue to promote INTERACT tools in the 24 participating facilities; some facilities have adopted their use in paper form, and others have electronic systems in which electronic versions of INTERACT forms are embedded. ECCP staff also continue to provide tailored in-service trainings at participating facilities in the POLST, care management of conditions related to avoidable hospitalizations, medication management, and skills trainings (e.g., IV insertion). As in previous years, ATOP staff continue to assist facilities with non-ATOP related activities such as pre-survey preparation activities by conducting reviews of documentation and medication administration procedures. Not envisioned in the original model, a new ECCP training to improve retention of CNAs was recently developed and is due to begin in all ATOP facilities in the summer of 2015.

HealthInsight, a QIO, continues to promote ATOP objectives by inviting all facilities in the state to ATOP trainings provided through the Perry Foundation, believing that this will lead to quality improvement and a reduction in avoidable hospitalizations in all facilities in Nevada.

The ECCP experienced staffing adjustments during the past year, including the elimination of a half-time data analyst position hired to develop a program to produce quarterly progress reports for participating nursing facilities. With data from the ATOP registry collected by ATOP nursing staff, the ECCP routinely provides reports detailing the type of avoidable hospitalizations that occurred, with day, time, and authorizing physician. A half-time RN was hired for a geographically remote participating facility, and a half-time pharmacist was hired as a

consultant to provide targeted medication management training in several ATOP facilities. The ECCP also experienced facility-based staff turnover during the past year with RNs and APRNs departing for a variety of reasons, including preference for more clinical work with less traveling. At the time of the site visit, two of the five APRN positions were vacant and 2.5 FTE RNs were on medical leave or the positions were vacant. Despite extensive recruitment efforts, including advertising out of state, the ECCP has had difficulty filling these positions. In previous years the ECCP replaced an APRN with a physician assistant who has continued in the Initiative. The ECCP expressed concern about filling open clinical positions in the last year of the Initiative.

One pod of five facilities has been particularly affected by staff turnover from the beginning of the Initiative. Rather than an assignment of one APRN or physician assistant and two RNs rotating among the five facilities, as is their model, the ECCP has maintained a presence in these facilities through temporary assignments of RNs and APRNs from other pods or periodic visits by ECCP-based RN staff.

In May 2015, RTI staff learned of two new pilot projects within ATOP that had not been specified in the original model. In January 2015, the ECCP began a new pilot program with a Canadian firm (Think Research) to implement INTERACT-based electronic patient order sets in four ATOP facilities; subsequently, several other ATOP facilities joined the pilot. At the time of the site visit, approximately 10 different order sets, for conditions such as chronic heart failure, pneumonia, acute mental status changes, etc., were being adapted among the facilities for their use. Another new pilot using secure text messaging software (Qliqsoft) was initiated by the ECCP in May 2015 in five other ATOP facilities. The purpose of this activity is to improve communications between facility-based staff and remote primary care providers.

3.5.6 New York Reducing Avoidable Hospitalization (NY-RAH) Project of Greater New York Hospital Association (GNYHA) Foundation

The GNYHA Foundation continues to manage and support the NY-RAH project in 2015. The main feature of the NY-RAH model is the placement of RNCCs in participating facilities to provide education and mentoring to facility staff. The total number of facilities participating decreased from 30 to 29 facilities because of one facility closing in late 2014. Facilities continue to participate in the Bronx, Manhattan, Brooklyn, and Queens, and on Long Island (Nassau and Suffolk Counties).

Some notable staffing changes have occurred for the ECCP management staffing and among the facility-based ECCP staff. At the end of Year 2, the previous medical director left the project and was replaced by the palliative care director, who continues to serve as both NY-RAH's medical director and the palliative care director. A new clinical director also was appointed in the last year to coordinate and supervise the RNCCs; this is the third person to serve in this role since the project began. There has been less turnover among the RNCCs compared to previous project years. Several new types of RNCC positions also have been created in the past year, including "Float" RNCCs (n = 2) and an RNCC coach. Float RNCCs were hired to fill in for RNCCs who take temporary leave (e.g., vacation) or have resigned from the project; however, the utility of these positions was questioned by GNYHA Foundation leadership because one Float RNCC has since become permanent at a facility after the original RNCC left,

leaving the other Float position vacant. The RNCC Coach position was created to help the RNCCs build rapport and educate facility staff about the NY-RAH interventions; however, GNYHA Foundation leadership noted that the RNCC coach has instead generally filled the role as a Float RNCC.

No major changes to the NY-RAH model have occurred in the past year, although the Medication Stage has reduced in scope. The original plan included using the AMDA Multidisciplinary Medication Management Resource and INTERACT Medication Reconciliation Worksheet for Post-Hospital Care to be incorporated into a participating facility's medication and pharmacy protocols. However, nursing facilities and pharmacies pushed back about changing their protocols related to medication management; ECCP leadership noted there was no champion among their leadership to facilitate pushing the Medication Stage past this barrier. In place of the original plan, ECCP staff created a training on medication management, which includes medication reference cards. These cards were created using the AMDA guidelines with input from GNYHA Foundation's pharmacy staff. Facility staff can use the cards as a reference. Although some facility staff have found these cards useful, other staff have noted that the information provided on the cards is elementary, adding that the cards are rarely used.

The NY-RAH model components have all been introduced, and facility staff have received training on the relevant tools. The SBAR and Stop and Watch tools are increasingly being used by the nursing and CNA staff in most facilities we spoke with during the site visit, and training is ongoing. All facilities received palliative care training, including information about advance directives and the MOLST form. Some facility staff members do not agree with the MOLST process or form. The NY-RAH leadership recently provided training on the Conversation Project to help facilitate the conversation social workers or nurses have with family members and residents when completing the MOLST. In addition, the majority of participating NY-RAH facilities have also had direct messaging software installed to facilitate the flow of electronic structured patient summary information from hospitals; however, both ECCP and facility leadership indicated that technical, organizational (both nursing facility and hospital), and policy barriers will need to be addressed before nursing facilities will be able to receive and utilize this electronic information.

Concurrently with the implementation of NY-RAH, New York is also implementing the Delivery System Reform Incentive Payment program (DSRIP), which is one part of the state's Medicaid Redesign Waiver received from the federal government. DSRIP's goal is to restructure the health care delivery system with the primary goal of reducing avoidable hospital use by 25 percent over 5 years. Some of the facilities participating in NY-RAH are also participating in DSRIP, particularly those in Suffolk County. Because of the similar goals in the two projects, the DSRIP was mentioned both by ECCP and facility leadership as a vehicle for sustaining the NY-RAH interventions, particularly in terms of continued use of the INTERACT tools and the MOLST.

3.5.7 University of Pittsburgh Medical Center (UPMC) Community Provider Services Program to Reduce Avoidable Hospitalizations using Evidence-based Interventions for Nursing Facilities (UPMC-RAVEN).

During our third year of data collection, the UMPC-RAVEN model continued to develop all components originally planned for implementation, demonstrating strong fidelity to the original model design. The program is firmly established in all visited facilities. The program has wide support and continues to receive overwhelmingly positive feedback. As in prior years, the facility staff's recognition and acceptance of the RAVEN program continues; reports about support and buy-in from physicians have increased. RAVEN staff were reported to have solidified relationships in each participating facility. The most valued element of the program continues to be the hands-on care provided by UPMC-RAVEN NPs. One visited facility had a RAVEN RN, not an NP; her work in the facility was also positively received and valued, although she could not write orders. One facility did not have a nurse on staff due to difficulty replacing an RN who left. All facilities reported a strong preference for keeping the RAVEN nurses on staff once the Initiative is over. Telemedicine is now operational in all facilities. The actual use of telemedicine consultations was reported to be low, but the utilization trend is positive. A majority of facility staff reported telemedicine to be a valuable tool, but cumbersome to implement. Over the past year, several changes have been made to the telemedicine program. Most notably, a specific NP, previously working in one participating facility, was assigned as the permanent after-hours telemedicine coverage NP. A telemedicine educator RN was also hired to support facilities and educate them with the goals of increasing the utilization. In addition, the telemedicine RN provides reports to facility leadership of telemedicine usage in their facility. In Project Year 3, the telemedicine software was changed, with all facilities being retrained to utilize the new software.

In Project Year 3, the pharmacy component has a new focus on reducing antipsychotic medications by setting up Interdisciplinary Teams (IDT) in three facilities to educate staff on antipsychotic medications and to reduce their utilization. These team meetings were very well received; staff reported seeing reduced use for these medications. Rx Partners plan to work with other facilities to set up similar teams. Pharmacy consultants also continue their regular task of reviewing records from each participating facility and making recommendations on residents.

In Project Year 3, the use of INTERACT tools was reported in all facilities visited but remains inconsistent across staff types. As implementation has progressed, some facilities have repeated refresher trainings for Stop and Watch and SBAR tools to reinforce their utilization. Most facilities reported that they will definitely use these tools once the Initiative is over. UPMC-RAVEN NPs continue to use the Acute Care Transfer Review Form to collect and analyze data on each transfer that has occurred among UPMC-RAVEN residents; this tool is used for root cause analysis with summary data distributed to participating facilities quarterly. Facilities reported reviewing the data and utilizing it to understand and improve upon hospital transfer rates. The reports identify contribution of individual physicians to the hospitalization rate and the reasons for transfers; facilities use this information in their quality improvement efforts.

Condition-specific SBARs have been introduced to some facilities, with the goal of having them in 14 facilities by the end of the Initiative. UPMC-RAVEN NPs continue to review

and advise residents and families on advance directives by reviewing POLST; this process is working smoothly and is well received by families. This year, RAVEN NPs did not report any problem with data collection; ECCP staff appeared to have adjusted to the data collection tools and made them a part of their workflow. A new data analyst was hired by ECCPs to support data collection and analyses, and the ECCP provides data reports to participating facilities.

In the past year, a few management changes have taken place, including the resignation of the ECCP director. The RAVEN program manager was promoted to direct the Initiative. The manager position is currently vacant. To improve job tenure, the ECCP has instituted retention bonuses for staff who stay until the end of the Initiative.

3.6 Key ECCP Model Features: Project Year 3 Site Visits

In this section, the features of and changes to the implementations are updated and tabulated in a way that allows comparisons to be made across the ECCPs. ***Table 3-2*** displays organizational change data, such as the number of participating facilities. ***Table 3-3*** shows changes to staffing and subcontractors in Project Year 3, and ***Table 3-4*** shows changes to nurse practice agreements. ***Table 3-5*** focuses on changes made in Project Year 3 to data collection practices and tools. ***Table 3-6*** displays changes made to the intervention, such as new efforts for education, medication management, or advance care planning and palliative care. Lastly, ***Table 3-7*** explores feedback on Initiative sustainability from both the perspective of the ECCP leadership and the facility staff.

Table 3-2
ECCP organizational changes from 2014 through 2015

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Number of facilities participating in the Initiative	23	19	16	14	24	29	19
Number of facility ownership changes	0	0	0	0	0	4	0
Number of participation agreement signed	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Number of facilities that became ineligible	0	0	0	0	0	0	0
Number of facilities withdrawn from Initiative	0	0	0	1	0	1	0
Sharing of ECCP award funds with facilities	No	No	No	Yes, ECCP indicated it will pay for staff training, no similar reports on facility side	No	No	No
Partners/other entities providing new financial/ in-kind support for the Initiative to ECCP	Yes, CMS has provided an additional award (amount unknown)	Yes, OPTIMISTIC was awarded an 18-month planning grant in spring 2015 from the John A. Hartford Foundation in the amount of $621,697	Yes, CMS has provided an additional award (amount unknown).	No	No	No	No

NOTE: ECCP = Enhanced Care Coordination Provider.

Table 3-3
ECCP staff and subcontractor changes in 2015

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
ECCP							
ECCP Employees	No changes	No changes	Increase of HIT lead's time on project from .2 to .4 FTE	No changes	0.5 data analyst eliminated	No changes	3 positions added: Telemedicine Education RN, Telemedicine Coverage CRNP, business analyst
Leadership staff	No changes	No changes	No changes	No changes	No changes	Medical director left, palliative care MD promoted to director. Clinical director left and replaced.	Program director left, program manager promoted to director
Facility-based ECCP staff	Still 23 RN positions, but 4 FTE RNs have been replaced or transferred this year, and there is still 1 FTE RN vacancy	Still 18 RNs (17.35 FTE) covering 19 NFs, but 3 have been replaced or transferred. Total 8 NPs (6.6 FTE) with 6 covering 19 NFs. Two new NPs hired to complete polypharmacy CCRs.	No changes	Net change of 0.5 FTE added 3 NPs were added, 2 NPs left, 1 NP transitioned from 1 to 0.5 FTE	0.5 RN added to 1 remote NF	Two FTE Float RNCCs positions created. 1 FTE RNCC Coach position created and filled 1:2 open Float RNCC positions.	No changes
Total FTE facility-based staff by type	23 FTE RN positions; 22 currently filled	Embedded RNs 17.35 FTEs; NPs 6.6 FTEs.	No changes	6.5 FTE NPs	0.5 data analyst eliminated 0.5 RN added	27 FTE RNCC positions; 26 currently filled	7 RN 10 CRNP 2 Lead CRNP

(continued)

Table 3-3 (continued)
ECCP staff and subcontractor changes in 2015

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Supervisory Staff	No changes	ECCP RN supervisor moved from .5 FTE to 1.0 NP supervisor decreased 0.1 to 0.5 FTE	No changes	No changes	No changes	1 FTE clinical manager left. One position is open.	No changes
Consultants	No changes	No changes	No changes	No changes	No changes	5	No changes
Subcontractors							
Education	Completed all IHI trainings; no longer subscribing to IHI	No changes	No changes	N/A	No changes	No changes	Not originally budgeted past year 3, RMU and JHF will work in year 4 because of funds roll-over
Pharmacy	No changes	Previous consultant pharmacist was replaced. Consulting agreement for .1 FTE moved from Purdue University to Butler University	No changes	N/A	0.5 FTE Health Insight pharmacist assigned to provide targeted assistance to selected NFs	N/A	No changes
IT	No changes	Previously down 1 FTE in data management position, which has been filled. A .5 FTE person added to support data management.	CareViewer implementation (built in 2014)	N/A	No changes	No changes	Business analyst position added and filled to support data analysis and management

(continued)

Table 3-3 (continued)
ECCP staff and subcontractor changes in 2015

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Other (including visiting coaches)	N/A	Subcontract with the University of Indianapolis for nurse coach (time limited program) not renewed.	N/A	N/A	N/A	N/A	No changes

NOTES: APRN = Advanced Practice Registered Nurse; CCR = collaborative care review; CRNP = Certified Registered Nurse Practitioner; ECCP = Enhanced Care Coordination Provider; FTE = Full-time employee; HIT = health information technology; IHI = Institute for Healthcare Improvement; JHF = Jewish Healthcare Foundation; NF = nursing facility; NP = nurse practitioner; RMU = Robert Morris University; RN = Registered Nurse; RNCC = Registered Nurse Care Coordinators.

Table 3-4
Functions and changes to nurse practice arrangements in 2015

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Key functions of ECCP Nurses in facilities							
Education only	X					X	
Education, assessment, and care provision			X				
Education, assessment, writing orders, care provision		X		X	X		X
Changes to state policies in collaborative practice agreements (CPA)	N/A	No	No	Yes—LB 107 signed into law (03/15), granting NPs the right to independent practice. Will not impact the Initiative, as CHI Health, which purchased Alegent in 2014, still requires the NPs to have CPAs.	No	N/A	No

NOTES: CPA = collaborative practice agreement; ECCP = Enhanced Care Coordination Provider.

Table 3-5
ECCP data collection in 2015

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
New systems for CMS-required data collection	Yes, streamlined existing Access database	Yes, REDCap system updated to allow for the ability to more quickly identify and easily correct errors	No	No	No	No	No
Changes to data submission process in 2015	Yes, added Dropbox to share non-PHI data	No	No	No	No	No	No
New technology used by staff for data collection	No	No	No	No	No	No	No
New technology used for other purposes	No	No	No	No	No	No	No
ECCP reports to NFs on hospitalization rates	Yes, added monthly score cards and progress reports	No, reports to facilities are currently suspended pending a change in the structure of the reports	Yes, facilities are given the admissions data to assist with achieving the targeted rate	Yes, the ECCP presented data on hospitalization rates during semi-annual steering committee meetings	Yes, no changes to quarterly reports schedule	Yes, no changes, ECCP continues to share quarterly reports on hospitalization rates.	Yes, no changes, ECCP shares results with facilities quarterly based on data gathered in the Acute Care Transfer Review form

(continued)

Table 3-5 (continued)
ECCP data collection in 2015

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
New data sharing activities between ECCP and participating facilities	Yes, added monthly score cards and progress reports. All data now in streamlined Access database	Yes, added monthly level-of-effort reporting detailing types of activities and percent time spent for NF-based ECCP RNs and NPs, which is shared with participating NFs	More data collection associated with internal audits of residents with ADs and Durable Power of Attorney.	No	Yes, ECCP will have access to INTERACT Patient Order Set pilot data in 6 NFs. ECCP RNs are piloting the use of Qliqsoft texting to PCPs in 5 NFs.	Yes, ECCP changed the Palliative Care Report (AD trends) and added a quarterly facility progress report (most recent 6m hospital transfer rate, % of residents with ADs, and ACOCs used with a NY-RAH intervention tool.	No

NOTES: ACOC = Acute Change of Condition; AD = advance directives; ECCP = Enhanced Care Coordination Provider; PCPs = primary care physicians; PHI = personal health information; RNs = Registered Nurses.

Table 3-6
Summary of changes to interventions

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Early Identification of Change in Condition and Condition Management	No changes	No changes	Hydration program to prevent dehydration; perineum care focus to prevent UTIs	No changes	New CAUTI initiative in 2 NFs	No changes	No changes
Support to Improve Communication with Physicians	No changes	No changes	No changes	No changes	No changes	N/A	Condition-specific SBARs were developed by JHF/RMU for use in the facilities; specific use was not reported by facilities
Care Transition Improvement	No changes	Additional visits required from NPs for individuals who have been readmitted to the hospital within 30 days	New term used—Enhanced Quality Improvement to refer to RCA conducted with NFs with high rate of hospitalization/ readmission	No changes	Efforts to improve transitions have not started in the 4 visited NFs	No changes	No changes

(continued)

Table 3-6 (continued)
Summary of changes to interventions

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Medication Management	New quarterly interactive webinars for AQAF Nurses and facility staff	New polypharmacy CCR. Began rolling this out in July 2015; began implementation in 1 of 4 NFs at the time of the site visit, but currently on hold.	No changes	No changes	No changes	Change to Stage 4: Implemented Medication Reference Cards in each facility and training by RNCCs on use. Will not implement Medication Reconciliation Form and RNCC evaluation of physician-prescribed medications	RAVEN Pharmacy staff initiated psychotropic medication review teams in 3 facilities; plan to roll out in more facilities
End of Life/Palliative Care	New training for facilities; as a result, focus on end of life has increased in 4 NFs to varying degrees	ECCP did an audit of ACP activities in early spring 2015. A follow-up audit is planned for winter 2015.	ECCP participated in the Healthcare Decisions Day in both 2014 and 2015. ECCP will participate in the Conversation Project, scheduled for 09/2015.	ECCP updated their Life Issues Review form to use as a tool in EOL discussions with families	No changes	No changes	No changes

(continued)

Table 3-6 (continued)
Summary of changes to interventions

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Quality Improvement (including RCA, PDSA, QAPI)	1 NF has formed teams for QAPI; 3 facilities plan to form teams in the future	ECCP RNs continue to report INTERACT tool use and hospitali-zetions in NF QI meetings in all 4 NFs. New training being piloted in guided creation and presentation of QAPI projects for 7 ECCP RNs.	Implemented FOCUS-PDSA to address hospitalization rates; called enhanced Quality Improvement	No changes	No changes	No changes	RMU/JHF has developed a training surrounding process improvement, which will be made available to facilities this year.
IT Interventions	N/A	N/A	No changes	N/A	N/A	No changes	Telemedicine: New Vid-yo software; consistent NP after-hours coverage for phone calls and tele-consults.
Other	New focus on corporate buy-in, leadership buy-in, and administrator training	Focus on ensuring that priority aspects of OPTIMISTIC are fully implemented	Removal of side rail to reduce resident restraints in 1 facility visited	ECCP is using the funds previously used to develop and host in-service trainings to support the training of key facility staff using NICHE materials	New program to improve retention of CNAs to begin in July in 4 NFs	New program to improve palliative care conversations began summer 2015	N/A

NOTE: ACP = advance care planning; CAUTI = catheter-associated urinary tract infection; CCR = Collaborative Care Review; CNA = certified nursing assistant; EOL = end of life care; FOCUS-PDSA = Find Organize Clarify, Understand, Select – Plan Do Study Act; JHF = Jewish Healthcare Foundation; MOLST = Medical Order for Life-Sustaining Treatment; NF = nursing facility; NP = nurse practitioner; PDSA = Plan Do Study Act; QAPI = quality assurance and performance improvement; QI = quality improvement; RCA = root cause analysis; RMU = Robert Morris University; RNCC = Registered Nurse Care Coordinator; UTI- urinary tract infection.

Table 3-7
Sustainability

	Alabama (AQAF-NFI)	Indiana (OPTIMISTIC)	Missouri (MOQI)	Nebraska (Alegent + Creighton)	Nevada (ATOP)	New York (NY-RAH)	Pennsylvania (UPMC-RAVEN)
Interventions reported to potentially continue after end of the Initiative							
ECCP reports	INTERACT tools (Stop and Watch, SBAR, care pathways, possibly transfer forms) huddles, QAPI teams, leadership engagement	INTERACT Tools (SBAR, care pathways, possibly Stop and Watch), POST forms, respecting choices conversations, QAPI reports, possibly transition visits	Stop and Watch, SBAR, QI activities, advance care directives and advance care tool, changes in record systems, medication reconciliation, Care Path Tool, relationship with stakeholders, nursing and social work developed skills	The ECCP plans to increase the presence/role of NPs by proposing a new model in which a NP team working under a MD replaces the medical director. The ECCP is testing this model in a non-participating SNF.	Stop and Watch, critical thinking skills, awareness of conditions leading to hospitalizations	Stop and Watch, SBAR, MOLST, other palliative care interventions	Use of the INTERACT tools and POLST. The use of telemedicine is uncertain as the carts are CMS property, and will need to be purchased. Facilities will have to provide staff and technical support.
Facility reports from 4 visited facilities	Some INTERACT tools (varied by facility as to which tools would be used), huddles, possibly QAPI	INTERACT Tools (SBAR, possibly Stop and Watch and care pathways), POST forms	Stop and Watch, SBAR, QI activities, nurse assessment skills, hospitalization reductions	Support for NP to remain in facilities, although no concrete plans. Continue to encourage the use of INTERACT tools.	Stop and Watch, SBAR, critical thinking skills, nurse assessment skills, awareness of conditions associated with rehospitalizations, POLST	Stop and Watch, SBAR, MOLST, other palliative care interventions	Stop and Watch and SBAR. Support having a NP and continuing telemedicine, but unsure about funding and logistics for these elements.

NOTES: ECCP = Enhanced Care Coordination Provider; MD = Medical Doctor, MOLST = Medical Orders for Life-Sustaining Treatment; NP = Nurse Practitioner, POLST= Physician Orders for Life Sustaining Treatment; POST = Physician Orders for Scope of Treatment; QAPI = Quality Assurance and Performance Improvement; QI = Quality Improvement; SBAR = Situation Background Assessment Recommendation (tool); SNF = Skilled Nursing Facility.

SOURCE: RTI data collected during 2015 site visits.

3.7 Project Year 3 Site Visits and Early Phone Interviews

Overall, RTI evaluation site visits in Project Year 3 reported that general enthusiasm, acceptance, and support for the Initiative were strong in Missouri, Pennsylvania, Indiana, and Nebraska, but less so in Alabama, Nevada, and New York.

Arrangements

- As in previous years, the ECCPs did not report sharing funds directly with facilities, but they subcontract and partner with multiple organizations to carry out the Initiative. One ECCP reported that they would pay for the time of hourly staff who attended the training for the Initiative; however, interviewed facilities were not aware of this payment.

- As of the end of Project Year 3, most of the nursing facilities contacted to date continue to be committed to the Initiative. As of September 1, 2015, the total number of Project Year 3 facilities in the Initiative was 144. Several facilities changed ownership but continued their participation in the Initiative.

- Two ECCPs reported receiving additional funding from CMS based on achieving certain quality goals for the Initiative; quality scores were developed by the implementation contractor.

ECCP interventions

- The ECCPs' intervention designs underwent several changes during Project Year 3. Most of the changes that have been implemented were minor, with the majority focusing on streamlining processes or trimming features that would not be feasible to complete in the time remaining on the project (AQAF-NFI). One ECCP reported a significant new effort of implementing INTERACT-based patient order sets in certain facilities participating in the Initiative (ATOP). Another ECCP (Alegent + Creighton) reported having a plan to implement a new education program for nurses in participating facilities. Apart from these, most key model features and individual interventions remain essentially the same in Project Year 3 as they were previously.

- Although most facilities did not report incurring major costs to implement the Initiative when interviewed, survey findings (see section 3.10) indicated that about one fifth of all participating facilities reported incurring some type of cost.

- In many ECCPs, ECCP leadership is directly involved in managing the program; most visit participating facilities on a regular basis.

- Although state agencies are represented in advisory boards or steering committees, most are not directly involved and do not support the Initiative directly on a regular basis.

- As of Project Year 3, some ECCPs reported having implemented all aspects of their initiatives (UPMC-RAVEN, MOQI, OPTIMISTIC, Alegent+Creighton), but others

are still rolling out some components through Project Year 4 (AQAF-NFI, ATOP, NY-RAH). Reasons for these delays include staffing challenges within the ECCPs (e.g., turnover of ECCP RNs/NPs), minor changes made to the Initiative designs, and a need for ongoing relationship development and trust-building between ECCPs and participating facilities.

ECCP model characteristics

- As originally proposed, most models continue to include direct assignment of ECCP staff to participating facilities on a permanent basis; two models (ATOP, Alegent+Creighton) rotate staff among facilities. One model embeds an RN in facilities, but rotates NPs among facilities (OPTIMISTIC). However, some ECCPs could not maintain the originally proposed staffing arrangements and had to increase caseloads for ECCP nurses or make some other changes.

- With the exception of two ECCPs where education is the main intervention (AQAF-NFI, NY-RAH), most models are centered on NPs or RNs providing hands-on clinical care and assessments and, in the case of NPs, writing orders for residents. For ECCPs where NPs are involved in assessing residents and writing orders, collaborative practice agreements (CPAs) continue to be necessary to enable NPs to work in facilities. One ECCP team hired a physician assistant when they were unable to replace one NP (ATOP). MOQI NPs do not have CPAs and, therefore, do not write orders; MOQI continues to work with state leaders and key stakeholders to enact legislation to enable NPs to write orders.

- Most ECCPs provide medication reviews, either directly through ECCP nurses or via consulting partners who sometimes use ECCP-specific tools for medication review (UPMC-RAVEN, ATOP, OPTIMISTIC, MOQI). Medication management typically focuses on reducing antipsychotic drug use and polypharmacy. One ECCP reported only providing Medication Reference Cards and not directly reviewing medications (NY-RAH).

- All ECCP nurses continue to provide education to facility staff. Five ECCPs educate facility staff directly via ECCP nurses (Alegent + Creighton, ATOP, AQAF-NFI, MOQI, and OPTIMISTIC). ECCPs also subcontract or partner with other organizations to deliver educational components of the Initiative. Most ECCPs continued to provide some education in facilities in Project Year 3 with INTERACT tools, end-of-life care, consistent staffing, medication management, and clinical skills being most common topics in 2015. One ECCP (UPMC-RAVEN) did not plan to conduct education in Project Year 3, but the ECCP was able to carry over funds remaining from the prior year for ongoing refresher training.

- INTERACT tools remain important across all ECCPs and appeared to be used more widely in Project Year 3. More support for INTERACT tools from facility leadership was reported. Some facilities are mandating use of INTERACT tools, and others are tracking the use of specific tools or providing incentives to encourage continued use. For early identification of change in condition, the Stop and Watch is the most

common tool in use across facilities. All ECCPs promote the use of the INTERACT SBAR as a tool to improve communication with Physicians. Many corporate owners across ECCPs support the use of INTERACT tools, in paper or electronic format, and some facilities reported use of modified versions of INTERACT tools to meet specific needs (e.g., shortened version of SBAR).

- In Project Year 3, end-of-life care (EOL), including palliative care and advance directives counseling to residents and families, as well as education of facility staff, appeared to be a strong focus in most ECCPs. ECCPs in states with standardized forms (e.g., MOLST, POLST, or POST) have focused more on advance care planning than states without standardized forms. One ECCP elected to participate in the National Healthcare Decisions events for their EOL component (MOQI).

- Some facilities include information technology (IT) interventions in their models. These interventions range from using telemedicine to support ECCP NP coverage after hours to developing special data systems for tracking and integrating data, as well as special registry and e-tools for improving communication and note-taking. Implementation of some IT interventions has been slow (UPMC-RAVEN, NY-RAH, MOQI). Telemedicine, which is part of the UPMC-RAVEN program, enjoys wide general support in facilities, but the actual utilization, although on the rise for Project Year 3, was still very low.

Data collection and data exchange

- As of Project Year 3, data collection was no longer described as a significant burden by most of the ECCP Nurses. Most ECCPs addressed data collection workload by developing new systems to streamline data management, such as web-based data collection and shared database systems, or by hiring additional staff (UPMC-RAVEN, OPTIMISTIC).

- Some ECCPs hired their own IT staff, and some hired IT contractors to maintain data collection or provide support; other ECCPs purchased special software to assist with data collection. Some ECCPs planned to implement software (UPMC-RAVEN) to improve the process but discontinued these plans due to poor fit.

Learning Community activities

- There was a substantial decrease in Learning Community activities this year; after a few calls, no additional events have occurred in the past 6 months. The website has had several technical glitches that made it difficult to access for many months.

- Some ECCP staff indicated that these activities were missed, but most described the calls, in particular, as disappointing and were content that these activities have been discontinued.

- Despite disinterest in the calls, several ECCPs described the utility of face-to-face meetings that include all ECCPs.

Successes and challenges

- In Project Year 3, facility buy in from staff and physicians remained strong across some ECCPs (UPMC-RAVEN, MOQI, OPTIMISTIC), but inconsistent among others (ATOP, Alegent + Creighton, NY-RAH, AQAF-NFI). Physician buy in was low for some ECCPs, but reported to be on the rise (e.g., UPMC-RAVEN), largely because of new awareness of upcoming changes expected in quality reporting processes for SNFs.

- Most ECCP Nurses report feeling well integrated into facilities. Residents and resident families interviewed accept ECCP staff as part of the care team and rarely understand that they are employed by an outside organization.

- Implementation of individual components of the Initiative is highly variable, with some facilities having fully implemented all aspects of their ECCP model and others still lagging far behind in component roll-out. This variation is observed across ECCPs and within ECCPs' various participating facilities.

- Although a majority of ECCP and facility staff interviewees have a positive perception of the Initiative goals and potential benefits of reducing hospitalizations, some facility interviewees perceive the Initiative as more work, unnecessary, or designed solely to save money by prioritizing savings over provision of good resident care.

- Attitudes varied on whether specific Initiative interventions are having an effect. For many facilities, anecdotal evidence, in the form of examples and stories of early response to change in condition and avoiding admissions, indicates positive culture change.

- Staff turnover was a persistent problem in Project Year 3. There were high levels of turnover among ECCP clinical staff (NPs and RNs) in some facilities. ECCP leadership turnover also occurred (UPMC-RAVEN, NY-RAH). Turnover among facility staff on all levels, including facility leadership involved in supporting the Initiative, remains one of the major barriers to implementation.

- Concerns about the imminent termination of ECCP Nurses at the end of the Initiative has led to difficulty filling currently vacant positions. To reduce the likelihood of Nurses leaving before the end of the project, several ECCPs have described implementing retention bonuses and other incentives to help keep ECCP Nurses in place through the final months of the Initiative. There was an announcement by CMS, as this report was being submitted, of a phase 2 of the Initiative, which will change the situation and may improve the staff retention.

- Administrative staff in facilities reported a strong preference for receiving updates or ECCP progress reports (AQAF-NFI, UPMC-RAVEN, ATOP, NY-RAH) that highlight changes in hospital admission rates or that compare performance to peer facilities. Some reports also identify individual physicians responsible for most admissions. Collectively, these types of reports were said to help support model

components that have been implemented, while also helping to highlight where additional work is still needed. Some facilities used these reports for their quality improvement/QAPI activities.

- Although most facility staff are trained to use various INTERACT tools, use remains highly variable and sporadic, particularly for Stop and Watch and SBAR, in part because of high turnover of facility staff. In facilities with very engaged leadership who provide incentives or accountability, use of INTERACT tools is widespread. When facility leadership, corporate owners, or both are not engaged, use of tools declines.

Unintended consequences

- Education for staff, facility-wide, remains a positive spillover effect across most participating facilities. These staff may spread best practices and knowledge to residents not involved in the Initiative.

- ECCP model components have been adopted by non-participating facilities and by corporate chains in several states. Some of these facilities have received copies of forms and other materials (e.g., INTERACT tools) from peers they see at state meetings (e.g., trade associations). Other non-participating facility staff have attended formal meetings or trainings with ECCP staff (ATOP, MOQI, AQAF-NFI), either by direct invitation from the ECCP or affiliates or through business connections, such as shared corporate ownership between a non-ECCP facility and an ECCP facility. Use of some elements across non-ECCP facilities, such as POST, POLST or MOLST, was driven by state policies.

- Within ECCP facilities, most interviewees reported using INTERACT tools for all residents, regardless of their enrollment in the Initiative (e.g., tools used for both long-stay and short-stay residents).

- No negative spillover effects were reported in Project Year 3.

Preliminary Thoughts on Sustainability

- ECCP advance practice nurses and RNs remain the most valuable component of the Initiative across most facilities. The provision of clinical care by these individuals is reported to be the most essential element for the five ECCPs that use this model. Some facilities reported that removal of these RNs and advance practice nurses at the end of the Initiative is a major concern, as not having the Nurses in place is expected to diminish positive outcomes observed thus far.

- Many facilities interviewed expressed interest in keeping their ECCP Nurses after the project concludes, though funding was reported to be a major barrier to sustaining this component of the Initiative. Some have suggested corporate support to fund these positions, while others are hoping that local hospitals or even CMS might help reimburse facilities for the cost of hiring long-term advance practice nurses.

- Education also has been described as a key success of the project, with many facilities across ECCPs reporting continued use of learned tools, such as use of INTERACT forms, advance directives, and consistent assignment of staff, as well as potential ongoing medication review and QAPI/quality improvement efforts.

- State policy may drive the sustainability of the use of some ECCP tools among ECCP facilities. For example, in New York State, the Delivery System Reform Incentive Payment (DSRIP) Program, which has the goal of reducing avoidable hospitalization by 25 percent over the next 5 years, was cited by many ECCP leadership and facility staff as being a primary reason why some facilities will continue using the SBAR and the MOLST form.

3.8 Learning Community Activities

The original goal of the Learning Community forum was to disseminate best practices and lessons learned so that successes could be replicated throughout all facilities in the Initiative. ECCPs were therefore supposed to perform rapid-cycle analyses to evaluate their progress and identify lessons learned, and then pass this information on to Telligen, the contractor who leads the Learning Community events and develops the curriculum for the Learning Community. The ECCPs were also supposed to post updates of their activities to the Learning Community website, which is also administered by Telligen.

Overall, we did not find that ECCPs were providing rapid-cycle analyses or lessons learned to the broader Learning Community forum; site visit data revealed that they focused instead on performing internal analyses on their own facilities to determine the progress and effect of their specific Initiatives. Moreover, tracker files were generally the only documents uploaded by ECCPs on the website; no other information or updates about ECCP activities were posted and available.

Nonetheless, we evaluated the Learning Community activities in Project Year 3 to identify which Learning Community events or components ECCPs found most useful or valuable during implementation (see ***Section 3.7.1***). ***Table 3-8*** provides an overview of the issues investigated. This information was gathered through attending the Learning Community events and monitoring activities on the Learning Community website, when possible. In addition, we also obtained feedback on the Learning Community events from site visits (RTI staff had difficulties accessing the website; see ***Section 3.7.2***). Of note, the original contractor that was administering the Learning Community events (Colorado Foundation for Medical Care) was acquired by Telligen in August 2014. Because of the change in contractors, the staff also changed, including the primary point of contact for the Learning Community events and website.

Table 3-8
Tracking ECCP Learning Community Activities

Areas	Findings
Logistics/technical aspects: What was the format of the event? Were there any technical issues? Is this format feasible and sustainable in the long-term?	Each event (call) has one major topic with generally two ECCP presentations. A Q&A period is included at the end, although it is often limited by the remaining time allotted for the event. Materials are disseminated via the forum website and email. This is inexpensive and easy to manage, and so far there have been no technical issues with distributing the materials. Thus, this format is hypothetically sustainable in the long-term.
Engagement: Which ECCPs were most engaged? Are there significant differences in the results of the ECCPs who are and are not engaged?	There have not been enough Learning Community events in Year 3 to determine which ECCPs were most engaged or whether engagement affected ECCP results. Presentation topics are assigned, and all ECCPs attend all events.
Sharing resources: Did discussions in the Learning Community spur the sharing of materials outside the events? Did ECCPs pose questions to the group and receive suggestions?	At every event where one ECCP was presenting, follow-up questions were asked by other ECCPs. Because of the limited nature of activities in Year 3, no other sharing was observed or reported.
Feedback received	So far Learning Community activities are not fulfilling the original goal of disseminating best practices and lessons learned among the ECCPs and are not conducive to encouraging open discussion among the ECCPs. ECCPs mentioned that calls could be structured to encourage greater informal communication among the participants. One ECCP suggested that the facilitator could send out materials ahead of calls to encourage ECCP participation and follow up with ECCPs regarding issues that were brought up on the calls. The in-person meetings among the ECCPs are considered more valuable.

NOTE: ECCP = Enhanced Care Coordination Provider.

The Learning Community activities, both the planned events and website activities, have substantially decreased in this past project year. From August 2014 through August 2015, there were only three Learning Community events, compared to the eight events that occurred between August 2013 and August 2014. ***Table 3-9*** provides a brief overview of the dates and topics that the Learning Community events discussed. As indicated, there have been no Learning Community events since February 2015.

Table 3-9
Learning Community Events as of August 2015

Date	Event Topic
August 20, 2014	Operations Support: How State Surveys Integrate with Initiatives
November 19, 2014[13]	ECCP Staff Turnover
February 18, 2015	Enhanced Care & Coordination Providers (ECCPs) Data Quality Assessment: Recommendations for Reducing ECCP Quarterly Reporting Burden and Improving Data Quality

In addition, there was one "ECCP Office Hours" event that took place on January 5, 2015. The ECCP Office Hours have no agenda and no scheduled presentations, but are a time for the ECCP staff to ask questions of Deloitte or Telligen or of other ECCPs. No ECCPs called in for this office hours meeting.

Of the limited number of Learning Community events that did occur in the last year, two of the events tended to follow the same general format as in previous years: two ECCPs were selected to present on a specific topic, with time after each presentation for questions. The third meeting focused on Deloitte staff presenting updates to the ECCPs on their data collection activities and requirements for ECCP data submissions. All of the Learning Community meetings lasted approximately an hour. The Learning Community events are facilitated by Telligen. The type of staff participating in the Learning Community events varied across ECCPs, ranging from ECCP NPs to attendance only by ECCP leadership and administrators.

The Learning Community also includes a CMS Innovation Center Partner Collaboration Website that participating ECCPs can access to get additional information on the Initiative and the relevant tools needed to implement it. Some ECCPs uploaded their milestone trackers to the website. As in the past, the ECCPs' use of the website forum for discussing topics has been minimal. With the change in contractors administering the Learning Community events, there were several glitches and a period where the website was down. RTI staff have been unable to access the website for the past several months and therefore have since been unable to monitor website activities.

3.8.1 Major Themes of Discussion

The limited number of Learning Community events in the past project year included a few themes. These themes tended to focus on particular issues or challenges the ECCPs faced as they continued to implement their specific initiatives, as well as some lessons learned about how best to address those issues. For example, the Learning Community event in August 2014 focused on how state surveys interacted with the activities of the ECCP initiatives and how activities for state surveys could be incorporated into Initiative work. After Telligen staff reviewed state survey and quality improvement activities in nursing facilities, GNYHA

[13] RTI staff were not invited or notified of event.

Foundation and Alegent + Creighton presented their own experiences with state surveys. GNYHA Foundation found that state surveys have had an overall negative impact on the Initiative, often because participating nursing facilities were concerned about how implementing the interventions might affect their survey results. In contrast, Alegent + Creighton described how the Initiative was able to help facilities prepare for surveys, particularly among facilities that had received deficiencies in the past. Other ECCPs provided additional feedback; for example, AQAF noted that they had tried to be very collaborative with the survey teams and had made sure to reach out and educate the state surveyors about the Initiative. During another call that addressed a separate topic, OPTIMISTIC discussed how they developed definitions, such as acute care, when they did their data collection.

The event that was led by Deloitte in February 2015 included discussion of ways to improve and streamline the process of submitting quarterly data to the Deloitte dashboards. The Deloitte staff presented their analysis of the quarterly data and made recommendations on what data were most relevant for ECCPs to submit moving forward. ECCPs were then given the opportunity to ask questions about the quarterly reports and how the changes in submission requirements might affect their specific Initiative.

3.8.2 Feedback on Learning Communities

RTI received feedback on the utility and overall value of the Learning Communities from the ECCPs during the 2015 site visits. Overall, the response to past Learning Community events was mixed, and many ECCP staff could not even recall the last Learning Community event that was held. For example, a staff member from one ECCP noted that they missed getting to hear from other states about their experiences and lessons learned as they implemented their initiatives. However, they also noted that they thought the Learning Community calls encouraged competition between ECCPs and made participants feel territorial and leery of sharing information with others. This staff person felt that the structure of the calls pitted ECCPs against each other in a manner that did not encourage openness, sharing, and trust.

Staff from another ECCP indicated that the Learning Community events were "a disappointment" because these events were too structured and did not leave enough time for ECCPs to effectively communicate. They noted that in-person meetings were best, and they thought that the Learning Community calls could be structured in a way that allowed for ECCPs to communicate more. Some ECCPs suggested that the facilitator could send out additional "pre-work" to encourage ECCP participation and follow up with ECCPs regarding issues that were brought up on the calls. For example, one ECCP sent out a survey to other ECCPs regarding their definition of acute care as preparation for a Learning Community event in which the ECCP was presenting. The ECCP was disappointed when the Learning Community facilitator did not follow up with the other ECCPs to collect the survey information and develop a "harmonized definition" of the acute care term.

Several ECCPs noted that they had formed relationships with other ECCPs, but they did not attribute these activities to the Learning Community events. For example, one ECCP staff person mentioned that they have reached out to other ECCPs with questions about data. We also heard that the ECCP medical directors have calls outside of the Learning Community events. When asked about use of the Learning Community website forum, most of the ECCP staff did

not indicate using the website. One ECCP staff person noted the difficulty in accessing the website, even when trying to upload a milestone tracker.

Similar to previous years, many of the ECCPs stressed that they found the in-person meeting in Baltimore to be most valuable. Many ECCPs found the opportunity for face-to-face exchange and sharing very positive. We heard that that the ECCPs thought that the in-person meetings were most beneficial for initiating relationships with each other. Several of the ECCPs mentioned that they also liked the setup of the in-person meeting, which enabled them to directly share their thoughts and concerns with CMS staff.

3.9 Analysis of ECCP Quarterly Monitoring Reports

Deloitte's Quarterly Monitoring Reports of ECCPs in the Initiative provide another data source for RTI's evaluation. The operations contractor generates quarterly narrative and dashboard reports from CMS data sources and from data collected and reported by ECCP staff. The reports are designed to track and trend the implementation of the interventions and monitor the activities in the ECCPs. The narrative reports contain quarterly goals, intervention updates, staffing updates (both facilities and ECCP), facility engagement assessments, and best practices, among other pertinent information. The dashboards provide population data, data on tool use, transfers, nursing facility staff turnover, ECCP staff effort, and other domains, aggregated by each ECCP. Data at the nursing facility level are also displayed in some domains.

Originally, our team had considered using data from the Quarterly Monitoring Reports, as well as raw quarterly data used to generate these reports, for RTI quantitative and qualitative analyses. After considerable investigation, RTI's quantitative team came to the conclusion that it was not feasible to incorporate data from the dashboards into their analyses. However, the narrative reports are extensively used to track ECCPs' progress; narrative report findings are incorporated into the RTI ECCP narrative reports.

3.10 Wave 2 Nursing Facility Administrator Survey

3.10.1 Background

One component of RTI's primary data collection efforts is to conduct surveys of Nursing Facility Administrators from the participating facilities. The main objective of the survey is to collect standardized information from all participating nursing facilities, including details about the implementation process, such as associated costs incurred and resources allocated, across all years of the Initiative.

RTI is administering surveys annually in four waves (one per year in Project Years 1 through 4). The surveys are being administered via a web-based application. The survey instrument and the data collection are designed and managed by the RTI evaluation team in collaboration with RTI's Survey Research Division and Research Computing Division in close consultation with CMS. RTI is responsible for collecting, processing, and analyzing all survey data. The survey and data collection procedures were approved by RTI's IRB.

RTI completed data collection for wave 2 of the Nursing Facility Administrator survey in September 2014. Wave 2 refers to the responses collected from all facilities during the second year

of the Initiative. Wave 2 data collection took place from August 2014 through September 2014. Response rates overall and by ECCP are reported in ***Table 3-10***. Results from the wave 2 survey are presented in ***Appendix F,*** and a comparison of wave 1 and wave 2 survey results is presented in ***Appendix G***.

3.10.2 Instrument Development

RTI designed the wave 2 survey instrument specifically for the evaluation of this Initiative. The aim of the instrument is to obtain information from Nursing Facility Administrators or another designated facility contact in management about their implementation experiences during the second year of the Initiative and to capture baseline facility information. The survey instrument (referred to as a questionnaire) was developed with input from an interdisciplinary team, including individuals with expertise in long-term care, health policy, survey methods, and clinical knowledge. The development team primarily consisted of the RTI evaluation team. The project's subcontractors (the Long Term Care Institute; David Grabowski, PhD; and Mary Naylor, PhD, FAAN, RN) and CMS also provided input on the instrument development.

The survey instrument covers several key and broad domains. The following are the final survey domains for the wave 2 survey:

- Introductory items (e.g., respondent's role and tenure at facility; role in the Initiative)
- Facility capabilities (e.g., electronic information systems and customization for the Initiative)
- Implementation successes and challenges (e.g., perspectives on support provided by ECCP, whether the facility had resources to implement, staff resistance, training, etc.)
- Care model description (e.g., components used, such as medication reconciliation, INTERACT, and AMDA tools)
- Implementation process (e.g., preparation time, organizational resources, and staffing and staff time required)
- Solicited feedback on the questionnaire for future use

These domains were intentionally broad to allow for a wide range of implementation experiences likely to be found in this first year of the Initiative. After initial domain development, our team refined the domains by adding specific questions within each domain. The wording of the questions and instructions was reviewed thoroughly over the course of several iterations to ensure that they were clear and concise. This was particularly important given that pilot testing of the instrument was not feasible because there were no appropriate facilities where this instrument could be administered in a meaningful way. Where relevant, RTI reviewed other survey instruments (e.g., National Nursing Home Survey) to use similar language for this survey.

The goals of the survey included minimizing respondent burden and reducing overlap with other primary data collection activities. We purposefully limited the overall length of the

instrument and the number of questions. We also incorporated gate questions in the survey design to allow respondents to skip over follow-up questions if these were not applicable. We conducted tests to estimate the length of time it would take respondents to complete the questionnaire. Based on our tests of the survey instrument, the survey length was determined to be approximately 20 to 30 minutes for facilities. In addition, the goal was to minimize overlap with other primary data collection efforts or information collected by Deloitte.

3.10.3 Data Collection

Wave 2 data collection was conducted in a single round in August and September 2014. We asked respondents to use "since January 1, 2014" as the reference period.

The response rates overall and by ECCP are reported in ***Table 3-10***. Out of 146 total ECCP facilities surveyed, 130 facilities responded to the survey, for a response rate of 89 percent. Of these 130 facilities, a total of 120 facilities completed the survey, and the remaining 10 had partially completed the survey. All responses are included in the results. Given the inclusion of partially completed surveys (item nonresponse), the tables and figures presented in this section may contain differing numbers of respondents. Therefore, we report the number of respondents in all analyses.

Table 3-10
Wave 2 response rate overall and by ECCP

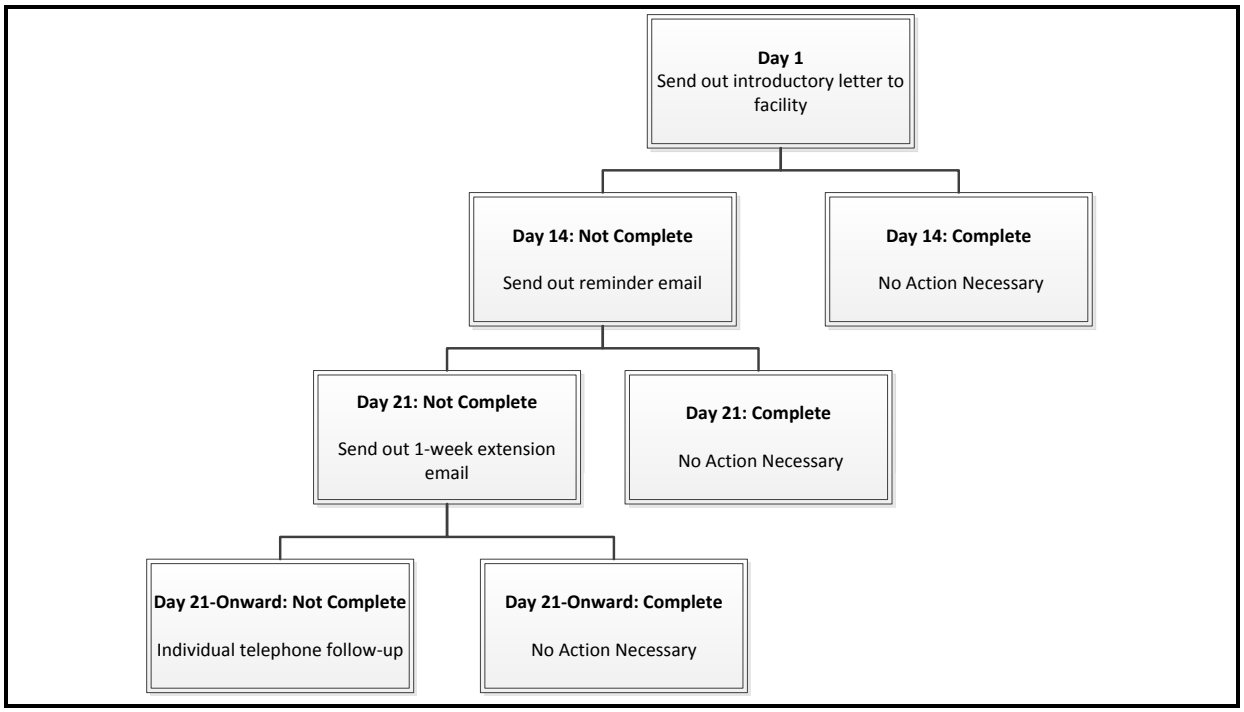
ECCP	State	Total # of participating facilities	Response rate	Surveys completed	Partial surveys
AQAF-NFI	AL	23	91.3%	17	4
OPTIMISTIC	IN	19	94.7%	17	1
MOQI	MO	16	93.8%	14	1
Alegent + Creighton	NE	15	80.0%	12	0
ATOP	NV	24	75.0%	17	1
NY-RAH	NY	30	93.3%	27	1
UPMC-RAVEN	PA	19	94.7%	16	2
All ECCPs		***146***	***89.0%***	***120***	***10***

SOURCE: RTI analysis of wave 2 Nursing Facility Administrator Questionnaire (2014).Survey administration was conducted via a web-based application developed by RTI called Hatteras™.* Hatteras provides the necessary flexibility for data collection, but also offers data encryption to ensure data security. Other modes of administration (e.g., telephone or paper and pencil) were provided to respondents based on need or preference. In total, two facilities elected to complete the questionnaire by phone.

* Hatteras is an online survey platform developed by RTI; additional information about the software can be found at http://www.rti.org/page.cfm/information_technologies.

All facilities were given roughly 4 weeks to complete the questionnaire: 3 weeks of "official" data collection and 1 additional week as an extension only to those facilities that had not yet responded. ***Figure 3-1*** provides an overview of the data collection process. On day 1 of data collection, the RTI team used contact information from CMS to send out an introductory e-mail to the corresponding nursing facility administrator, executive director, or other management contact, requesting that they complete the questionnaire. This introductory e-mail included a link to the web-based application with their log-in ID and password. We also provided appropriate contact information for RTI and CMS for questions or any technical difficulties. On day 14, facilities that had not yet completed the questionnaire were sent a reminder e-mail alerting them that there was 1 week left to complete the survey. On day 21, facilities that had still not completed the questionnaire were sent another e-mail alerting them they had been granted a 1-week extension. At this point, individual follow-ups began by telephone for nonresponding facilities. These follow-up calls were helpful in ensuring that respondents received the e-mail invitation and were also effective in promoting cooperation.

Figure 3-1
Overview of data collection process



During the data collection phase, the RTI team was also able to address all technical issues dealing with access to the survey, password issues, and time-outs. Many of these issues were communicated to RTI via the e-mail account that had been created for this survey (pah@rti.org). Facilities also used the toll-free telephone number provided to notify RTI of any difficulties they were experiencing. The RTI team followed up individually with facilities where an undeliverable e-mail receipt was received to the survey's e-mail address so that the questionnaire could be routed to the correct respondent.

3.10.4 Conclusions and Next Steps

The main objective of the survey effort was to collect standardized information about the implementation process from all participating nursing facilities, and to assess the response to the Initiative from participating facilities over time. The second wave of the web-based survey was conducted successfully. We obtained a high response rate (89 percent) among participating facilities across all ECCPs, allowing us to draw several conclusions about the Initiative and the second year of implementation. The following are the wave 2 data highlights by survey domain.

- ***Leadership turnover among some participating facilities may potentially impact implementing and sustaining the Initiative over time. This finding is consistent with the wave 1 results and previous reports of major turnover in facility administration that the RTI team found documented in site visits and phone interviews***. Eighty-five percent of respondents who completed the wave 2 survey were administrators; however, other facility staff, such as DONs and/or assisted administrators, also completed the questionnaire. The length of time that respondents were in their current position varied, but 42 percent reported tenure of 5 years or more, and 20 percent reported tenure of less than 1 year. We found some variation across ECCPs, and anticipate that this is a relevant factor for all participating facilities that warrants ongoing assessment.

- ***Leveraging IT.*** Twenty-eight percent of facilities customized their electronic information systems to support the Initiative, and another 22 percent reported plans to customize. One example of how these were customized included incorporating electronic INTERACT tools. ***With almost a third of facilities reporting some system customization, understanding the extent to which facilities invest resources to adapt the current systems to facilitate implementation provides valuable information about their commitment to the Initiative.***

- ***Qualitative data pointed to the importance of physician employment arrangements to the Initiative buy-in; survey findings suggest that these arrangements varied widely in participating facilities.*** Given the important role that residents' physicians play in decisions to hospitalize nursing facility residents, we surveyed facilities about the employment arrangements and found variation. For example, about half of facilities reported contracting directly with physician groups and/or reported that physicians practiced independently. Less than 10 percent reported directly employing physicians overall, but 30 percent of one ECCP, NY-RAH, reported directly employing residents' physicians.

- ***Training support is reported to be sufficient and well-received.*** Respondents were generally very positive about the training support ECCPs provided, the helpfulness of the ECCP nurse, and the responsiveness of the rest of the ECCP team. However, there was some variation by ECCP, and a very small number of facilities reported finding the ECCP nurse only somewhat or not at all helpful.

- ***Facility administrators report few barriers to the Initiative's implementation.*** The majority of respondents did not identify financial resources, staffing resources, and staff support, suggesting that facilities perceive few barriers in their ability to implement the Initiative. However, staff turnover was reported as a potential barrier to the Initiative by 20 percent of respondents. Monitoring changes in staff turnover over time will continue to be an important area.

- ***By the end of the second year, the Initiative is still not fully implemented, and the majority of facilities are continuing to phase in components.*** In Project Year 2 of the Initiative, we found that most facilities were still phasing in Initiative components. Sixty-two percent of facilities expected to have phased in all Initiative components over the next 1 to 12 months, and only 25 percent overall reported having fully implemented all components. This suggests that Project Year 2 reflects continued implementation and is important context for our evaluation.

- ***There are some costs to the Initiative's implementation, and some facilities report that resources are required.*** Approximately 20 percent of facilities reported incurring costs for IT and improving infrastructure or adding new capabilities. Few facilities provided cost estimates, and the estimates provided were wide ranging.

- ***Staffing and Turnover.*** Very few facilities (less than 6 percent) reported hiring additional clinical staff or consultants. However, 37 percent reported turnover of key initiative staff, such as the DON.

- ***Training is key to this Initiative, and most facilities are engaged.*** Given that facilities are phasing in Initiative components and many experience turnover, staff training is an important activity. Additionally, training is an essential part of most ECCP models. Nearly all facilities reported providing training for the Initiative, which was most often provided by the ECCP staff.

- ***The Initiative requires commitment from facility staff.*** We also found that time spent implementing the Initiative varied by staff type. Clinical administrative staff spent the most time implementing the Initiative, and RNs/LPNs reported spending the most time per resident per day for the Initiative. About half of respondents reported that the time required for the Initiative was about what they had anticipated.

- ***Most care model components are stable and remain the same in the second year of implementation.*** Staff education and condition management/early identification of change in condition were the top care model components introduced, implemented, or enhanced as a result of the Initiative. These and other care components were recommended by respondents when asked which components they would recommend to facilities trying to reduce avoidable hospitalizations.

- ***The Initiative is beginning to play a role in quality improvement, often by fulfilling QAPI requirements.*** Seventy-seven percent of facilities reported that Initiative participation contributed to fulfilling QAPI requirements.

- ***The Initiative is promoting communication between organizations and providers.*** Project Year 2 of the Initiative was associated with developing more formal procedures or communications with outside organizations, such as hospitals and hospice agencies, for half of facilities.

- ***Overall Initiative support remains strong in the second year.*** Wave 2 survey findings reflected strong support by nursing facility administrators for the Initiative. Respondents overwhelmingly supported the Initiative: 95 percent strongly supported or supported it.

In summary, the wave 2 survey findings revealed mostly positive responses to the Initiative overall. Several of the care components are being used, and very few potential barriers were identified. Even though administrators are often knowledgeable about the Initiative and may have obtained assistance from other facility staff for information, it is possible that they may not have known all Initiative specifics. Similarly, nursing facility administrators represent one perspective, and this perspective may differ from other facility staff. For example, in wave 1, we found some discrepancies between the survey data reported by nursing facilities and what the RTI primary data collection teams observed during site visits. The surveys are self-reports, mainly by the administrators. As we continue to review the wave 2 survey data, we anticipate that we may find similar discrepancies and think it is worth mentioning these caveats for interpretation of the initial wave 2 results.

3.11 Comparison Nursing Facility Administrator Survey

3.11.1 Background

The primary data collection activities in our evaluation provide important context for the results of the secondary data analysis. However, finding definitive and robust results from the secondary data analysis has proven difficult because of small sample sizes and the relatively early stage of the Initiative during wave 2. It is conceivable that there is a lag between Initiative implementation and measurable impacts on outcomes, or that the Initiative does not always produce the desired outcomes as defined. In fact, our wave 2 survey results indicate that 75 percent of ECCP facilities were still phasing in Initiative components. Although there are a number of plausible explanations for the small or no effect sizes found to date, our evaluation is not designed to test all of these explanations. Some important issues we identified during our site visits and phone interviews include the possibility that there is some degree of parallel change of practice in the comparison groups and potential spillover effects of the Initiative to nonparticipating facilities.

Potential parallel changes in the comparison group refer to the possibility that comparison facilities are concurrently implementing INTERACT tools or other initiatives aimed at reducing potentially avoidable hospitalizations, such as placing NPs on the floors. These activities could be the result of state, corporate, or facility-level initiatives or quality improvement efforts. Given the current policy attention on hospitalizations and rehospitalizations of Medicare beneficiaries (e.g., the Hospital Readmission Reduction program, anticipation of publicly reporting SNF readmissions rates, and SNF value-based purchasing), it is indeed likely that facilities have adopted INTERACT or other models in response. Spillover refers to the possibility that the

Initiative itself causes nonparticipating facilities to change their behavior as a result; for example, participation of a chain-owned facility may spur a corporate-wide implementation of some or all model components. Corporate-wide implementation would be of concern if any of these facilities were assigned to our comparison group. Both parallel change and spillover could diminish the effect sizes and impact the results of our evaluation. Therefore, it will be valuable to have some insight into the extent that these other initiatives may be present.

One way to strengthen our evaluation is to assess the extent to which there is "contamination" of these types in the comparison group. In Project Year 3, the RTI team expanded the primary data collection activities to include a web-based survey of comparison facilities. The goal of the survey is to collect data about specific interventions and quality improvement initiatives related to reducing hospitalizations that are being implemented. These data are not available in the existing secondary data sources. Understanding whether observed effects are being diluted by the penetration of similar changes in the comparison group or the state in general will be important in interpreting the results.

3.11.2 Instrument Development

Expanding the evaluation required designing a new survey instrument. The survey instrument is brief, focusing only on the areas where information is needed. The instrument includes a list of interventions and quality improvement areas related to avoidable hospitalizations and asks respondents to report which they are currently implementing. For respondents indicating that their facility is or has implemented interventions to reduce hospitalizations, we will ask for details of the practices being implemented, such as what source motivated the implementation of this intervention (e.g., state, corporate, etc.) and when the practice began. This will allow us to understand the extent to which these activities overlap with the CMS Initiative in terms of the content, resident population, and time period.

To simplify the data collection and reduce respondent burden, the survey instrument is brief and targeted to the specific topic areas. The survey items are closed-ended, although we allow respondents to describe other initiatives not accounted for in the response categories. Please see ***Appendix I*** for a copy of the final comparison facility instrument.

3.11.3 Data Collection

Using a list of 262 comparison facilities, RTI contacted facilities by telephone to obtain names and e-mail addresses of administrators. RTI prepared a script for staff to use in contacting facilities by telephone that standardized how the project was described and how questions were answered. A copy of the CMS-approved script can be found in the May 2015 update of the project design report. The script and survey wording describe the questionnaire as information gathering for CMS on activities related to reducing hospitalizations occurring in each of the states. The Initiative itself is not mentioned so as not to create confusion.

Similar to the wave 2 survey, the comparison facility survey was conducted via a web-based application developed by RTI called Hatteras™. RTI obtained e-mail addresses for administrators at 236 of the 262 facilities (90 percent). These 236 facilities with known email addresses constituted the survey sampling frame. RTI used this contact information to send out

an introductory e-mail to the facility administrators asking that they complete the questionnaire. This introductory e-mail included a link to the web-based application with their log-in ID and password. We also provided appropriate contact information for RTI and CMS for questions or any technical difficulties. Comparison facility data collection launched in June 2015 and was completed in August 2015.

3.11.4 Preliminary Findings

Of the 236 facilities we invited to complete the survey via e-mail, a total of 102 completed or partially completed the survey, yielding a final response rate of 43 percent. Response rates were lowest in Alabama (22 percent) and highest in Pennsylvania (80 percent) and averaged 43 percent across all states. Following are a few preliminary data highlights. The full set of results will be disseminated in standalone memorandum to CMS, to be released in the fall of 2015.

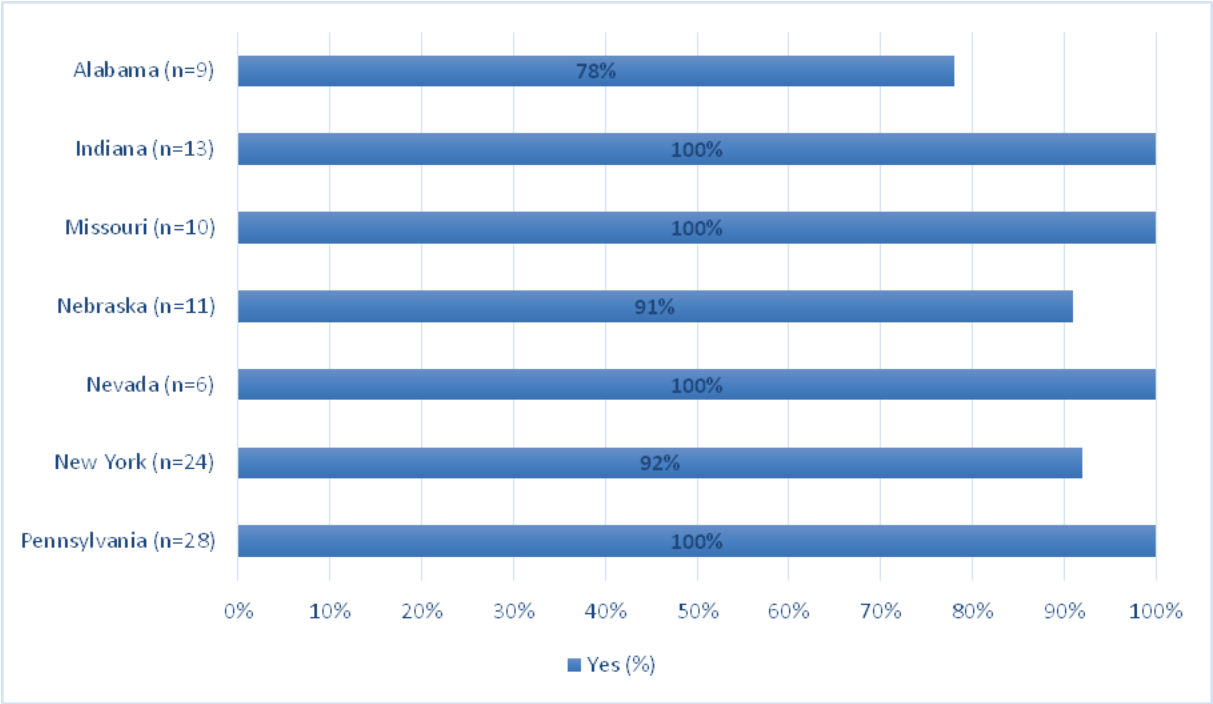
- Eighty-four percent of respondents reported being nursing facility administrators, who were our target respondents.

- **Key Finding: Overall, 95 percent of comparison facilities that responded reported that since January 2011, their facility has introduced policies or procedures designed specifically to reduce avoidable hospitalizations of long-stay residents.**

- The proportion of facilities reporting these findings varied by state, as shown in ***Figure 3-2***. All comparison facilities in Indiana, Missouri, Nevada, and Pennsylvania reported introducing policies or procedures to reduce avoidable hospitalizations of long-stay residents, compared to 78 percent in Alabama.

- Several specific policies and procedures to avoid hospitalizations for long-stay residents were reported. Notably, hospitalization rate tracking or review was reported by 93 percent of facilities; SBAR, Know It All Before You Call (AMDA), or other similar forms to standardize communication between nurses and physicians were reported by 79 percent of facilities; and Stop and Watch (INTERACT) to improve Certified Nursing Assistants' (CNAs') recognition of changes in condition, or other systems to alert staff to changes in residents' conditions that could lead to hospitalizations were reported by 71 percent of facilities.

Figure 3-2
Percentage of Comparison Facilities with Policies/Procedures to Reduce Avoidable Hospitalizations of Long-Stay Residents by State, 2015



Source: RTI analysis of survey data collected among the evaluation's comparison facilities, June-August 2015.

These preliminary results indicate that a great majority of comparison group facilities—and in many states, all facilities—have been engaged in practices related to the Initiative in the past 4 years. In our subsequent deliverables, RTI will provide more data on the specific details of these practices, timelines, and the types of entities who organized these efforts. These early findings will have major implications for the evaluation results.

SECTION 4
DISCUSSION

The 2014 data indicate much more clearly than data from 2013 that there are probable Initiative effects on many of the measures and some more consistent patterns of effects for a few of the ECCPs. In Pennsylvania and Missouri, there are strong patterns indicating intervention effects reducing utilization and spending. The measures are not all significant, but most are. Other ECCPs, in Alabama, Indiana, and New York, show mostly consistent indications of reductions, but few measures are statistically strong. The ECCP effects in Nebraska and Nevada are mixed, with inconsistencies in direction of effects weakening the evidence. It is also important to note that statistical significance refers to the probability that an effect could be observed by chance. As statistical estimates are made in large numbers, we observe more chance occurrences of large effects. A pattern of substantive estimated effects is stronger evidence for a causal relationship than sporadic findings. The Initiative effects we have measured are the effects on spending and utilization to the Medicare program, without accounting for the costs of the Initiative to CMS. Some of these costs would be unique to the structures of the Initiative and some to the actual interventions. In this report we are evaluating the intervention results.

The MDS-based quality measures do not show any pattern of change related to the Initiative. If the focus of the Initiative is on avoiding hospitalizations and ED use related to changes in resident condition, the effects of the interventions on the broad range of MDS-based quality measures may be very limited.

At this point it seems that the more "hands-on" interventions are showing greater effects than the purely educational interventions, though at greater cost. Our primary data collection indicates that there are other factors, varying across ECCPs and facilities, that make the Initiative effects vary as well.

Continuing from 2014, the 2015 site visits and preliminary telephone interviews also demonstrated varied progress across the ECCPs. Some ECCPs have implemented all or nearly all of their model components, whereas other ECCPs are still in the midst of implementation. The states that have made the most progress in terms of implementation (Pennsylvania and Missouri) also seem to have the most significant results from the quantitative analyses. Despite varied degrees of implementation, the response to the ECCP RNs and NPs generally has been very positive across all ECCPs. Facilities report a strong appreciation for extra staff on-site, particularly nurses who provide clinical support. Participating facilities also report appreciation for the education provided by the ECCPs. Although the existing quantitative data indicate various degrees of success in reducing hospitalizations thus far, the majority of interviewees viewed the Initiative as positive and potentially beneficial for residents.

Of particular note, relationships remain critically important for success within all ECCPs and across all levels. The "fit" of the ECCP nurses with the facility staff is pivotal in affecting culture change and developing new best practices within facilities (e.g., consistent use of INTERACT tools). Likewise, the relationships between staff and facility leadership, as well as corporate ownership, were said by interviewees to affect the overall potential success of the ECCP Initiatives and greatly influence the consistency of INTERACT tool use. Early engagement across all levels of staff, leadership, and ownership was said by interviewees to be

critical in successful deployment of any intervention to nursing facilities. In terms of challenges, qualitative findings pointed to difficulty with implementing new technology, lack of consistent buy-in among specific physicians, pressure from families, and lack of facility leadership support as the main barriers to implementation of the Initiative. Staff turnover in the ECCPs and facilities, as well as staff retention difficulties, further complicated the implementation.

Thinking forward to the final year of the Initiative in its current form, many facilities report concern over losing their ECCP nurses at the conclusion of the Initiative. Some facilities are interested in additional funding to retain their ECCP nurses permanently. Many facility interviewees indicated that some aspects of the Initiative will remain in place, even if the ECCP nurses are no longer present in the facilities. Some INTERACT tools—medication review with the focus on reducing antipsychotic medications, quality improvement/QAPI efforts to reduce avoidable admission, and advance care planning—were the Initiative components most likely to remain in place after the end of the project. Beyond these specific components of the Initiative, several interviewees across ECCPs indicated that the project has opened their eyes to more opportunities to improve care for residents, while also potentially reducing hospitalizations and resultant costs. Even if the data are inconclusive or inconsistent in demonstrating reductions in hospitalization rates across all ECCPs, this anecdotal evidence suggests a potential mindset shift in facilities that may result in better care and fewer hospitalizations over time.

As this report was being written, CMS announced a solicitation for ECCP participation in a second phase of the Initiative to start in October 2016. In this phase, payments to facilities would be made for patients with particular conditions who are not admitted to hospitals. This will address staff retention concerns at participating ECCPs.

In the context of the qualitative findings from our site visits, phone interviews, and surveys in the summer of 2014, we know that the interventions were still maturing throughout 2014. They were certainly more developed than in 2013, but were still being refined, and components were being rolled out throughout the year. This protracted implementation of individual components of the Initiative across ECCPs makes it difficult to ultimately tease out what individual interventions are working well. However, the numbers in the multivariate analyses are pointing in the desired direction and savings. If these trends are maintained in the next 2 years of data analysis, it would be easier to make positive conclusions about the overall effect of the Initiative. However, it is not clear whether it would be possible to attribute these positive results to the specific interventions that are part of each individual ECCP model.

A potential issue identified during site visits and phone interviews is the possibility that there is some degree of parallel change in practice in the comparison group. A web-based survey of comparison facilities indicated that 95 percent of comparison facilities that responded reported that their facility has introduced policies or procedures designed specifically to reduce avoidable hospitalizations of long-stay residents since January 2011. The intensity of the training and the presence of clinical staff that the ECCPs bring to the facilities seems to make a difference beyond just introducing new tools, as may be occurring in the comparison facilities. We will be able to investigate this further in the next year.

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