Evaluation of the Independence at Home Demonstration

An Examination of Year 9, the Third Year of the COVID-19 Pandemic

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Overview of the demonstration

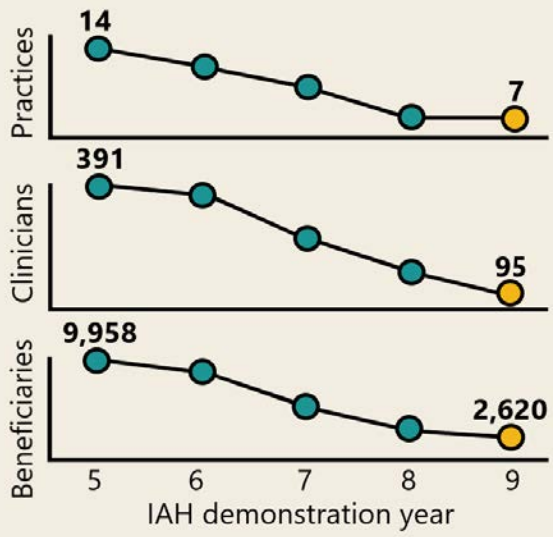
The Independence at Home (IAH) demonstration was a Congressionally mandated test of whether a payment incentive and service delivery model for providing home-based primary care reduces health care spending and improves health outcomes for Medicare beneficiaries who are chronically ill and functionally limited. Participating home-based primary care practices could earn incentive payments if (1) the Medicare spending of their beneficiaries spending was less than a given spending target and (2) their performance on selected quality measures met specified thresholds.

The IAH demonstration, which began in June 2012, was originally intended to last three years, but Congress extended it three times. This report describes the evaluation's findings through 2022, which was Year 9 of the demonstration. It also draws conclusions about the demonstration across the first three years of the COVID-19 pandemic (IAH Years 7 to 9).

Chapter 1

Seven of the 14 evaluated practices participated in Year 9.

Practice participation in Year 9 was unchanged from Year 8. Year 9 was the third consecutive year in which these seven practices experienced a decrease in the number of IAH-eligible beneficiaries. At most of these seven sites, the number of participating clinicians also fell and contributed to the reduction in beneficiaries.



Chapter 2

In Year 9, IAH beneficiaries continued receiving more ambulatory visits and home health services than comparison beneficiaries, as they had throughout the COVID-19 pandemic.

Overall, IAH beneficiaries had 7.3 percent more ambulatory visits in Year 9 than comparison beneficiaries—including home, office, telehealth, and telephone visits. IAH beneficiaries received more primary care and less specialty care than comparison beneficiaries in Year 9, as in previous years. On average, IAH beneficiaries had about one primary care visit every six weeks, and comparison beneficiaries had about one visit every nine weeks. IAH beneficiaries had a lower percentage of primary care visits via telehealth or telephone (11.0 percent) than comparison beneficiaries (17.2 percent) in Year 9. This differed from Years 7 and 8 when IAH beneficiaries had a higher percentage of primary care visits via telehealth or telephone. As in previous years, IAH beneficiaries used home health services more than comparison beneficiaries did in Year 9, with seven more visits and 28 more days in care.

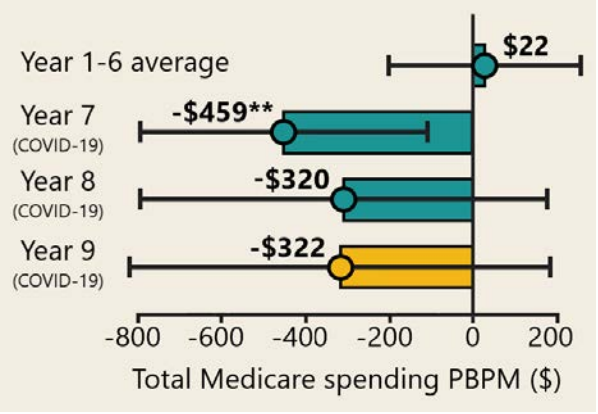
Chapter 3

The estimated effect of IAH on total spending in Year 9 was not statistically significant but continued a trend of larger estimated reductions in spending during the pandemic than in previous years.

IAH may have reduced total Medicare spending in Year 9 by -$322 per beneficiary per month (PBPM) (-7.5 percent, not statistically significant). COVID-19 diagnoses and hospitalizations did not play a direct material role in this result.

After accounting for incentive payments to practices, IAH may have slightly *increased* total net spending by CMS in Year 9—despite most practices earning no more than half the maximum incentive payment in Year 9 because of poor performance on some quality measures.

The estimated effects in the three years of the COVID-19 pandemic (Years 7 to 9) ranged from -$320 to -$459 PBPM. By contrast, across Years 1 to 6, the estimated effect of IAH among the 10 practices that participated in IAH during at least one pandemic year was near zero ($22 PBPM).



Note: Effects in Years 1 to 6 reflect the 10 sites that participated during the pandemic.

** Difference is statistically significant at the 0.05 level.

The effect on spending was concentrated among beneficiaries dually eligible for Medicare and Medicaid. The reduction of -$856 PBPM (-18.6 percent, statistically significant) in Year 9 among dually eligible beneficiaries was similar to Year 8.

Chapter 4

IAH did not have favorable effects on hospital-based measures of quality of care in Year 9, but likely reduced mortality.

IAH did not reduce unplanned readmissions, potentially avoidable hospitalizations, nor potentially avoidable ED visits in Year 9. This finding was consistent with results in earlier years of the pandemic. IAH likely reduced the probability of dying in Year 9 (-15.0 percent), a statistically significant result that was similar to the results in Years 7 and 8.

Chapter 5

IAH did not convincingly reduce spending and hospital use in Year 9, except for dually eligible beneficiaries.

The IAH demonstration aimed to reduce Medicare spending by lowering hospital use and improving health outcomes, but IAH did not convincingly meet those goals in Year 9.

IAH may have led to larger reductions in spending and mortality during the COVID-19 pandemic, and these results were concentrated among beneficiaries dually eligible for Medicare and Medicaid. However, these effects were likely the result of changes in the relative effectiveness of home-based primary care because of the unique circumstances of the pandemic. During the pandemic, developing a trusting relationship and effective communication through visits at home with IAH clinicians may have made IAH beneficiaries feel more comfortable receiving primary care and home health visits, COVID-19 vaccinations, and other services.

At the same time, several factors suggest that the IAH payment incentive was not an effective policy to reduce spending and hospital use during Year 9, including declines in the number of participating clinicians and beneficiaries, no favorable effect on Medicare spending net of IAH incentive payments or hospital use, and most practices earning no more than half the maximum incentive payments.

1. Introduction

Section 3024 of the Patient Protection and Affordable Care Act (Public Law 111-148) enacted the Independence at Home (IAH) demonstration in 2010. The purpose of the IAH demonstration was to test a payment incentive and service delivery model for providing home-based primary care to Medicare beneficiaries who are chronically ill and functionally limited. Home-based primary care is any service that primary care clinicians provide in the home (including assisted living facilities and other group residences) rather than in an office. In June 2012, the Centers for Medicare & Medicaid Services (CMS) launched the IAH demonstration. Under the demonstration, physicians and nurse practitioners (NPs) directed home-based primary care teams with the goal of reducing health care spending and improving health outcomes.

The legislation authorizing IAH required an independent evaluation to determine the impact of the demonstration on beneficiaries' Medicare spending and health-related outcomes. This report describes the evaluation's findings through the ninth year of the IAH demonstration. It is the latest addition to our previous evaluation reports covering the first eight years of the IAH demonstration.[1]

1.1. Background on the IAH demonstration and evaluation

The IAH demonstration provided incentives to home-based primary care practices that met certain requirements to encourage lower cost and higher quality care. As part of the IAH demonstration, participating practices could earn incentive payments if the Medicare spending on their beneficiaries was below the practice's target spending level and the practice met standards on a set of quality measures. (See Appendix A for more information about calculation of the incentive payment and Chapter 2 for more information about the quality measures.) The IAH demonstration provided incentives to practices to deliver timely, coordinated care at home by treating beneficiaries' acute conditions promptly and preventing beneficiaries' chronic conditions from worsening. Improved management of care for beneficiaries may decrease the need for costly emergency department (ED) visits and hospital admissions. For the IAH demonstration to produce savings for the Medicare program, it must have first convincingly reduced Medicare spending for beneficiaries of IAH practices compared with similar beneficiaries who did not receive home-based primary care. Then, the reduction in Medicare spending must have been larger than the incentive payments CMS paid to IAH practices, which represented the cost to CMS of attracting and maintaining participants in the demonstration.

[1] Previous IAH evaluation reports are available at https://www.cms.gov/priorities/innovation/innovation-models/independence-at-home.

1.1.1. Eligibility requirements for practices and beneficiaries

The law that enacted the IAH demonstration described the eligibility requirements for practices and beneficiaries. Demonstration practices must have had experience delivering home-based primary care and have had teams led by physicians or NPs; the teams could include physician assistants (PAs), clinical staff, and other health and social services staff (Exhibit 1.1).

Exhibit 1.1. Requirements for practices to participate in the IAH demonstration

- Be led by physicians or nurse practitioners who provide home-based primary care as part of a team
- Be organized at least in part for the purpose of providing physicians' services
- Have experience providing home-based primary care to beneficiaries with several chronic illnesses
- Make in-home primary care visits and have staff who are available at all hours
- Use electronic medical records, remote monitoring, and mobile diagnostic technology
- Provide services to at least 200 IAH-eligible beneficiaries each year
- Report data for quality measures to the Centers for Medicare & Medicaid Services
- Achieve savings at least once in three consecutive years

Beneficiaries who received home-based primary care from the IAH practices were eligible for the demonstration if they met several criteria related to their health and use of health care (Exhibit 1.2). Congress limited the demonstration to 10,000 beneficiaries in each of the first five years, 15,000 beneficiaries in Years 6 and 7, and 20,000 beneficiaries in Years 8 to 10.[2]

Exhibit 1.2. Requirements for beneficiaries to be eligible for the IAH demonstration

- Have at least two chronic conditions
- Require human assistance with at least two activities of daily living
- Have been hospitalized and received acute or subacute rehabilitation services in the prior 12 months
- Be enrolled in fee-for-service Medicare
- Not be in long-term care or hospice at the time of enrollment in the demonstration

1.1.2. Evaluation study design

We used a quasi-experimental difference-in-differences design to study the effects of IAH on key outcomes, such as spending and hospital use. We matched beneficiaries in a comparison group (who did not receive home-based primary care) with IAH

[2] The IAH group used for the evaluation is not constrained by the statutory limit on the number of enrollees, but the evaluation group never exceeded those limits. For information about differences between the evaluation and the list of beneficiaries enrolled in the demonstration, see Appendix A.

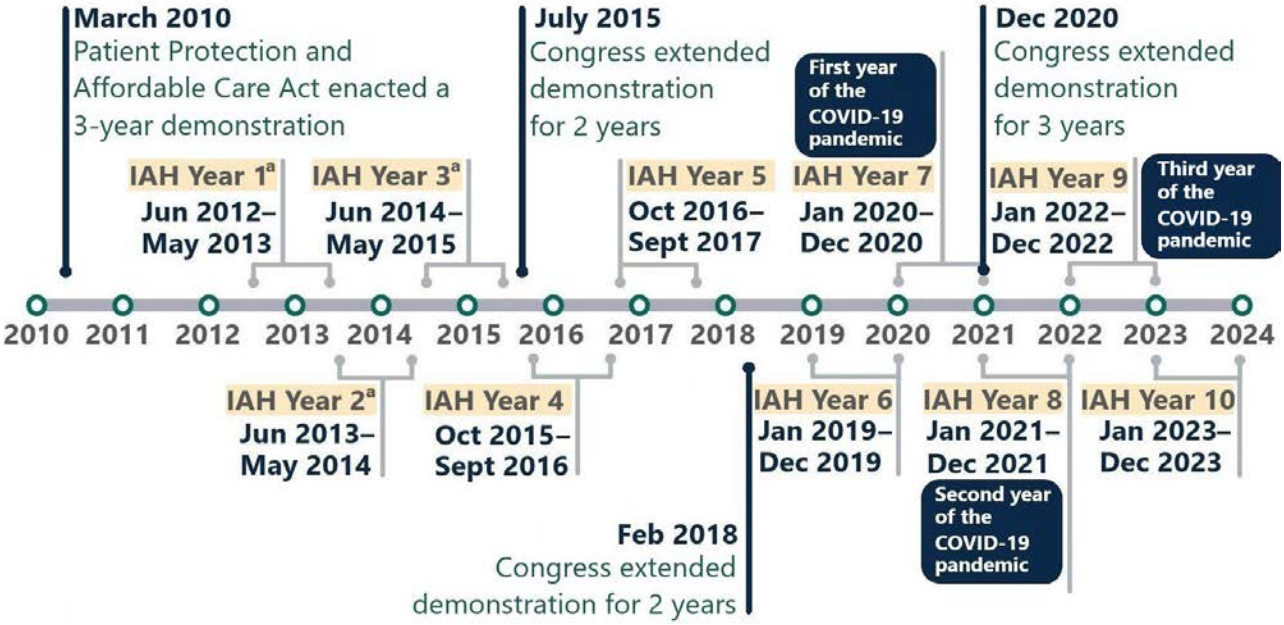
beneficiaries based on their characteristics each year (that is, IAH beneficiaries and their matched comparisons must requalify for the sample each year). Beneficiaries in the matched comparison group met the IAH eligibility criteria and lived in the same geographic areas as IAH beneficiaries. We constructed our sample of IAH and comparison beneficiaries for each of 11 years: two fixed pre-demonstration years and nine demonstration years. We measured outcomes for beneficiaries during the months they were eligible for IAH the year.

For each demonstration year, we estimated effects as the change in outcomes for beneficiaries meeting IAH eligibility criteria and receiving home-based primary care from IAH practices before and after the start of the demonstration relative to the change in outcomes during the same period for the comparison group. This difference-in-differences methodology removes any consistent influence of unmeasured factors on outcomes from the estimated effects (see Appendix A for details on the methodology).

1.2. History of the IAH demonstration

The IAH demonstration, which began in June 2012, was originally intended to last three years, but Congress has extended it three times (Exhibit 1.3). Year 9, the subject of this report, was the second year of the third extension of the demonstration.

Exhibit 1.3. Key dates related to the IAH demonstration



[a] For three participants, Years 1 to 3 began in September and ended in August rather than June to May.

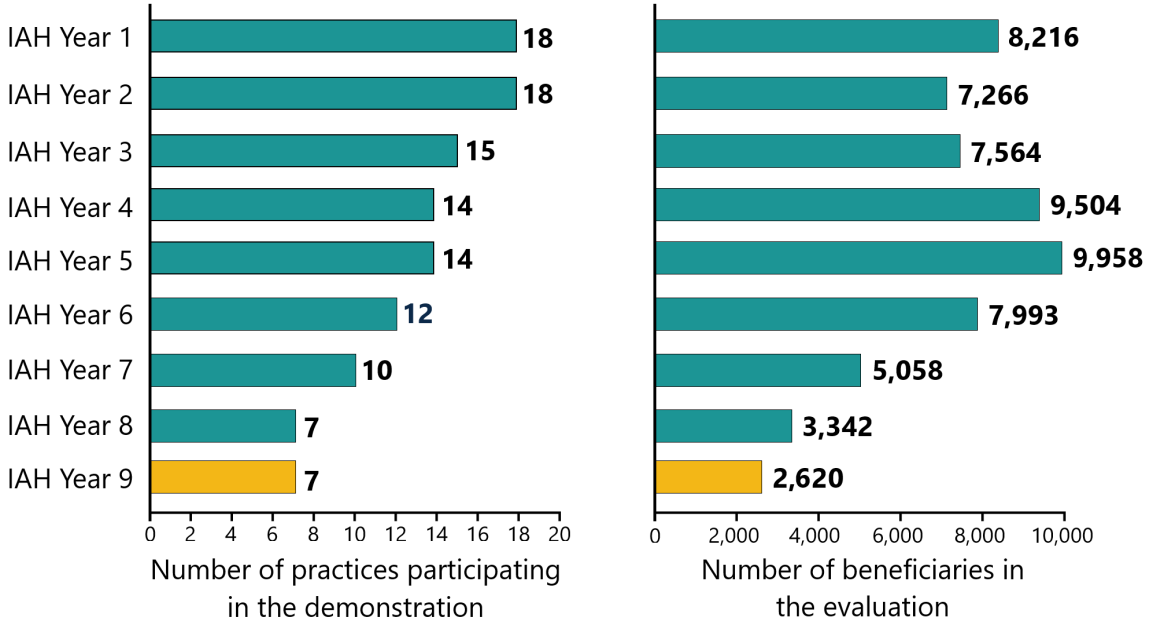
The demonstration began with 15 participants, and three more participants joined in September 2012 for a total of 18. We refer to each of these participants as practices

(or sites), though some of the 18 were consortia that consisted of multiple organizations with different ownership participating as one practice.

1.3. Continued decline of IAH participation in Year 9

Only seven of the original 18 participants remained in the demonstration (and the evaluation) by Year 9 (Exhibit 1.4). Five of these seven are operated by the HarmonyCares Medical Group (which was known as Visiting Physicians Association until 2022). For all but one of these sites, Year 9 was the final year of participation in the demonstration. Year 9 was the third consecutive year in which fewer eligible beneficiaries participated than in any previous year of the demonstration.

Exhibit 1.4. Number of IAH beneficiaries and participating practices in the evaluation by year

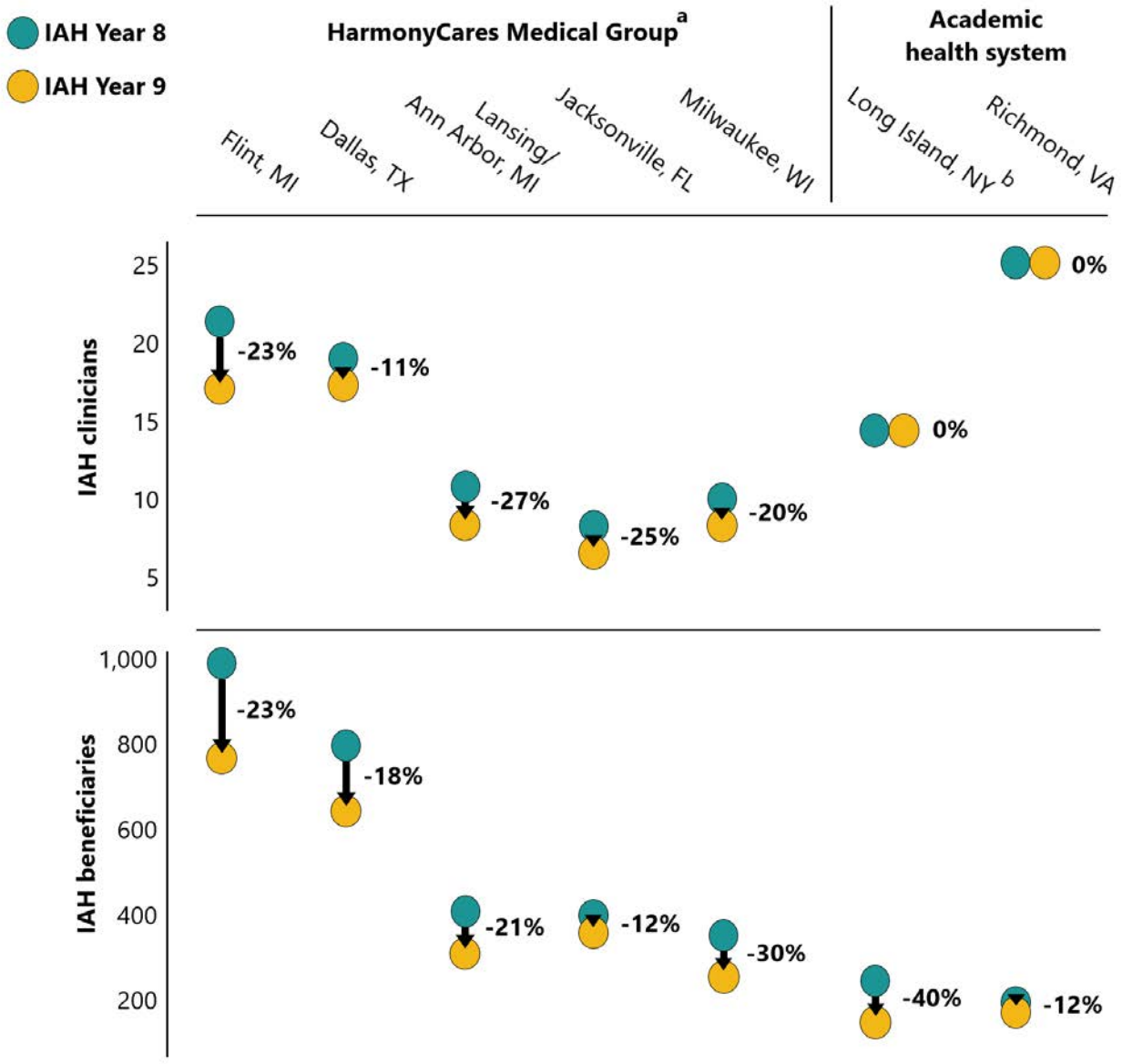


Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: This evaluation report excludes four practices that left the demonstration before Year 4. For more information about these practices, see Exhibit 1.6.

At most of these seven sites, the number of clinicians participating in the demonstration in Year 9 decreased notably relative to Year 8 (Exhibit 1.5). As a result, the number of IAH beneficiaries decreased, too. From Years 8 to 9, the average IAH site had a 15 percent reduction in clinicians participating in the demonstration and a 22 percent reduction in beneficiaries; it followed decreases of 24 percent (clinicians) and 18 percent (beneficiaries) from Years 7 to 8.

Exhibit 1.5. The number of IAH clinicians participating in the demonstration and beneficiaries in the evaluation sample decreased from Year 8 to Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Note: The practice in Richmond is a consortium that consists of three organizations located in Richmond, Philadelphia, and Baltimore. For more information, see Appendix A.

[a] HarmonyCares Medical Group was known as Visiting Physicians Association until 2022.

[b] The discrepancy between the large decrease in the number of IAH beneficiaries and no change in the number of clinicians for the practice in Long Island was driven by two factors: (1) two clinicians listed as active in the IAH Reporting System for Year 9 had no visits to IAH-eligible beneficiaries we identified in administrative data, and (2) two clinicians added in 2022 (replacing two clinicians who were removed after Year 8) did not start until June and September of 2022.

IAH practices provided clinician identification numbers for clinicians that participated in the demonstration to the IAH implementation contractor through the IAH Reporting System, and the evaluation used those clinician identification numbers and Medicare claims data to identify IAH beneficiaries treated by the clinicians for the evaluation sample each year. Each demonstration year, IAH practices added new clinician identification numbers and removed others through the IAH Reporting System because of turnover among clinicians and changes in the size of the practice. However, according to an analysis by the IAH implementation contractor, five of the seven IAH practices that participated in Years 8 and 9 stopped adding and removing clinician identification numbers after Year 8, with a few minor exceptions. The lack of changes to clinician identification numbers suggests that the evaluation might not include all beneficiaries that it otherwise would have included had these five IAH practices updated clinician identification numbers. In addition, it serves as evidence of disengagement from the IAH demonstration by these five practices after Year 8.

All seven participants in Year 8 remained in Year 9. The 11 practices that withdrew before Year 8 did so for a variety of reasons (Exhibit 1.6). Four of the 11 practices left the demonstration before Year 4 because they could not meet the demonstration requirements, and we did not include these four practices in any year of the evaluation sample. Of the remaining seven practices, two left the demonstration after completing Year 5, two left after Year 6, and three left after Year 7.

Exhibit 1.6. Reasons why practices left the IAH demonstration

Practice	Timing of withdrawal	Reason for withdrawal
Atlanta, GA (2 practices)[a]	Before Year 3	Internal business issues and reporting difficulties
Chicago, IL (7 practices)[a]	Before Year 3	Internal business issues and reporting difficulties
Stuart, FL (2 practices)[a]	Before Year 3	Internal business issues and reporting difficulties
Louisville, KY	Before Year 4	Did not meet Medicare programmatic billing rules
Austin, TX	Before Year 6	Did not meet statutory requirement for achieving savings at least once in three consecutive years
Cleveland, OH	Before Year 6	Did not meet statutory requirement for achieving savings at least once in three consecutive years
Boston, MA	Before Year 7	Did not meet statutory requirement for minimum number of beneficiaries
Durham, NC	Before Year 7	Dissatisfaction with demonstration operations
Brooklyn, NY	Before Year 8	Began participating in a different CMS Innovation Center initiative
Portland, OR	Before Year 8	Began participating in a different CMS Innovation Center initiative
Wilmington, DE	Before Year 8	Began participating in a different CMS Innovation Center initiative

Source: Data from the IAH implementation contractor.

[a] Practices located in Atlanta, Chicago, and Stuart participated as consortia.

1.4. Summary of previous reports

> *"[One] challenge we faced was the continual shifting of focus and work in order to address the surges and declines of COVID cases with each wave."*
>
> — IAH practice survey respondent

The IAH demonstration aimed to reduce Medicare spending and hospital use and improve health outcomes. However, the evaluation did not produce convincing evidence that IAH consistently achieved these goals in Years 1 to 8. Evidence of spending reductions and improved health outcomes in some years of the demonstration were either driven a single influential site (which stopped providing primary care after Year 5)[3] or were probably driven by the unique circumstances of the COVID-19 pandemic.[4] Further, the demonstration did not provide a sufficient incentive for IAH practices to prioritize high performance on the quality measures used to calculate incentive payments. To be eligible for an incentive payment in a given year, IAH practices had to meet performance thresholds for at least three of six quality measures. Whether the practice earned its full maximum payment or a lower amount depended on the number of quality measures for which it met the threshold. In every demonstration year, more than half of the IAH practices had poor performance on at least two of the six quality measures, leading to smaller payments.

1.5. Implications of the COVID-19 pandemic for evaluating Year 9

The ways IAH could have affected spending and other outcomes in Year 9 (2022), the third year of the COVID-19 pandemic:

- Changes in care delivery by IAH practices because of the IAH payment incentive
- Changes in the relative effectiveness of home-based primary care for IAH beneficiaries during the COVID-19 pandemic, some of which may have also applied in Year 7 and Year 8 (2020–2021)

IAH Year 9 ran from January to December 2022. The U.S. Department of Health and Human Services (HHS) declared a public health emergency on January 31, 2020, because of COVID-19. The COVID-19 pandemic and the public health emergency continued through all of 2022 and affected many aspects of health care during that time. A variety of factors made 2022 a distinct phase of the pandemic, such as the introduction of an antiviral therapy, which was granted Emergency Use Authorization in December 2021; most adults having some level of immunity to COVID-19 because of infection, vaccination, or both (Jones et al. 2023); and the relaxation of some initial pandemic policies such as those regarding masks and in-person gatherings.[5] However, cases of COVID-19 illness and related mortality remained high in 2022, particularly early in the year (CDC 2024; New

[3] For more information, refer to the evaluation report covering Year 5 of the IAH demonstration.

[4] For more information, refer to the evaluation report covering Year 7 of the IAH demonstration and the evaluation report covering Year 8 of the IAH demonstration.

[5] For more information about the trajectory of the COVID-19 pandemic, refer to the Centers for Disease Control and Prevention's COVID-19 Timeline.

York Times 2023). People who met IAH eligibility criteria remained at much higher risk of severe illness or death from COVID-19 than other groups of people because of their poor health and functional status—particularly since take-up of antiviral therapy was low (Lazer et al. 2022).

As was the case for the first and second years of the COVID-19 pandemic (2020–2021), interpretation of the estimated effect of the IAH demonstration in the third year should differ during the pandemic from years preceding the pandemic. If home-based primary care through IAH practices became relatively more (or less) effective at reducing spending during the pandemic relative to care received by the comparison group and this change continued through the third year of the pandemic, then the estimated effect in Year 9 would reflect this change. Or it could differ from the estimated effect in Year 7 and Year 8 because of differences in the phases of the pandemic during each year (for example, the relative efficacy of home-based primary care could have returned to its pre-pandemic level as comparison beneficiaries returned to more typical patterns of care in physician offices). In this report, we examine the effects of IAH in Year 9 and all years of the pandemic (Years 7 to 9).

2. What was care like for IAH beneficiaries in Year 9 and other years of the COVID-19 pandemic?

Key takeaways

- IAH practices' home-based primary care had several features that differed from typical office-based care, such as opportunities for clinicians to observe potential safety issues and medication management in the home. These features of home-based primary care may have offered enhanced benefits during the COVID-19 pandemic.
- IAH beneficiaries had 7.3 percent more ambulatory visits than comparison beneficiaries in Year 9, a considerably smaller gap than in Years 7 (27.5 percent) and 8 (15.8 percent). This change was primarily from a decrease in telehealth and telephone visits for IAH beneficiaries.
- Although primary care continued to play a larger role in IAH beneficiaries' health care than it did for comparison beneficiaries in Year 9, the difference in primary care visits between IAH and comparison beneficiaries decreased. In Year 9, IAH beneficiaries averaged 3.3 more primary care visits than comparison beneficiaries, a smaller gap than in Years 7 (5.4 visits) and 8 (3.9 visits)
- IAH beneficiaries had a lower percentage of primary care visits via telehealth or telephone (11.0 percent) than comparison beneficiaries (17.2 percent) in Year 9. This differed from Years 7 and 8 when IAH beneficiaries had a higher percentage of primary care visits via telehealth or telephone.
- IAH beneficiaries continued to use home health services more than comparison beneficiaries. Among beneficiaries who used home health services, IAH beneficiaries had 23.5 percent higher home health spending, seven more home health visits, and 28 more days in care than comparison beneficiaries.

As we noted in Chapter 1, the COVID-19 pandemic continued to disrupt health care delivery in Year 9 of the demonstration. In this chapter, we describe changes in care delivery for IAH practices during Year 9 compared with the first two years of the COVID-19 pandemic (Years 7 and 8). We also describe care delivery changes for IAH practices relative to the comparison group. We used multiple data sources to describe and measure service provision, including Medicare claims data, qualitative interview data collected from Years 1 to 6, and survey data collected by the IAH implementation contractor early in Year 9. These combined sources offer valuable insight into the evolving landscape of health care delivery for IAH and comparison beneficiaries during the COVID-19 pandemic, and they shed light on the experiences of IAH practices and how they adapted to help meet beneficiaries' needs.

2.1. Home-based primary care provided by IAH practices

In Year 9, seven practices participated in the demonstration—the same seven practices that participated in Year 8 (Exhibit 2.1). (For more information about these seven practices, see Appendix A.)

Exhibit 2.1. Characteristics of IAH practices participating in Year 9, as of 2019

Site	Affiliation	Ownership	Clinicians making home visits			Other staff involved in care team				
			Physicians	PAs	NPs	Care coordinators[a]	RNs	MAs	SWs	Others
HarmonyCares Medical Group[b]										
Dallas, TX	U.S. Medical Management	For profit	13 FT	-	7 FT	1	2	31	-	
Flint, MI	U.S. Medical Management	For profit	23 FT[c]	-	-	1	-	24	-	
Jacksonville, FL	U.S. Medical Management	For profit	3 FT 2 PT	-	1 FT 3 PT	4	1	9	-	
Lansing/Ann Arbor, MI	U.S. Medical Management	For profit	9 FT	1 FT	-	1	-	11	-	
Milwaukee, WI	U.S. Medical Management	For profit	8 FT	-	2 FT	4	1	11	-	
Academic medical centers										
Long Island, NY	Northwell Health	Nonprofit	4 FT 4 PT	-	3 FT	-	5	-	5	
Richmond, VA	Virginia Commonwealth University	Nonprofit	2 FT	-	3 FT 6 PT	-	2	-	3	1 consulting pharmacist

Source: Information collected November 2019 to February 2020 (late in Year 6 of the demonstration to the beginning of Year 7). For more details, see Appendix A.

[a] Care coordinators are health professionals that help manage a patient's care by monitoring and coordinating care plans, connecting them with health care providers, and making check-in phone calls. IAH sites use differing titles for this category of care, including nurse navigators, patient care coordinators, and care managers. For IAH practices, these staff generally are MAs, RNs, or LPNs.

[b] HarmonyCares Medical Group was known as Visiting Physicians Association until 2022.

[c] The Flint site did not provide a breakdown of physicians, PAs, or NPs.

FT = full time; LPN = licensed practical nurse; MA = medical assistant; NP = nurse practitioner; PA = physician assistant; PT = part time; RN = registered nurse; SW = social worker.

IAH practices' home-based primary care offered several distinctive features that differed from typical office-based care and may have offered beneficiaries enhanced benefits throughout the COVID-19 pandemic. These features included beneficiaries' access to primary care services provided in the home and the opportunity for clinicians to gather valuable information about beneficiaries' care needs during home visits that they cannot obtain during office visits, such as identifying safety improvements to reduce the risk of falling and medication storage and organization (Exhibit 2.2). (See Exhibit A.7 for hypotheses of how these features of home-based

primary care delivered by IAH practices, along with IAH financial incentives, may affect outcomes, such as hospital and ED use.)

Exhibit 2.2. Common features of home-based primary care delivered by IAH practices

Feature	Description or example
Provides access to primary care for beneficiaries who have limited mobility or costly or unreliable transportation	For some beneficiaries, traveling to an office for a visit presents substantial physical demands and a financial burden. In addition to providing visits at home, IAH practices tend to arrange a variety of other services provided in the home, such as x-rays, ultrasound exams, and blood draws.
Allows the clinician to obtain information they could not obtain in an office visit that may improve health care, avoid accidents, or address health-related social needs	Examples include observing how beneficiaries and their caregivers communicate, learning how beneficiaries store and organize medication, understanding obstacles to symptom management, and identifying safety improvements that would reduce the risk of falls.
Encourages development of a trusting relationship and effective communication among the beneficiary, caregiver, and clinician	A trusting clinician relationship may help clinicians become aware of and respond to acute exacerbations of chronic conditions and new problems and understand a beneficiary's goals and preferences for care.
Tracks beneficiaries across settings, as required by the IAH demonstration to provide follow-up contacts within 48 hours of hospital and ED use	Early in the IAH demonstration, many IAH practices added staff, such as nurse case managers, to their care teams to track beneficiaries across settings. Some practices expanded their use of electronic medical records or electronic health information exchanges to improve timely notification and follow-up of hospital and ED visits.
Offers access to the primary care team at all hours, as required by the IAH demonstration	Access to care teams is especially valuable for beneficiaries and caregivers so they can obtain help in managing acute conditions and avoid visits to urgent care centers and EDs. Early in the IAH demonstration, IAH practices reported efforts to improve consistency of access at all hours and coordinate after-hours care through communication supported by an electronic medical record.
Coordinates care with home health agencies for beneficiaries receiving home health services	Home health services refer to services provided under the Medicare home health benefit, which requires a beneficiary to be homebound and needing at least one of the following: (1) intermittent skilled nursing care or (2) physical therapy, speech-language pathology, or occupational therapy services. IAH practices reported having close relationships with home health agencies, and communication and coordination with home health agencies was an important part of preventing or responding to acute problems.

Source: Mathematica's analysis of information reported by IAH practices in interviews in Years 1 to 4. For more information about how these features of home-based primary care delivered by IAH practices may affect outcomes, see Exhibit A.7.

ED = emergency department.

2.2. Ambulatory visits

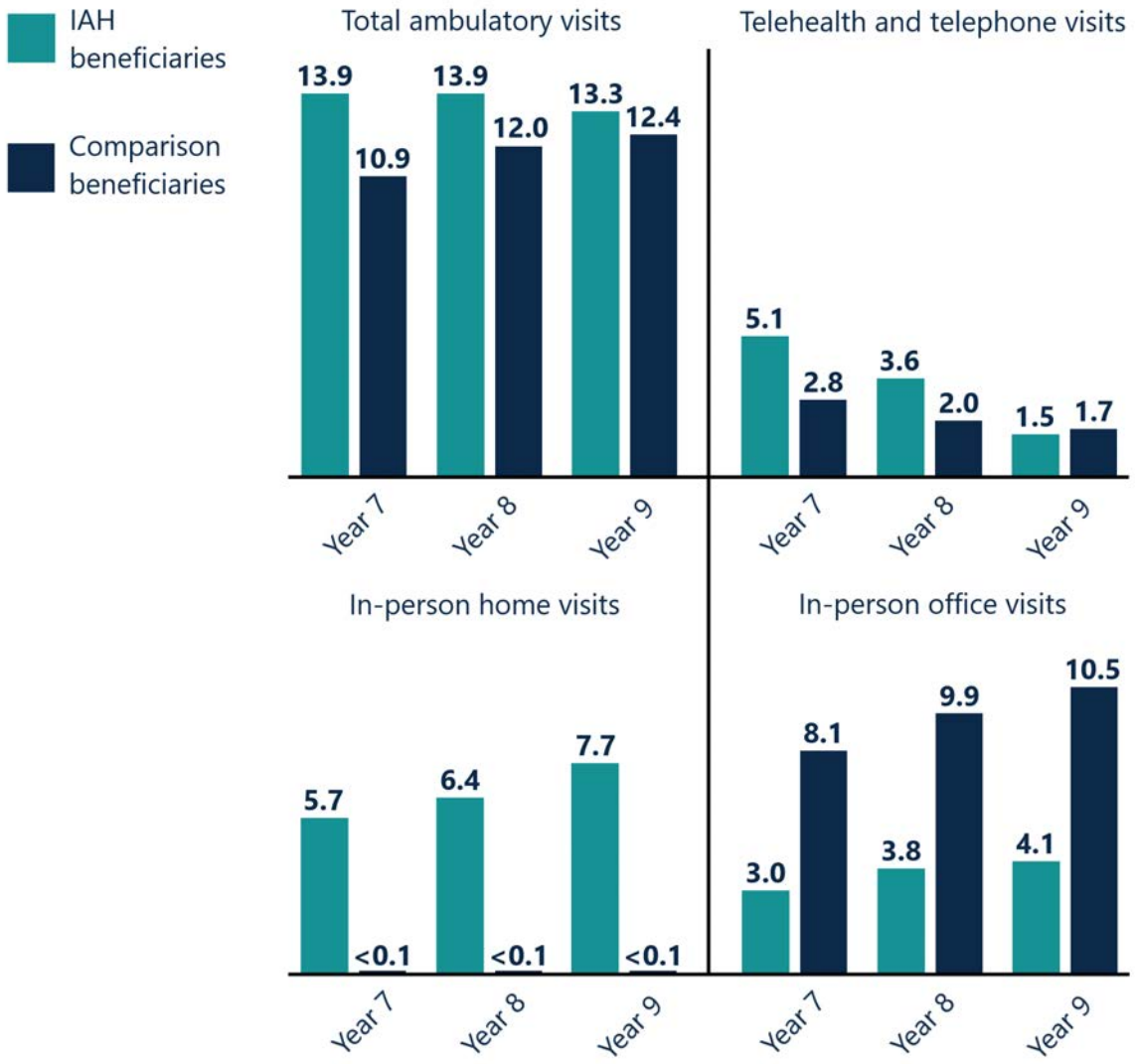
IAH beneficiaries had 7.3 percent more ambulatory visits than comparison beneficiaries in Year 9, a considerably smaller gap than in Years 7 and 8. IAH beneficiaries averaged less than one ambulatory visit per year more than comparison

beneficiaries when accounting for primary and specialty care received in person, by telehealth, or by telephone (13.3 and 12.4 visits, respectively) (Exhibit 2.3). This result continued the declining trend in the gap between IAH and comparison beneficiaries since Year 7. In Year 8, IAH beneficiaries averaged 1.9 more visits than comparison beneficiaries, and, in Year 7, IAH beneficiaries averaged 3.0 more visits. The closing of the gap between IAH and comparison beneficiaries in Year 9 reflects a decrease in average number of visits for IAH beneficiaries (from 13.9 in Year 7 to 13.3 in Year 9) and an increase in average number of visits for comparison beneficiaries (from 10.9 in Year 7 to 12.4 in Year 9). This increase for comparison beneficiaries may reflect a return to pre-pandemic levels because comparison beneficiaries may have had a larger decrease in ambulatory visits than IAH beneficiaries in the first year of the pandemic. Although we did not measure ambulatory visits in the year before the pandemic, we observed that comparison beneficiaries had a larger decrease in spending for specialty care services than IAH beneficiaries from Years 6 to 7 (-9.0 percent for comparison beneficiaries versus -4.9 percent for IAH beneficiaries), suggesting that comparison beneficiaries may have had a larger decrease in ambulatory visits from Years 6 to 7 than IAH beneficiaries (Exhibits B.1 and B.2).

In Year 9, the third year of the pandemic, IAH and comparison beneficiaries had a decline in telehealth and telephone visits, but the decrease was more pronounced for IAH beneficiaries. IAH beneficiaries had 2.1 fewer telephone and telehealth visits in Year 9 than Year 8 (3.6 versus 1.5 visits), compared with a decrease of 0.3 visits (2.0 versus 1.7 visits) for comparison beneficiaries. This change is notable from the first two years of the pandemic, when IAH beneficiaries had more telephone and telehealth visits than comparison beneficiaries (2.3 more in Year 7 and 1.6 more in Year 8). The decline in telehealth and telephone visits led to an overall reduction in the total number of ambulatory visits for IAH beneficiaries in Year 9 because it was only partially offset by increases in in-person home and office visits. In all the pandemic years, IAH beneficiaries received nearly two-thirds of their in-person visits at home (7.7 of 11.8 visits in Year 9), whereas comparison beneficiaries had practically all in-person visits in the office.

> *"As the COVID cases declined, we converted back to in-person visits, and when cases surged, we reverted to telehealth visits, but not as much as during March–April 2020. After vaccines were available for staff, even during case surges, we maintained in-person presence with our patients."*
>
> – IAH practice survey respondent

Exhibit 2.3. IAH beneficiaries averaged one more ambulatory visit than comparison beneficiaries in Year 9, a smaller gap than in Years 7 and 8



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

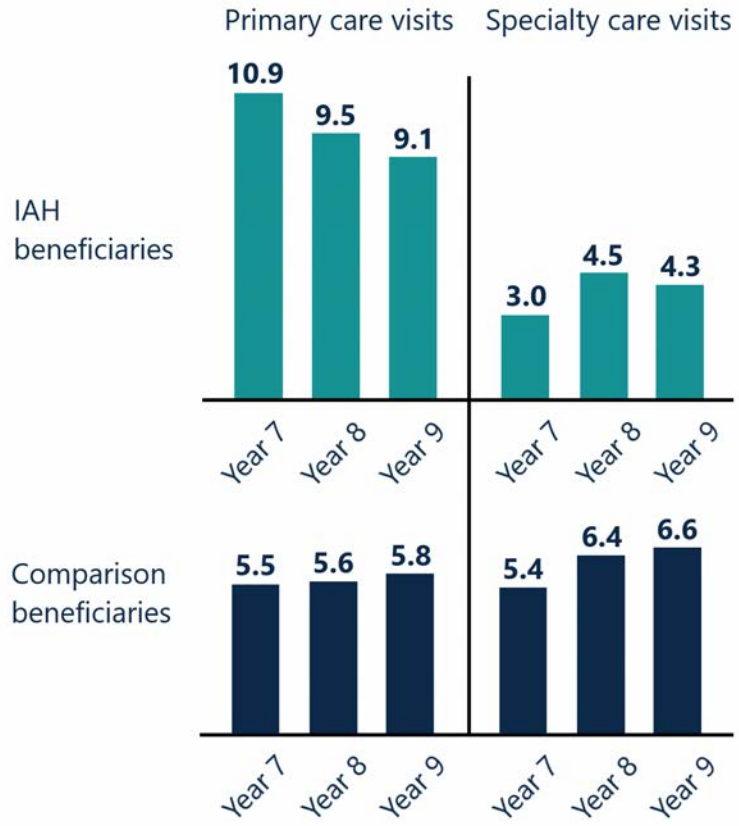
Notes: Results are unadjusted and weighted to reflect the number of months beneficiaries were eligible for IAH. Numbers may not sum to the totals because of rounding. Ambulatory visits include home, office, telehealth, and telephone visits with all primary and specialty care providers. See Appendix A for more details. Results for Year 7 reflect the 10 practices that participated in Year 7, and they did not differ substantively from results in the same year for the seven practices that also participated in Years 8 and 9.

2.3. Frequency of primary and specialty care visits

Although primary care continued to play a larger role in IAH beneficiaries' health care than it did for comparison beneficiaries in Year 9, the difference in primary care visits between IAH and comparison beneficiaries decreased. This difference reflected a slight decrease in primary care visits for IAH beneficiaries and a slight increase in primary care visits for comparison beneficiaries from Year 8. On

average, IAH beneficiaries had 9.1 primary care visits (about 1 visit every 6 weeks) in Year 9, and comparison beneficiaries averaged 5.8 visits (about 1 visit every 9 weeks) (Exhibit 2.4). The difference of 3.3 visits per year between IAH and comparison beneficiaries in Year 9 was smaller than the difference in Year 8 (3.9 visits) and Year 7 (5.4 visits). However, the continuing difference highlights the ongoing importance of primary care for IAH beneficiaries.

Exhibit 2.4. Primary care visits declined for IAH beneficiaries from Years 7 to 9 but remained stable for comparison beneficiaries



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Unadjusted average results weighted to reflect the number of months beneficiaries eligible for IAH. Results reflect home and office visits as well as telehealth and telephone visits. Primary care visits for IAH beneficiaries include visits from all primary care clinicians (primary care physicians, nurse practitioners, and physician assistants) at all locations, not just IAH practices. See Appendix A for more details about the definition of primary care visits used in this analysis. Results for Year 7 reflect the 10 practices that participated in Year 7, and they did not differ substantively from results in the same year for the seven practices that also participated in Years 8 and 9.

Specialty care visits remained relatively stable from Year 8 to Year 9, with comparison beneficiaries continuing to receive approximately two more specialty visits than IAH beneficiaries. IAH beneficiaries averaged 4.3 specialty visits in Year 9 compared with 4.5 visits in Year 8. Comparison beneficiaries averaged 6.6 specialty visits in Year 9 and 6.4 visits in Year 8. Both IAH and comparison

beneficiaries averaged more specialty care visits in Year 9 than in Year 7 (the first year of the pandemic). This increased use of specialty care for both groups relative to Year 7 could reflect beneficiaries' increased comfort seeking in-person specialty care after avoiding it during the first year of the pandemic.

2.4. Telehealth and telephone primary care visits

In Year 9, the third year of the COVID-19 pandemic, the CMS waiver allowing eligible providers to deliver certain services through telehealth and telephone remained in place.[6] Before the public health emergency in 2020, except for certain waivers, Medicare only paid for telehealth when a beneficiary was in a designated rural area and received a telehealth visit outside his or her home at a clinic, hospital, or certain other types of medical facilities. In addition, clinicians could not furnish telephone visits to Medicare beneficiaries. To examine use of telehealth and telephone visits by IAH and comparison beneficiaries, we focused mainly on primary care visits because IAH practices rarely deliver specialty care.

This report refers to real-time audio and video communication between the clinician and the beneficiary as telehealth visits. Telephone visits include only real-time audio.

In Year 9, IAH beneficiaries averaged 3.3 more in-person primary care visits than comparison beneficiaries, a larger difference than observed in Years 7 and 8. In Year 9, IAH beneficiaries received an average of 8.1 primary care visits in person, a considerable increase from about 6.6 in-person visits in Years 7 and 8 (Exhibit 2.5). In contrast, comparison beneficiaries experienced a gradual increase of in-person visits over the three pandemic years, averaging 4.8 visits in Year 9 and 4.0 visits in Year 7.

Exhibit 2.5. In Year 9, in-person primary care visits increased among IAH beneficiaries and telephone and telehealth primary care visits decreased

Group	In person			Telehealth			Telephone		
	Year 7	Year 8	Year 9	Year 7	Year 8	Year 9	Year 7	Year 8	Year 9
IAH beneficiaries	6.7	6.6	8.1	2.7	2.1	0.9	1.5	0.8	0.1
Comparison beneficiaries	4.0	4.5	4.8	1.0	0.8	0.8	0.5	0.3	0.2
Difference	2.7	2.1	3.3	1.7	1.3	0.1	1.0	0.5	0.1

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Results are unadjusted and weighted to reflect the number of months beneficiaries were eligible for IAH. Primary care visits for IAH beneficiaries include visits from all primary care clinicians (primary care physicians, nurse practitioners, and physician assistants) at all locations, not just IAH practices. See Appendix A for more details on these measures. Results for Year 7 reflect the 10 practices that participated in Year 7, and they did not differ substantively from results in the same year for the seven practices that also participated in Years 8 and 9.

[6] For more information, see https://www.cms.gov/files/document/covid-19-emergency-declaration-waivers.pdf.

IAH beneficiaries had fewer primary care visits through telehealth and telephone in Year 9 than in Year 8. For IAH beneficiaries, the average number of telehealth visits dropped from 2.1 visits in Year 8 to 0.9 in Year 9; telephone visits decreased from 0.8 in Year 8 to 0.1 in Year 9. Telehealth and telephone visits for comparison beneficiaries remained stable from Years 8 to 9 at 0.8 telehealth visits and 0.2 to 0.3 telephone visits in each year. The decrease in telehealth and telephone visits by IAH beneficiaries may reflect a preference for in-person care in the third year of the pandemic. In a survey conducted in Year 9, IAH practices reported successes and challenges with telehealth visits during the pandemic. Survey respondents reported that functional limitations and cognitive impairments hindered beneficiaries' ability to attend visits via telehealth or telephone independently.

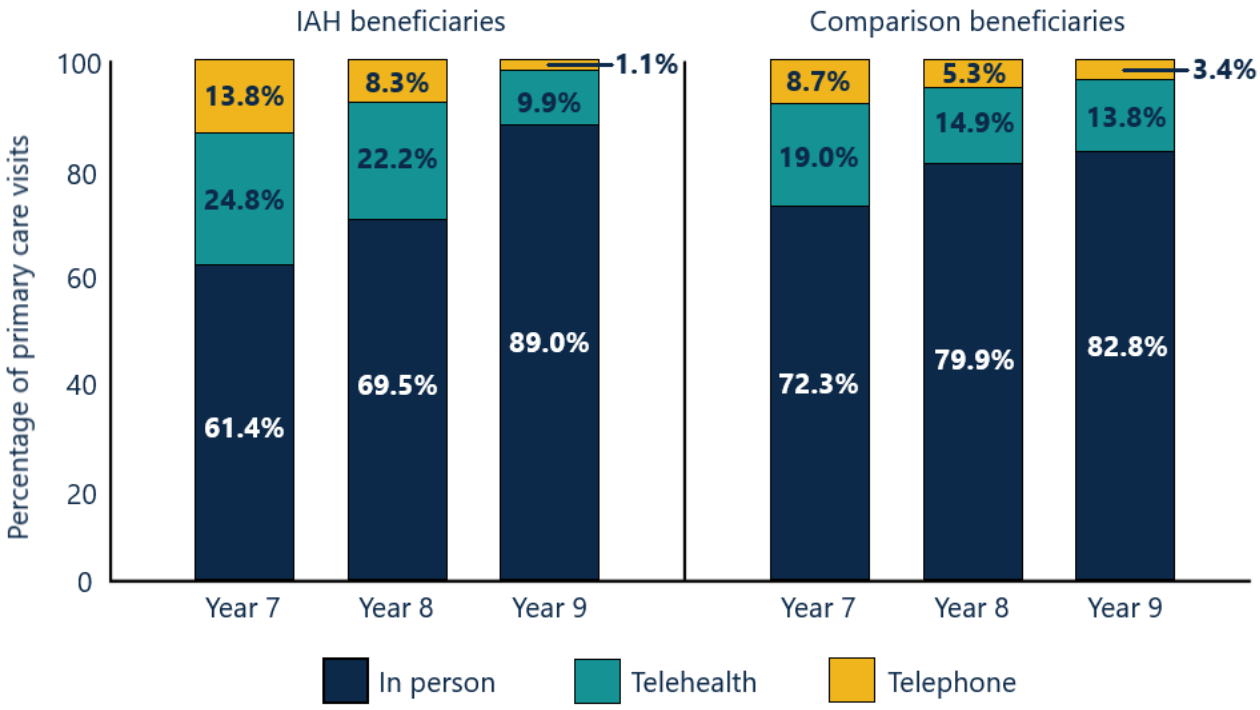
> *"Our providers have gotten extremely familiar with using the technology. However, most of [our] patients prefer in-home visits to telehealth visits."*
>
> – IAH practice survey respondent

Year 9 marked a shift from previous years during the pandemic, as IAH beneficiaries had a lower percentage of primary care visits via telehealth or telephone than comparison beneficiaries. Although IAH beneficiaries averaged 11.0 percent of their primary care visits by telehealth or telephone, comparison beneficiaries averaged 17.2 percent (Exhibit 2.6). This differed from Years 7 and 8, when IAH beneficiaries had a higher percentage of primary care visits via telehealth or telephone than comparison beneficiaries (30.5 for IAH beneficiaries and 20.2 percent for comparison beneficiaries in Year 8). This change from Year 8 to Year 9 happened because, relative to the comparison group, IAH beneficiaries had a larger increase in the number of primary care visits in person and a larger decrease in the number of primary care visits by telehealth or telephone.

> *"We had explored telehealth use in the past, and there have always been limitations, mostly related to patients' not having telehealth-capable devices or being able to operate a device without assistance…With COVID, patients and families were highly motivated to get devices and assist with telehealth visits given the risks of in-person care and patient vulnerability."*
>
> – IAH practice survey respondent

For IAH and comparison beneficiaries, most specialty care visits occurred in person in all three pandemic years, with a consistent upward trend in the percentage of in-person visits and a decrease for telehealth and telephone visits for both groups from Years 7 to 9 (Exhibits B.3 and B.4).

Exhibit 2.6. In Year 9, IAH beneficiaries had a larger increase in the percentage of primary care visits in person and a larger reduction in telehealth and telephone visits than comparison beneficiaries



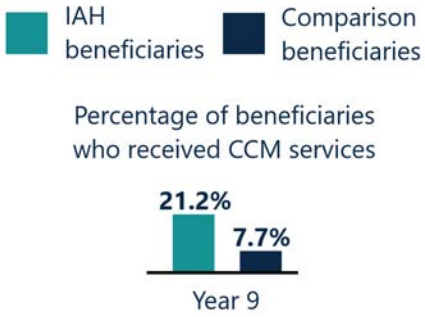
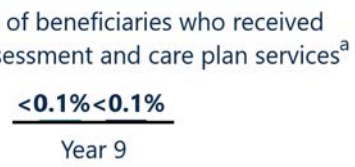
Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Results are unadjusted and weighted to reflect the number of months beneficiaries were eligible for IAH. Primary care visits for IAH beneficiaries include visits from all primary care clinicians (primary care physicians, nurse practitioners, and physician assistants) at all locations, not just IAH practices. See Appendix A for more details on these measures. Results for Year 7 reflect the 10 practices that participated in Year 7, and they did not differ substantively from results in the same year for the seven practices that also participated in Years 8 and 9.

2.5. Chronic care management, advance care planning, cognitive assessment, and remote patient monitoring services

In Year 9, IAH practices delivered more chronic care management (CCM) and advance care planning services to their beneficiaries than non-IAH providers delivered to comparison beneficiaries, but these differences were smaller than in Year 8. The changes between IAH and comparison beneficiaries from Years 8 to 9 were mostly because of decreases in these services among IAH beneficiaries. In Year 9, 21.2 percent of IAH beneficiaries received CCM services and 10.7 percent received advance care planning—down from 27.7 percent and 20.4 percent in Year 8, respectively (Exhibit 2.7). Receipt of cognitive assessment and remote patient monitoring services was negligible for IAH and comparison beneficiaries. Infrequent provision of CCM and other coordination and prevention services reflects a broader trend of infrequent billing for these services (Agarwal et al. 2022).

Exhibit 2.7. IAH practices delivered more CCM services and advance care planning to their beneficiaries than non-IAH providers delivered to comparison beneficiaries

Care delivery service description	IAH beneficiaries' services from IAH practices and comparison beneficiaries' services from non-IAH providers
CCM	
In 2014, Medicare began reimbursing CCM services provided to beneficiaries with multiple chronic illnesses that place them at a significant risk of death, exacerbation, or functional decline, with a duration expected to be at least 12 months or until death. CCM services involve a comprehensive approach, including helping beneficiaries achieve their health goals, providing round-the-clock access to care and health information, managing care transitions, and coordinating with clinicians and other health care providers. In 2020, new CCM codes were added to cover staff-provided principal care management services under physician supervision.	
Advance care planning	
Advance care planning services have been eligible for Medicare reimbursement since 2016. These services involve outlining a beneficiary's health care wishes before they become incapable of making medical decisions. A care team comprising the beneficiary, family members or caregivers, and a physician or another qualified health care professional typically participates in these services.	
Cognitive assessment and care plan services	
On January 1, 2017, Medicare began reimbursing clinicians for a comprehensive clinical visit for beneficiaries with cognitive impairment. Reimbursement requires cognition-focused evaluation; identification of caregivers and their needs; and development, revision, or review of an advance care plan.	
Remote patient monitoring	
Remote patient monitoring involves collecting and analyzing beneficiaries' physiologic data (such as blood pressure and glucose monitoring) that are used to develop and manage a treatment plan related to a chronic or acute health illness or condition. In 2019, Medicare expanded the list of services reimbursable under remote patient monitoring.	

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Unadjusted results weighted to reflect the number of months beneficiaries were eligible for IAH. Numbers may not sum to the totals because of rounding. Results for Year 7 reflect the 10 practices that participated in Year 7, and they do not differ substantively from results in the same year for the seven practices that also participated in Years 8 and 9.

[a] These results reflect the percentage of IAH and comparison beneficiaries who received cognitive assessment and care plan services in Year 9. About 40 percent of IAH and comparison beneficiaries had dementia; use of cognitive assessment and care plan services among these beneficiaries was also below 1 percent.

CCM = chronic care management.

2.6. Home health services

Home health services refer to services provided under the Medicare home health benefit, which requires a beneficiary to be homebound and needing at least one of the following: (1) intermittent skilled nursing care or (2) physical therapy, speech-language pathology, or occupational therapy services. These services do not include home-based primary care (such as the visits IAH practices provide), but home-based primary care can complement home health services. Beneficiaries who receive home health services are eligible to receive social work and aide services through home health. In most cases, home health services are paid on a flat basis per 30-day episode regardless of the number of visits, with adjustments for factors such as case mix and geography and whether the home health episode began after discharge from an inpatient facility such as a hospital or skilled nursing facility. A prior hospital stay is not required to qualify for home health services. The beneficiary must have an in-person visit with a physician, NP, or PA who certifies that the beneficiary is eligible under the Medicare home health benefit and establishes a home health plan of care.

IAH beneficiaries used home health services more extensively than comparison beneficiaries. As in prior years, most IAH and comparison beneficiaries used home health services in Year 9, but more IAH beneficiaries (93.2 percent) used these services than did comparison beneficiaries (81.6 percent) (Exhibit 2.8). The relative difference in percentage of beneficiaries who used home health services for IAH and comparison beneficiaries remained about the same from Years 7 to 9 (14.1 to 14.2 percent).

IAH practices tended to have close relationships with home health agencies. Several IAH clinicians reported in interviews conducted earlier in the demonstration that communication and coordination with home health agencies was an important part of preventing or responding to acute problems. Clinicians at IAH practices reported communicating regularly with home health agency staff about changes in beneficiaries' conditions and beneficiaries' recent hospital or ED use. Higher use of home health services among IAH beneficiaries may also be explained in part by IAH clinicians conducting home visits, in which they can observe beneficiaries' needs for home health care more readily than clinicians treating comparison beneficiaries during an office visit. For example, an IAH clinician may observe that a beneficiary would benefit from receiving home health services to improve how they store and manage their medications or increase their mobility.

Exhibit 2.8. IAH beneficiaries had higher utilization and higher spending for home health services than comparison beneficiaries

	IAH beneficiaries	Comparison beneficiaries	Relative percentage difference
Percentage of beneficiaries who used home health services			
Year 6	90.1	76.4	17.9%
Year 7	90.8	79.6	14.1%
Year 8	93.4	82.1	13.8%
Year 9	93.2	81.6	14.2%
Average home health spending PBPM for beneficiaries who used home health services			
Year 6	$774	$682	13.5%
Year 7	$832	$697	19.4%
Year 8	$915	$768	19.1%
Year 9	$978	$791	23.5%

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Home health services refer to services provided under the Medicare home health benefit. Results are unadjusted and weighted to reflect the number of months beneficiaries were eligible for IAH. Results for Years 6 and 7 reflect the larger numbers of practices that participated in those years, and they did not differ substantively from results in the same year for the seven practices that also participated in Years 8 and 9.

PBPM = per beneficiary per month.

Among IAH and comparison beneficiaries who used home health services, IAH beneficiaries had 23.5 percent higher spending on home health services in Year 9 than comparison beneficiaries—a gap that has widened during the pandemic. This 23.5 percent difference between IAH and comparison beneficiaries was an increase from before the pandemic (13.5 percent difference in Year 6) and Years 7 and 8 (differences of about 19 percent). Differences in spending for IAH and comparison beneficiaries reflect differences in the number of visits and days in home health for home health users. Among beneficiaries who used home health services in Year 9, IAH beneficiaries had more home health visits (52) and more days in home health (161) than comparison beneficiaries (45 visits and 133 days, respectively). In addition, the average number of days in home health increased by 8 for IAH beneficiaries from Year 8 to Year 9—more than twice the increase of 3 days in home health for comparison beneficiaries.

It is unclear what may have driven these differences in home health use and spending for IAH and comparison beneficiaries in Year 9. There was a general increase in home health use during the pandemic that affected IAH and comparison beneficiaries (Koenig et al. 2022). In 2020, CMS temporarily revised the definition of homebound status (which was required to be eligible for home health services) to include Medicare patients for whom (1) a physician has determined it is medically necessary for that patient to remain home because they have been diagnosed with COVID-19;

or (2) a physician has determined that is it medically necessary for the patient to remain home because they have a condition that may make them more susceptible to contracting COVID-19 (CMS 2020). The fact that it was easier than before the pandemic to certify a beneficiary as being homebound could have led to a larger increase in home health use and spending for IAH beneficiaries than for comparison beneficiaries. IAH clinicians providing home-based primary care to IAH beneficiaries may have had a greater focus on homebound status and use of home health than clinicians who cared for comparison beneficiaries. IAH clinicians may also have had more established relationships with home health agencies.

3. What were the effects of the IAH demonstration on Medicare spending, hospital use, and health outcomes through Year 9?

Key takeaways

- IAH may have reduced total Medicare spending in Year 9 (-$322 PBPM, -7.5 percent), but the result was not statistically significant. As in the previous two years of the COVID-19 pandemic, the size of this effect was larger than most years before the pandemic began.
- CMS paid practices about $1.6 million more in incentive payments in Year 9 than the estimated aggregate spending reduction.
- COVID-19 diagnoses and COVID-19 hospitalizations did not play a direct material role in the estimated effects of IAH in Year 9.
- For beneficiaries who were dually eligible for Medicare and Medicaid, IAH likely reduced spending in Year 9 by a considerable amount (-$856 PBPM, -18.6 percent), which was similar to results for this group throughout the pandemic. This large reduction differed considerably from the estimated increase of $74 PBPM (1.8 percent) for non-dually eligible beneficiaries.
- IAH may have increased hospital admissions in Year 9 (127 admissions per 1,000 beneficiaries, 7.1 percent), though the result was not statistically significant. After sharp declines in admissions in the first year of the COVID-19 pandemic in the IAH and comparison groups, IAH beneficiaries returned to the pre-pandemic level of admissions faster than the comparison group. IAH did not meaningfully affect hospital admissions preceded by an ED visit in Year 9 (22 admissions per 1,000 beneficiaries, 1.5 percent).
- IAH did not meaningfully reduce outpatient ED visits in Year 9 or any other year of the COVID-19 pandemic.

Examining beneficiaries who received home-based primary care from IAH practices before and after the start of the demonstration, we estimated the effects of the IAH demonstration in Year 9 on spending and other outcomes using a difference-in-differences methodology (see Appendix A for more details).

Starting in Year 7, the COVID-19 pandemic led to unprecedented changes in the delivery of health care and society more generally. As a result, interpretation of the estimated effect of the IAH demonstration 9 should differ during the pandemic from years preceding the pandemic. For IAH beneficiaries, the third year of the COVID-19 pandemic (Year 9) presented similar challenges to the previous two years of the pandemic (although, as discussed in Chapter 1, the third year of the pandemic differed from the previous two years in potentially important ways). Chronically ill, functionally impaired beneficiaries like those eligible for the IAH demonstration may still have felt stressed and isolated. Similar to the first two years of the COVID-19 pandemic, these and other factors particular to the environment during the pandemic may have led to changes in the relative effectiveness of home-based primary care for IAH beneficiaries (for instance, by reducing isolation through in-

home primary care visits). Those changes could account for differences in the estimated effects of IAH during the pandemic relative to years before the pandemic.

In Year 9, IAH beneficiaries were slightly less likely than comparison beneficiaries to be diagnosed with COVID-19 (28.9 percent versus 31.1 percent) but slightly more likely to have COVID-19 while hospitalized (14.8 percent versus 14.0 percent). However, as in the previous two years of the COVID-19 pandemic, we did not find evidence that COVID-19 diagnoses and beneficiaries diagnosed with COVID-19 while hospitalized played a direct material role in the effects of IAH in Year 9 (see results adjusted by these factors in Exhibits C.6a-b).

3.1. Effects of IAH on Medicare spending

3.1.1. Effects on total Medicare spending

IAH may have reduced total Medicare spending in Year 9 (-$322 PBPM, 7.5 percent), but the estimated reduction was not statistically significant (Exhibit 3.1). Although not statistically significant, the estimated effect sizes on spending in Year 9 were consistent with the effects in Years 7 and 8 and generally larger than effects before the COVID-19 pandemic. Among the 10 participating sites in Year 7 as well as the seven participating sites in Years 8 and 9, no estimated spending reduction before the pandemic was more than -$154 PBPM, which is about half the size of the estimated effects during the pandemic (Exhibits C.2a-b). Among these same sites, the probability that IAH reduced total Medicare spending by at least $200 PBPM ranged from 54 to 94 percent during the pandemic, in contrast to before the pandemic when it ranged from just 1 to 32 percent (Exhibits C.3a-b). Larger effects on spending were the result of a faster increase in spending among comparison beneficiaries throughout the pandemic relative to IAH beneficiaries.

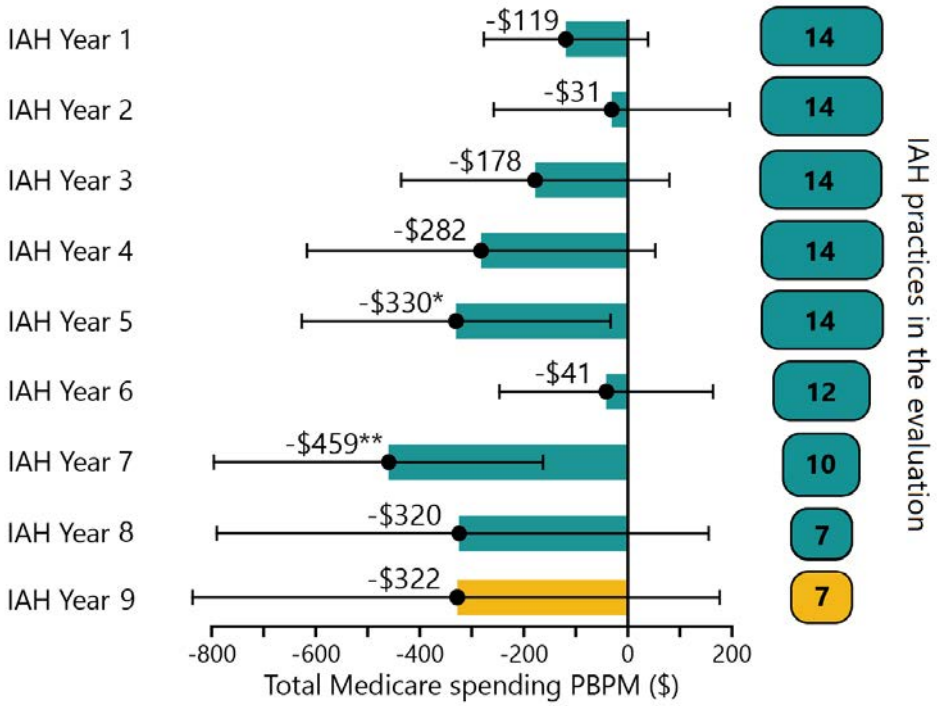
Effects of IAH during the COVID-19 pandemic on total Medicare spending were more than twice the size of the effects in previous years for the set of practices that participated in IAH both before and during the pandemic.

The lack of statistical significance in total spending estimates for Year 9 and Year 8 is attributable to at least two factors—higher variability in outcomes and fewer participating sites. In all years of the COVID-19 pandemic, there was higher variability in spending among IAH and comparison beneficiaries than in all other years of the demonstration (Exhibit C.17). The higher variability may be in part because COVID-19 hospitalizations were particularly expensive, as a result of complex treatment and lengthy hospital stays.[7] There were also fewer participating sites in Years 8 and 9 (seven sites in both years) than previous years of the demonstration, reducing the

[7] Higher variability in outcomes makes the estimates more uncertain, even if the estimates themselves do not change much because spending increases happened equally for IAH and comparison beneficiaries. In other words, although we did not find evidence that COVID-19 hospitalizations directly affected the point estimate of -$322 PBPM, these hospitalizations may have contributed to the larger standard error in Year 9 (and Year 8) relative to earlier years.

number of beneficiaries included in the analysis.[8] Both higher variability in outcomes and fewer participating sites led to larger uncertainty in the estimates (larger confidence intervals) in Years 8 and 9 relative to earlier years.

Exhibit 3.1. IAH may have reduced total Medicare spending in Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects in each year were estimated using the sites that participated in that year (seven sites in Years 8 and 9, 10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5). Differences between Years 5 to 9 represent the change in participating sites and any differences before and during the COVID-19 pandemic in the effects of the IAH payment incentive and home-based primary care. The horizontal lines represent 90 percent confidence intervals.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 levels.

PBPM = per beneficiary per month.

Across all nine years of the demonstration, IAH may have reduced average annual total Medicare spending, but the result was not statistically significant (-$211 PBPM, 90 percent confidence interval: -$437, $15). With so few sites (half of which withdrew from the demonstration before Year 8), the potential for an individual site to heavily influence the estimated effect for the full sample across all years is high. We tested this possibility by removing one site at a time and found that removing one site lowered the estimated average annual effects by two-thirds and removing another increased it by nearly a third (Appendix Exhibit C.4). The varied performance of

[8] There was more uncertainty in the estimates during the COVID-19 pandemic (Years 7-9) than in the estimate for earlier years among the sites that participated in Years 8 and 9, suggesting that the increased uncertainty was not entirely driven by fewer sites.

among such a small collection of sites is the main reason why we cannot generalize the results of the demonstration to other home-based primary care practices.

3.1.2. Aggregate spending effects

CMS paid practices about $1.6 million more than the estimated aggregate spending reduction in Year 9. Incentive payments were intended to motivate IAH practices to improve their performance on quality metrics and lower Medicare spending. Incentive payments have been calculated in a variety of ways across different CMS initiatives. The IAH incentive payment calculation was based on whether each IAH practice had lower Medicare spending than its estimated spending target and whether each practice met specific quality thresholds. The spending target reflected projected spending for Medicare beneficiaries who carried a high illness burden but did not strictly meet IAH eligibility criteria (Exhibit 1.2).

The methods and objectives for calculating incentive payments were different from the methods and objectives for estimating the effect of IAH on total Medicare spending by the evaluation. The evaluation analyzes whether programmatic spending changed from the year preceding the demonstration through each year of the demonstration against a comparison group who met IAH eligibility criteria but did not receive home-based primary care over the same period of time. See Appendix A for more information about differences between the calculation of effects on spending for the evaluation and incentive payments to IAH practices.

The evaluation accounted for incentive payments—which were a cost to CMS of running the demonstration—by adding them to the gross aggregate effects on Medicare spending incurred by beneficiaries (-$322 PBPM multiplied by total IAH person months), resulting in the estimated effect of IAH net of incentive payments. Year 9 had an estimated a gross aggregate spending reduction of $8.0 million with a wide confidence interval (-$20.5 million to $4.5 million), suggesting a large degree of uncertainty (Exhibit 3.2). Total incentive payments to IAH practices in Year 9 were $9.7 million, so the evaluation estimated a net increase in Medicare spending of $1.6 million in Year 9. Although we estimated larger per-beneficiary spending reductions during the COVID-19 pandemic than earlier years of the demonstration, incentive payments to IAH practices exceeded those reductions in the second and third years of the pandemic, leading to a net aggregate effect over all three years of the pandemic that was close to zero. Furthermore, after adding incentive payments, the confidence interval for net spending in each of the three pandemic years was wide and encompassed results as different as a $10 million decrease and a $14 million increase, providing little support that IAH reduced net spending in Years 7 to 9.

Exhibit 3.2. IAH did not convincingly reduce net spending in Year 9

Year	Gross Medicare spending		Incentive payments to IAH practices	Net Medicare spending	
	Aggregate effect	90 percent confidence interval		Aggregate effect	90 percent confidence interval
Year 1	-$9.4	-$22.1, $3.2	$11.7	$2.2	-$10.4, $14.9
Year 2	-$2.2	-$18.1, $13.8	$5.3	$3.2	-$12.8, $19.1
Year 3	-$12.9	-$31.6, $5.9	$7.2	-$5.6	-$24.4, $13.1
Year 4	-$25.4	-$55.9, $5.0	$8.1	-$17.3	-$47.8, $13.1
Year 5	-$31.4*	-$59.8, -$2.9	$6.9	-$24.5	-$52.9, $3.9
Year 6	-$3.2	-$19.2, $12.9	$11.1	$7.9	-$8.2, $23.9
Year 7 (COVID-19)	-$22.6**	-$39.3, -$6.0	$18.5	-$4.2	-$20.8, $12.5
Year 8 (COVID-19)	-$9.9	-$24.7, $4.8	$12.5	$2.5	-$12.2, $17.3
Year 9 (COVID-19)	-$8.0	-$20.5, $4.5	$9.7	$1.6	-$10.8, $14.1

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse. CMS provides incentive payment results at /https://www.cms.gov/priorities/innovation/innovation-models/independence-at-home.

Notes: All numbers in this exhibit are in millions. Gross aggregate effect calculations are based on the beneficiary-level estimates shown in Exhibit 3.1 and the number of IAH beneficiary months in each year. Net aggregate effects are calculated as the gross aggregate effect plus total incentive payments, or the spending changes after accounting for the outlays of incentive payments as costs to CMS.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 level.

CMS = Centers for Medicare & Medicaid Services.

3.1.3. Effects on spending categories

The two spending categories with the largest estimated reductions in Year 9 were inpatient spending (-$103 PBPM, -6.2 percent) and outpatient spending (-$134 PBPM, -53.1 percent), together representing about three-quarters of the estimated effect of IAH on total spending in Year 9. The estimated reduction in inpatient spending in Year 9 was somewhat smaller than in the previous two pandemic years, although, among the seven sites that participated in Year 9, the reduction was not statistically significant in any pandemic year (Exhibit C.10a). The estimated reduction in outpatient spending in Year 9 was about twice the size it was in the previous two pandemic years among the seven Year 9 participants and larger than the estimated reduction in inpatient spending (Exhibit C.10a). Outpatient spending includes ED visits for beneficiaries not admitted to the hospital, observation stays, and a range of other outpatient services such as facility charges for hospital-based physician visits, therapy, and imaging, rehabilitation facilities, renal dialysis facilities, rural health clinics, and federally qualified health centers. It is unclear which of these factors contributed most to the estimated effect of IAH on outpatient spending. Larger impacts on outpatient spending in Year 9 were the result of lower spending for IAH beneficiaries and higher spending for comparison beneficiaries

relative to Year 8. Those patterns are directionally consistent with similar patterns in the number of ED visits, suggesting some of the reduction in outpatient spending could be explained by fewer ED visits. However, as we discuss in Section 3.2, the size of the effect on ED visits was much smaller than the size of the effect on outpatient spending, and the effect on ED visits was not statistically significant.

Regardless of the factors contributing to outpatient spending, doubling the effect size in a single year after nine years of the demonstration is not explainable by how the demonstration aims to reduce spending. Furthermore, the estimated effect on outpatient spending may be overstated because the trends in outpatient spending between the IAH and comparison groups were not parallel at baseline (see Chapter 6 of Appendix A for a description of this parallel trends assumption and how we tested it).

Exhibit 3.3. Most effects on spending categories were small or not statistically significant in Year 9

Spending category	Effect on spending PBPM	90 percent confidence interval
Inpatient[a]	-$103	-$441, $236
Skilled nursing facility	-$87	-$188, $14
Home health (Part A and B)	$78*	$7, $150
Hospice	-$11	-$50, $28
Outpatient[b]	-$134***	-$167, -$100
Clinician/supplier	-$43	-$197, $110
Durable medical equipment	-$22	-$52, $7

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: The seven mutually exclusive spending categories sum to total spending. Effects in Year 9 were estimated using the seven sites that participated in Year 9.

[a] Inpatient spending includes payments for both acute inpatient care (such as short-stay acute hospitals and critical access hospitals) and non-acute inpatient care (such as inpatient rehabilitation facilities and psychiatric hospitals).

[b] Outpatient spending includes payments for outpatient facility services including those for ED visits (including observation stays), and other outpatient services (e.g., outpatient surgery, imaging, outpatient rehabilitation, and services provided by RHCs and FQHCs).

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 levels.

PBPM = per beneficiary per month.

In Year 9, we also found a statistically significant increase in spending on home health ($78 PBPM, 10.4 percent), which may be partly because of IAH practices having greater ability to identify their beneficiaries' needs for services at home during their home visits as well as close communication with home health practices (discussed in more detail in Chapter 2). There was an increase in Year 8 as well, though it was smaller and not statistically significant ($37 PBPM, 4.9 percent). IAH practices' outreach to their beneficiaries and communication with home health agencies—approaches they also used before the pandemic, but which could have been more effective during the pandemic—may have helped IAH beneficiaries feel more

comfortable allowing home health agency staff in their homes during the pandemic than comparison beneficiaries. In Year 9, spending on home health increased 6.1 percent relative to Year 8 for IAH beneficiaries but only 1.5 percent among comparison beneficiaries.

We did not find statistically significant spending changes in other spending categories, such as skilled nursing facility (SNF), clinician/supplier, durable medical equipment, and hospice. But, since the start of the COVID-19 pandemic, IAH may have reduced SNF spending by about 6 to 15 percent, which is noticeably different from estimated *increases* of about 8 to 11 percent in SNF spending in the same sample of sites participating in Years 8 and 9 from before the pandemic. The estimated effect on hospice spending may be understated because the parallel trends assumption behind our method of estimating the effects of IAH may have been violated (see Chapter 6 of Appendix A).

Across all years of the demonstration, there were no statistically significant effects on spending categories that accounted for more than 20 percent of the total estimated average spending effect across Year 1 to 9 (which was also not statistically significant).

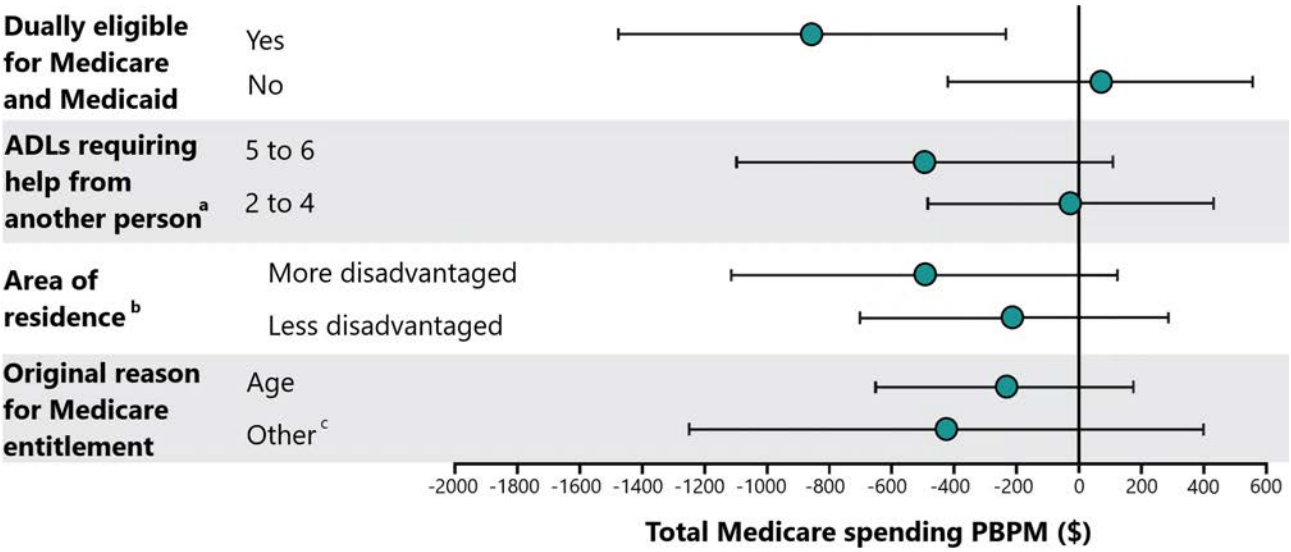
3.1.4. Subgroup analyses

To better understand the estimated effect of IAH during the pandemic, we explored the effects on total spending for several subgroups of beneficiaries who may have been at particularly high risk for experiencing poor outcomes and incurring high spending because of social and health care disruptions (Exhibit C.5a). These subgroups were defined by (1) the need for assistance from another person with activities of daily living (ADLs), such as dressing and bathing, (2) dual Medicare and Medicaid coverage, (3) original reason for Medicare entitlement being a disability or end-stage renal disease, or (4) living in a more disadvantaged area. We considered the effects by subgroup to be different if the difference in the effects of IAH between subgroup categories was statistically significant. For example, we calculated whether the estimated effect of IAH among beneficiaries dually eligible for Medicare and Medicaid was statistically different from the effect among non-dually eligible beneficiaries.

In Year 9, as in previous years of the pandemic, the estimated effects for most subgroups did not differ from each other (Exhibit 3.4). Only the subgroup defined by dual eligibility had a statistically significant difference between groups in the estimated effect on total spending in Year 9 (Exhibit C.5b), as was also the case in Year 8. Although differences for other subgroups were not statistically significant, the pattern of results across subgroups suggests that IAH may have had larger effects for those groups that are medically complex or are part of traditionally underserved populations in Year 9. For example, we estimate IAH reduced total spending for beneficiaries needing assistance with 5-6 ADLs by $506 PBPM in Year 9, but only by $35 PBPM for beneficiaries needing assistance with 2-4

ADLs. While we did not detect a statistically significant difference between those two estimates in Year 9, their values imply that the effect of IAH in Year 9 might have been considerably larger among members of the more medically complex group. Total spending may have decreased more for these subgroups of beneficiaries because home-based primary care played a larger role in helping them avoid costly inpatient and post-acute care during the pandemic.

Exhibit 3.4. Only the subgroup defined by dual eligibility had a statistically significant difference between groups in the estimated effect on total spending in Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Circles show the estimated effects of IAH in Year 9 for beneficiaries in the labeled subgroup. The horizontal lines represent 90 percent confidence intervals. Subgroup sample sizes are available in Appendix C.

[a] All beneficiaries in our sample required assistance from another person with at least two of six ADLs.

[b] Residing in a more disadvantaged area is defined as the beneficiary living in a nine-digit ZIP code with an Area Deprivation Index score at or above the 75th percentile across the United States. Residing in a less disadvantaged area reflects a score of less than 75. See Appendix A for more details.

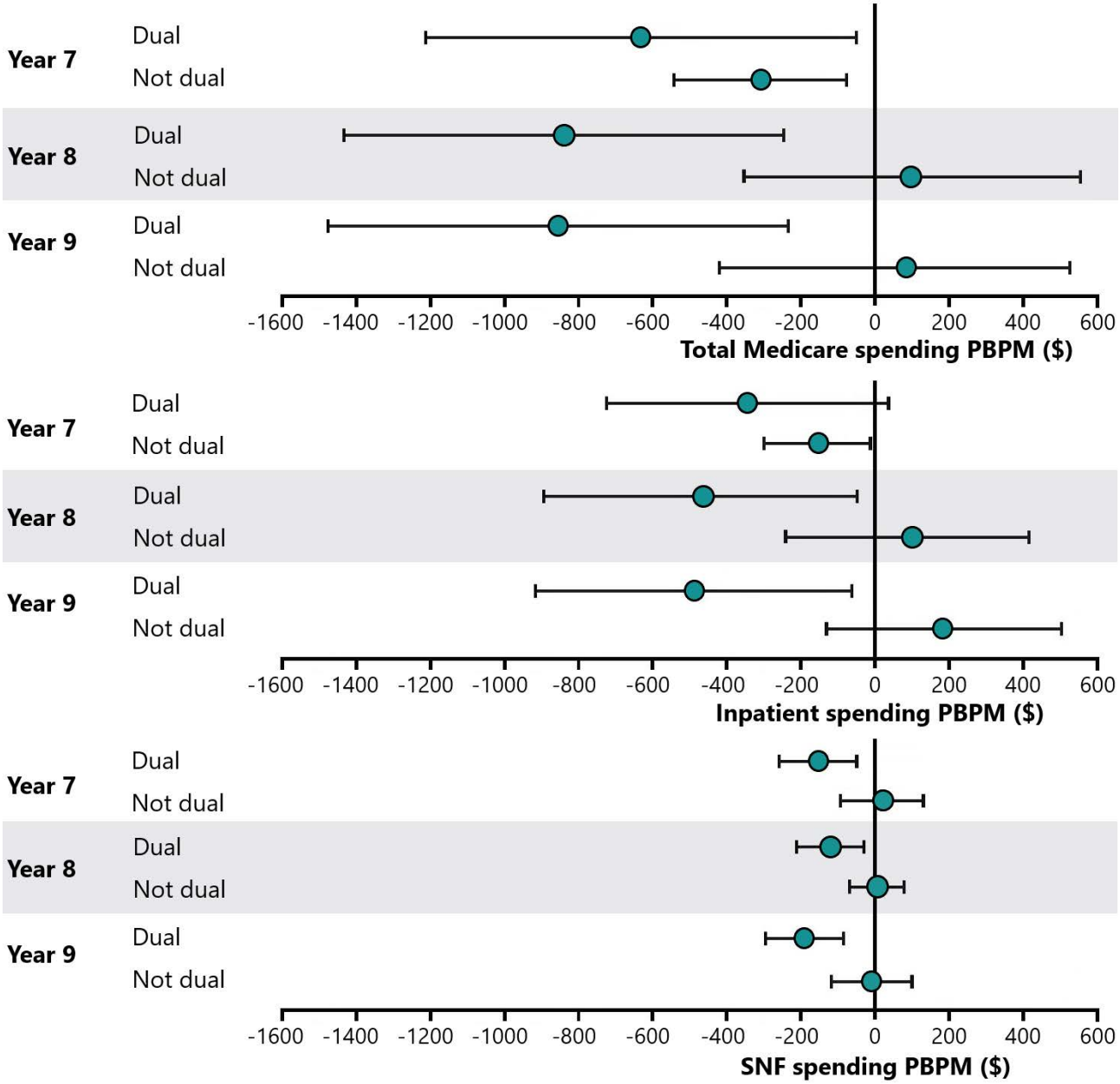
[c] The other category for the original reason for Medicare entitlement category includes entitlement because of disability, end-stage renal disease, or both.

ADLs = activities of daily living; PBPM = per beneficiary per month.

The entire estimated effect on total spending in the full sample in Year 9 was concentrated among the 43.5 percent of IAH beneficiaries who were dually eligible for Medicare and Medicaid. Compared with non-dually eligible IAH beneficiaries, dually eligible IAH beneficiaries were generally younger (34.9 percent aged less than 65 compared with 7.6 percent) and more likely to have qualified for Medicare through a disability (62.3 percent compared with 26.0 percent). We estimated a large reduction in spending of -$856 PBPM (-18.6 percent) for dually eligible beneficiaries in Year 9, similar to Year 8. There was a statistically significant difference between the estimated reduction of -$856 PBPM for dually eligible beneficiaries and the estimated increase of $74 (1.8 percent) for non-dually eligible beneficiaries. The Year 8 and 9 effects were statistically significant and larger than the reduction of -$522 PBPM for the same group of seven sites in Year 7, which was not statistically significant (Exhibit C.5b).

To help explain the effect on total spending for dually eligible beneficiaries, we illustrate the two categories that contribute most strongly to the effects in Exhibit 3.5: inpatient and SNF spending. As in Year 8, inpatient spending accounted for a large share of the estimated effect of IAH on total spending for dually eligible beneficiaries in Year 9. The reduction in inpatient spending for dually eligible beneficiaries in Year 9 was large and statistically significant (-$489 PBPM, -24.6 percent), whereas the effect for non-dually eligible beneficiaries was similar to effects for total spending—positive and not statistically different from zero ($183 PBPM, 12.8 percent). Statistically significant reductions in SNF spending also accounted for a large share of the estimated effect for dually eligible beneficiaries (-$196 PBPM, -39.8 percent). The estimated effect of IAH on SNF spending for dually eligible beneficiaries appeared only after the COVID-19 pandemic began (since Year 7, which is the same as we observed in the full sample). The likelihood of SNF use for comparison group beneficiaries increased by about 3 percentage points from Years 6 to 9, whereas it decreased by 1 percentage point for IAH beneficiaries in that period. IAH practitioners may have believed the SNF setting to be high risk for their IAH beneficiaries during the COVID-19 pandemic.

Exhibit 3.5. For beneficiaries dually eligible for Medicare and Medicaid, IAH probably reduced total spending throughout the pandemic by a considerable amount



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Circles show the estimated effects of IAH in Year 9 for beneficiaries in the labeled subgroup. The horizontal lines represent 90 percent confidence intervals. Subgroup sample sizes are available in Appendix C.

PBPM = per beneficiary per month.

3.2. Effects of IAH on hospital use

The IAH payment incentive may have motivated IAH sites to change how they provided care in ways that reduced hospital admissions and ED visits for two reasons. First, IAH practices could earn higher incentive payments by lowering total Medicare spending (as we explain further in Appendix A), and hospital admissions and ED visits are key contributors to total spending. Second, practices could earn incentive payments by meeting the performance threshold for quality measures that reflect hospital use, such as hospital admissions for select chronic conditions (see Chapter 4 and Appendix B for details). We examined effects of IAH on hospital admissions (total and those preceded by an ED visit) and outpatient ED visits in Year 9.

IAH may have increased hospital admissions in Year 9, though the result was not statistically significant. We estimate that admission increased by about 7.1 percent (127 admissions per 1,000 beneficiaries, Exhibit 3.6). At the start of the COVID-19 pandemic (IAH Year 7), admissions for IAH and comparison beneficiaries declined substantially like they did everywhere in the country as patients avoided the hospital when possible. But, over the next two years, admissions for IAH beneficiaries rose faster than for the comparison group, leading to larger estimated increases in admissions in Year 9 (though effects of IAH on hospital admissions were not statistically significant in any pandemic year).

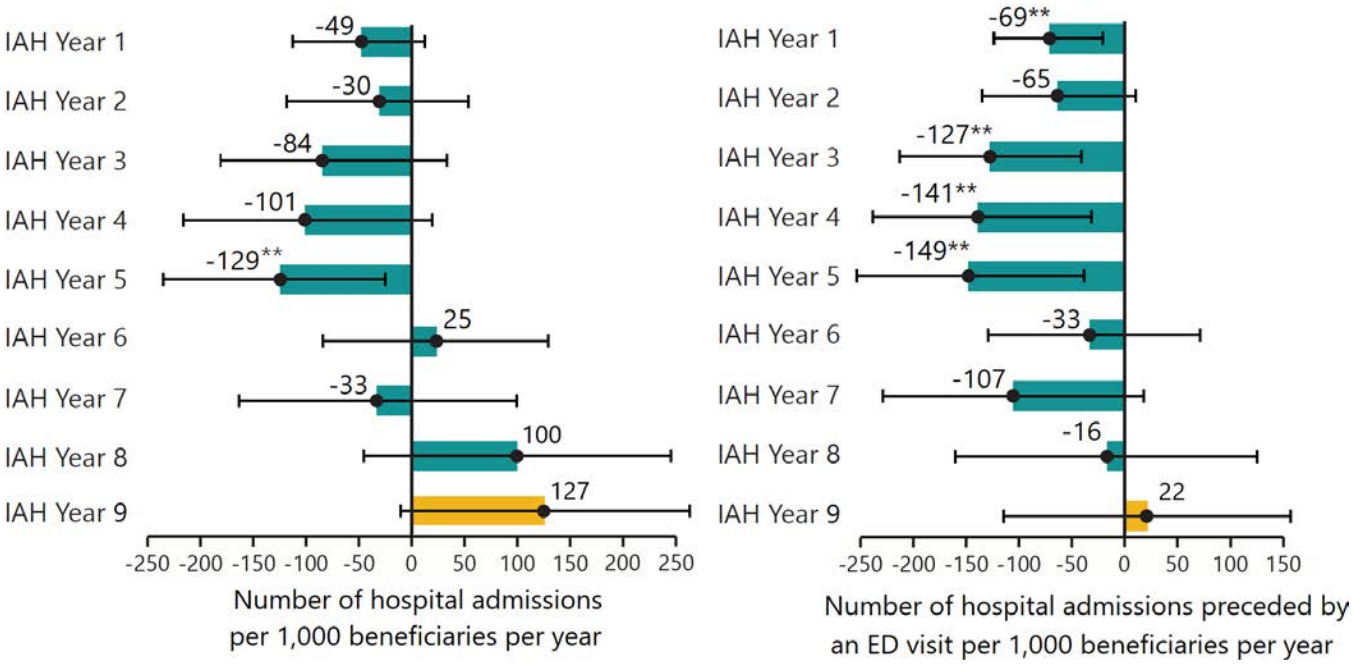
The estimated increase in hospital admissions in Year 9 was concentrated in beneficiaries who were not dually eligible for Medicare and Medicaid (206 admissions per 1,000 beneficiaries, 12.4 percent, statistically significant). These beneficiaries also had a similar increase in inpatient spending ($183 PBPM, 12.8 percent, not statistically significant), suggesting that increased inpatient spending for these beneficiaries came mostly from an increase in the number of total hospital admissions. The estimated increase in hospital admissions in Year 9 occurred because hospital admissions among non-dually eligible IAH beneficiaries rebounded from their initial COVID-19 related declines faster than the comparison group (though neither group reached pre-pandemic admission levels).

For dually eligible beneficiaries, IAH did not meaningfully affect the number of hospital admissions (-2.7 percent) but reduced inpatient spending by nearly 25 percent in Year 9. The effect in Year 9 was larger than it was in the same group of sites prior to the pandemic (when it was about 15 percent); this change was the result of a fairly large increase in inpatient spending among comparison beneficiaries from Year 6 to Year 9 compared with a much smaller increase among IAH beneficiaries. The fact that the number of hospital admissions among dually eligible IAH beneficiaries was largely unaffected suggests that IAH may have reduced the average cost of those admissions.[9] Medicare spending on a hospital admission is determined

[9] If IAH reduced the most expensive hospital admissions but increased less expensive ones, then there would be a similar overall number of hospital admissions but lower inpatient spending, since there were fewer very expensive hospital admissions.

by several factors including whether the beneficiary had a significant comorbidity or complication. If, for example, dually eligible comparison beneficiaries were more likely than IAH beneficiaries to have health conditions that went undiagnosed or untreated during the pandemic, then comparison beneficiaries might have had more comorbidities and complications (and more severe ones) while hospitalized, leading to higher inpatient spending.

Exhibit 3.6. IAH may have increased hospital admissions in Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects in each year were estimated using the sites that participated in that year (seven sites in Years 8 and 9, 10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5). The differences between Years 5 to 9 represent the change in participating sites and any differences in the effects of the IAH payment incentive and home-based primary care over time. The horizontal lines represent 90 percent confidence intervals.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 levels.

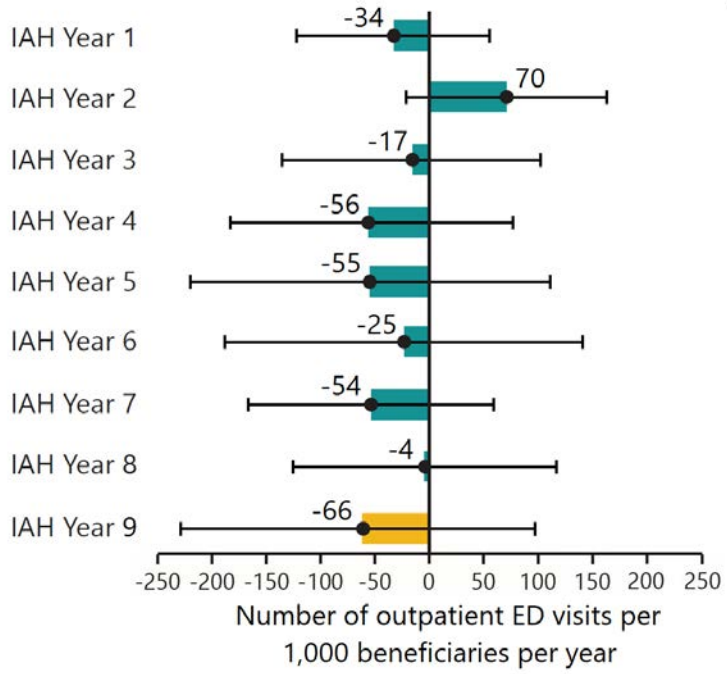
ED = emergency department.

IAH had no measurable effect on hospital admissions preceded by an ED visit in Year 9, which was similar to the result in Year 8. Therefore, most of the potential increases in total hospital admissions came from those not preceded by an ED visit, including planned hospitalizations (such as for elective surgery or inpatient chemotherapy) and direct admissions (unplanned hospitalizations that do not begin in the ED). IAH practices may have made their beneficiaries more comfortable with being hospitalized for planned reasons (perhaps for elective services deferred earlier in the COVID-19 pandemic) or as a direct admission relative to comparison beneficiaries in Years 8 and 9, who may not have had equally strong relationships with their providers.

The average effect of IAH on hospital admissions over all nine years of the demonstration was not statistically significant, but the reduction in hospital admissions preceded by an ED visit was a statistically significant reduction (86 admissions per 1,000 beneficiaries, Exhibit C.18). One possible explanation is that care from IAH practices led to better management of chronic conditions for IAH beneficiaries relative to comparison beneficiaries, such that IAH beneficiaries who visited the ED were less likely to be admitted to the hospital for a chronic condition than comparison beneficiaries.

IAH did not meaningfully reduce outpatient ED visits in Year 9. Outpatient ED visits are ED visits that were not followed by an inpatient hospital admission. The estimated effect of IAH on outpatient ED visits (-66 per 1,000 beneficiaries, -4.5 percent), though slightly larger than other IAH years, was not statistically significant in Year 9. This result is generally consistent with the findings in other years during the pandemic and in previous years of the demonstration (Exhibit 3.7). We did not find evidence that IAH reduced outpatient ED visits on average across all nine years of the demonstration (Exhibit C.18).

Exhibit 3.7. IAH did not meaningfully reduce outpatient ED visits in Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects in each year were estimated using the sites that participated in that year (seven sites in Years 8 and 9, 10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5). The differences between Years 5 to 9 represent the change in participating sites and any differences in the effects of the IAH payment incentive and home-based primary care over time. The horizontal lines represent 90 percent confidence intervals.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 levels.

ED = emergency department.

3.3. Sensitivity analyses of the estimated effect of IAH

We conducted several sensitivity analyses to better understand the Year 9 results, none of which substantively changed the main results. See Appendix A for more details about these sensitivity analyses.

Controlling for COVID-19 diagnosis or hospital admission did not materially change the estimated effect of IAH on spending (Exhibits C.6a and C.6b). Because we select comparison beneficiaries from the same geographic regions as IAH beneficiaries, area-level experience with COVID-19 (for example, unmeasured COVID-19 infections or public health policy responses) were unlikely to influence results. Still, as with Years 7 and 8, the pandemic may have generally changed factors that affected health care delivery and society more generally in Year 9, such as the flow of new beneficiaries into IAH practices or beneficiaries' levels of activity, stress, and loneliness—changes that IAH and comparison groups may have experienced differently, as we describe in Chapter 5.

Results in Year 9 were generally not driven by one site or by sites with the largest numbers of beneficiaries. To explore these potential explanations for the Year 9 results, we estimated the effect of IAH on total Medicare spending in Year 9 using an alternative weighting scheme that gave each practice equal weight in all demonstration years rather than a weight proportional to its size, which is the primary approach. Results from the equal weighting analysis were consistent with the primary approach (Exhibit C.7a).

We also estimated effects on total Medicare spending for Year 9 by excluding one practice at a time from the sample. We were not able to examine the performance of individual practices because they had too few beneficiaries to measure reliably—that is, we could not obtain estimates with enough certainty to draw conclusions. Excluding one site at a time generally produced Year 9 effects that were consistent with the full sample, with one exception (Exhibit C.4). Excluding one large site (Site B) led to a somewhat larger and statistically significant reduction in total spending. That site was the second largest IAH participant in Year 9 by number of beneficiaries, which led to the site having a larger influence on results for the full sample. We do not have qualitative data on changes this site made during the COVID-19 pandemic to explain why the effect of IAH was somewhat different without this site in Year 9 (and in Years 7 and 8). However, a larger spending reduction when excluding this site implies that the effect of IAH on spending at this site was less favorable (a considerably smaller spending reduction or possibly even a spending increase) than it was among other sites participating in Years 8 and 9. We interpret results from analyses excluding one site at a time with caution because the likelihood of any single site having a large influence on results is high with so few sites.

Results did not differ when we removed adjustments from the Merit-based Incentive Payment System (Exhibit C.8). These adjustments, applied to claims for clinicians participating in CMS initiatives, could have affected spending results if they had been

applied unevenly to clinicians who treated IAH and comparison beneficiaries. Similarly, results did not differ after accounting for population-based payments that CMS gives to providers participating in select CMS initiatives to facilitate care transformation.

Effects on total spending may have been somewhat smaller but were not convincingly different when accounting for an IAH practice's participation in an accountable care organization (ACO; Exhibit C.9). In Year 9, 94 percent of IAH beneficiaries (six of the seven IAH practices) and nearly half of comparison beneficiaries participated in an ACO. Although we observed different levels of participation for IAH and comparison beneficiaries, the fact that nearly all IAH beneficiaries participated in an ACO in Year 9 makes it difficult to separate the effect of IAH from any potential effects of being in an ACO for the seven practices that participated in Year 9.

4. What were the effects of the IAH demonstration on quality of care and health outcomes through Year 9?

Key takeaways

- IAH may have increased the probability of having an unplanned readmission in Year 9 (1.4 percentage points, 7.2 percent), a result that we did not find in any other year of the demonstration.
- IAH did not meaningfully reduce potentially avoidable outpatient ED visits or potentially avoidable hospital admissions in Year 9.
- As in other years during the COVID-19 pandemic, IAH likely reduced the probability of dying of any cause in Year 9 by a significant amount (-2.4 percentage points, -15.0 percent).
- IAH did not affect the probability of entering long-term care or the number of days beneficiaries spent at home in Year 9, which is consistent with most other years of the COVID-19 pandemic.
- Nearly all IAH practices could have earned a larger incentive payment if they had met the performance threshold for more quality measures.

Using the same differences-in-differences methodology we used to estimate effects on spending and hospital use described in the previous chapter, we estimated effects on quality of care and health outcomes in Year 9 (see Appendix A for more details). Similar to the effects discussed in the previous chapter, the way we interpret the effects of IAH on quality and health outcomes changed starting in Year 7 as a result of systemic changes to health care delivery and society more broadly during the COVID-19 pandemic.

4.1. Effects of IAH on quality of care as measured by hospital use

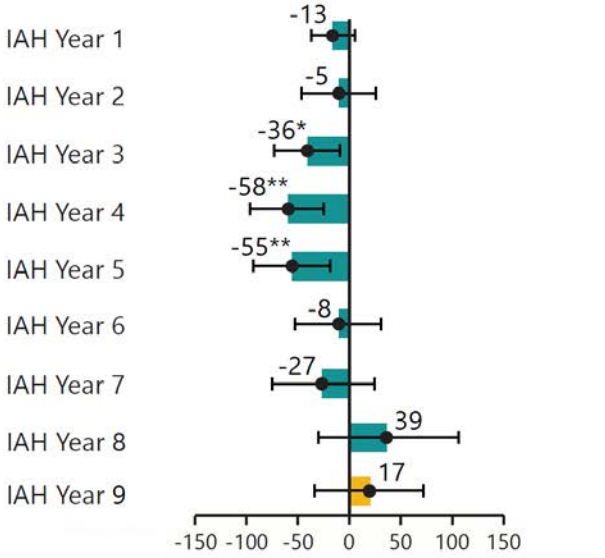
As we discussed in the previous chapter, the IAH payment incentive may have motivated IAH sites to change how they provided care in ways that reduced hospital admissions and ED visits. Changes made by IAH practices to be more comprehensive and responsive to patients' needs may have been particularly effective for hospital admissions and ED visits for certain conditions (such as hypertension and complications from diabetes, as we describe in Appendix A). We designate these admissions and ED visits as potentially avoidable because ambulatory care may have prevented or reduced the need for hospital use in these cases. We estimated the effect of IAH in Year 9 on these potentially avoidable hospital admissions and potentially avoidable outpatient ED visits as well as the probability of unplanned all-cause 30-day hospital readmission. The IAH implementation contractor used related measures to assess IAH practices' performance in the demonstration for the purpose of calculating incentive payments, as we discuss in the last section of this chapter. However, the list of conditions used to

identify potentially avoidable hospitalizations and ED visits as well as the methodology used to calculate performance differed substantially between the evaluation and the payment calculations (see Appendix A).

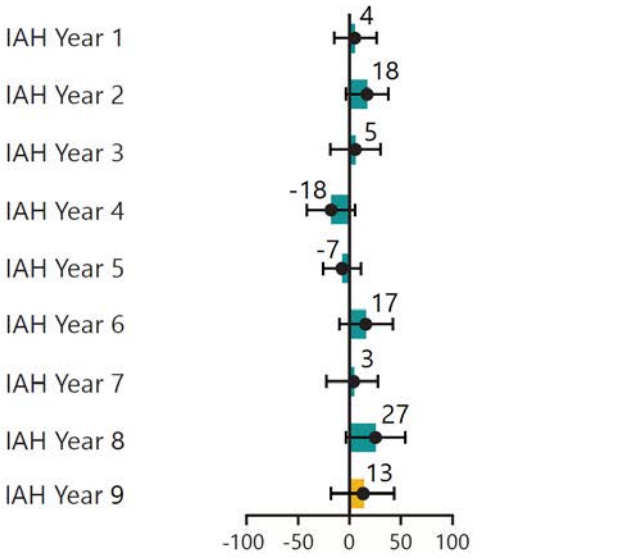
IAH may have increased the probability of having an unplanned readmission in Year 9. We estimated a statistically significant 1.4 percentage point increase in the likelihood of an unplanned readmission because of IAH in Year 9, or 7.2 percent (Exhibit 4.1). It was larger than the estimated increase of 3.9 percent in Year 8, which was not statistically significant. Underlying the larger increase in readmissions in Year 9 was a small decrease in the likelihood of an unplanned readmission for the comparison group between Years 8 and 9 with virtually no change for IAH beneficiaries. It ended a trend of declining readmissions for IAH beneficiaries since before the COVID-19 pandemic. In Year 6, the probability of having an unplanned readmission was 19.8 percent for IAH beneficiaries, and it decreased to about 15.7 in Years 8 and 9. For comparison beneficiaries, the probability of having an unplanned readmission was 21.6 percent in Year 6, and it decreased to 17.3 percent in Year 8 and 17.0 percent in Year 9. Since the likelihood of readmission was lower for IAH than comparison beneficiaries in recent years, perhaps IAH beneficiaries had less room for improvement, relative to the comparison group, making it more difficult to continue to lower the likelihood of readmission. The estimated increase in the likelihood of an unplanned readmission may have contributed to the potential increase in all hospital admissions in Year 9. Still, the result in Year 9 was not generally consistent with effects on readmissions during the first year of the pandemic (Year 7) or in earlier years of the demonstration (which were generally negative or close to zero), which limits confidence in the Year 9 estimate. When we combined the results from Years 7 to 9 with the effects before the pandemic, the average effect on unplanned readmissions over all nine years was not statistically different from zero (Exhibit C.18).

IAH did not reduce potentially avoidable hospital admissions or potentially avoidable outpatient ED visits in Year 9. We estimated a small increase on potentially avoidable hospitalizations (17 per 1,000 beneficiaries per year, 3.7 percent) and potentially avoidable outpatient ED visits (13 per 1,000 beneficiaries, 6.9 percent) in Year 9. Neither result was statistically significant, though they were similar to the effects in Year 8 and larger in magnitude than the effects estimated in the first year of the COVID-19 pandemic. Similar to readmissions, the increased effects for potentially avoidable hospitalizations may have contributed modestly to the estimated increase in hospital admissions in Years 8 and 9, but these admissions represent less than one-fifth of all hospital admissions. Overall, despite small increases in effects in Years 8 and 9, there is little evidence that IAH meaningfully affected potentially avoidable hospital use during the COVID-19 pandemic. Also similar to readmissions, when we combined the results from Years 7 to 9 (which were above or close to zero) with the effects before the pandemic (which tended to be below or close to zero), the average effects on potentially avoidable hospital admissions or potentially avoidable outpatient ED visits over all nine years were not statistically different from zero (Exhibit C.18).

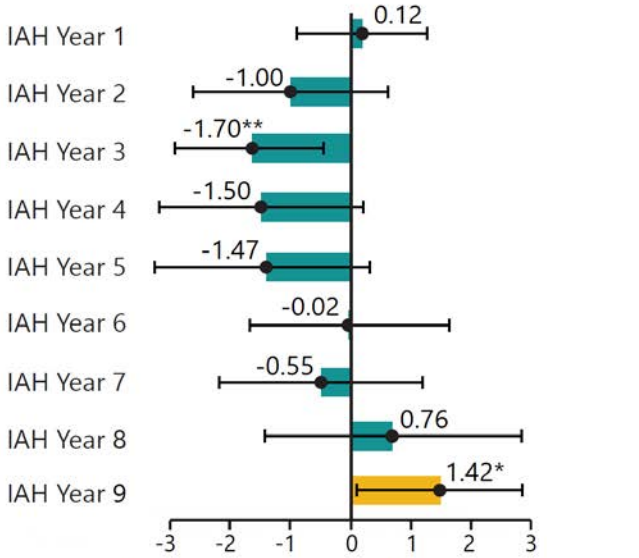
Exhibit 4.1. IAH may have increased unplanned readmissions but did not affect potentially avoidable outpatient ED visits or potentially avoidable hospital admissions in Year 9



Number of potentially avoidable hospital admissions per 1,000 beneficiaries per year



Number of potentially avoidable outpatient ED visits per 1,000 beneficiaries per year



Probability of an unplanned readmission within 30 days of discharge (percentage point change)

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects in each year were estimated using the sites that participated in that year (seven sites in Years 8 and 9, 10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5. Differences between Years 5 to 9 represent the change in participating sites and any differences before and during the COVID-19 pandemic in the effects of the IAH payment incentive and home-based primary care. The horizontal lines represent 90 percent confidence intervals.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 levels.

ED = emergency department.

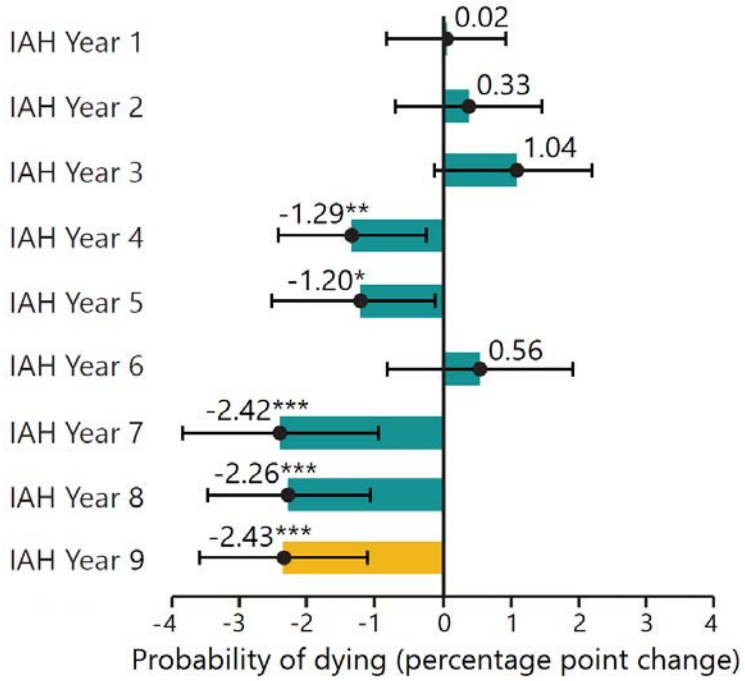
4.2. Effects of IAH on mortality

We also examined the effect of IAH on mortality. Mortality is relatively high in this population; about 14 percent of IAH beneficiaries died in Year 9 (23 percent in the comparison group). Changes that IAH practices made to care delivery in response to the payment incentive early in the demonstration could have affected health, including through changes in the mortality rate. In addition, a change in the relative effectiveness of home-based primary care during the COVID-19 pandemic could have affected mortality. For example, because of more frequent primary care visits or reduced isolation because of the home visits from IAH practices, mortality could be reduced. Finally, mortality can be a strong driver of spending. End-of-life care is often costly (Duncan et al. 2019), and, if IAH reduced mortality during the COVID-19 pandemic for IAH beneficiaries relative to comparison beneficiaries, less end-of-life care could have contributed to larger reductions in total spending.

IAH reduced the probability of dying of any cause in Year 9 by 2.4 percentage points (15.0 percent), a large, statistically significant effect that was similar to the effect in Years 7 and 8. Similar results across all years of the COVID-19 pandemic that are distinct from years before the pandemic lend credibility to the notion that IAH may have reduced the probability of dying during the pandemic (Exhibit 4.2). Comparison beneficiaries had a consistently higher rate of mortality (by 2 to 3 percentage points) during the pandemic than any previous demonstration year among sites that participated in Year 9, but for IAH beneficiaries, mortality was similar in Year 9 to what it was in the years before the pandemic (generally within 1 percentage point). COVID-19 diagnosis did not play a direct material role in the effect on the death rate in Year 9 (Exhibits C.14). The effect on mortality did not appear as strongly or consistently before the COVID-19 pandemic. Across all nine years of the demonstration, IAH may have reduced the probability of dying, but the result was not statistically significant (-0.6 percentage points, 90 percent confidence interval: -1.53, 0.43) (Exhibit C.18).

Reducing the probability of dying likely contributed to the sizeable but not statistically significant reduction in total spending in Year 9. Because end-of-life care is typically costly, lowering the probability of dying could contribute directly to reduced spending. In Year 9, on average, IAH beneficiaries who died had nearly twice the level of spending of those who did not ($8,945 versus $5,164 PBPM).

Exhibit 4.2. IAH reduced the probability of dying in Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects in each year were estimated using the sites that participated in that year (seven sites in Years 8 and 9, 10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5). The differences between Years 5 to 9 represent the change in participating sites and any differences in the effects of the IAH payment incentive and home-based primary care over time. The horizontal lines represent 90 percent confidence intervals.

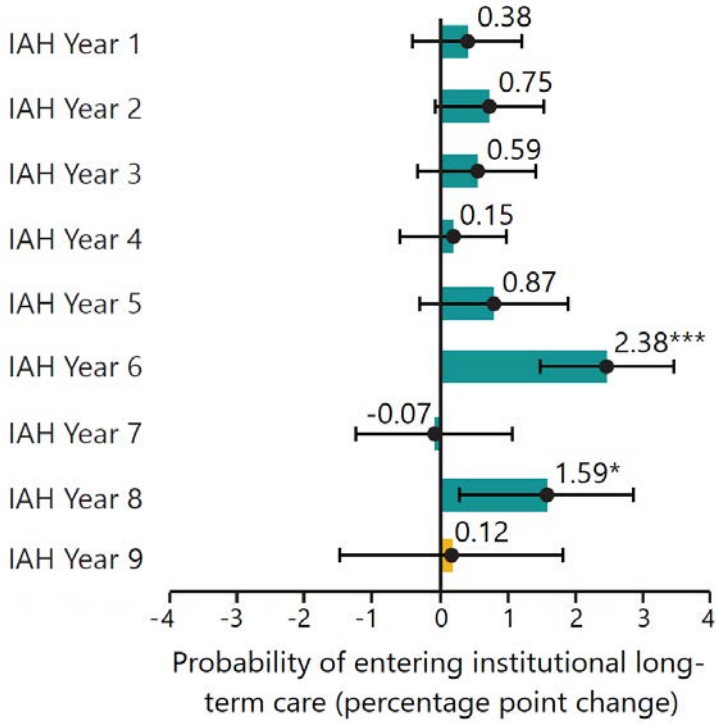
*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 level.

4.3. Effects of IAH on institutional long-term care

Entering institutional long-term care is a health outcome that matters to beneficiaries and their families because it is accompanied with sudden changes to day-to-day life, often at an age when making such changes is especially difficult. Institutional long-term care includes nursing facilities but not assisted living facilities. Although it is not an intended effect, the IAH payment incentive may have provided an incentive to IAH practices to encourage high-cost beneficiaries to enter institutional long-term care because residence in such a facility removed them from the calculation of incentive payments for the demonstration.

IAH did not affect the probability of entering institutional long-term care in Year 9. In Year 9, we find no effect of IAH on entering institutional care (0.12 percentage points, 1.4 percent), which differs from the increase we found in Year 8 (1.59 percentage points, 15.7 percent) but is similar to the lack of an effect in Year 7 (Exhibit 4.3).

Exhibit 4.3. IAH did not reduce the probability of entering institutional long-term care in Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects in each year were estimated using the sites that participated in that year (seven sites in Years 8 and 9, 10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5). The differences between Years 5 to 9 represent the change in participating sites and any differences in the effects of the IAH payment incentive and home-based primary care over time. The horizontal lines represent 90 percent confidence intervals.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 level

Overall, we did not find consistent evidence that IAH affected the probability of entering long-term care during the COVID-19 pandemic. Results that combined all nine years of the demonstration suggest that IAH may have increased the probability of entering institutional long-term care (0.67 percentage points, Exhibit C.18). However, that estimate reflects a larger decrease in long-term care use among comparison beneficiaries than among IAH beneficiaries—not an absolute increase in long-term care use by IAH beneficiaries.

The IAH demonstration coincided with a national shift away from institutional care toward community-based care for Medicaid beneficiaries who require long-term supports and services during the IAH demonstration (Murray et al. 2021). We saw evidence of this shift among IAH and comparison beneficiaries—the probability of entering institutional long-term care declined each year (from 9.3 percent in 2011 to 6.1 percent in 2022 for IAH beneficiaries and from 17.1 percent to 13.8 percent for comparison beneficiaries. Changes in institutional long-term care use may have differed across geographic areas, but this would not have affected the evaluation results because, in each pre-demonstration and demonstration year, we identified

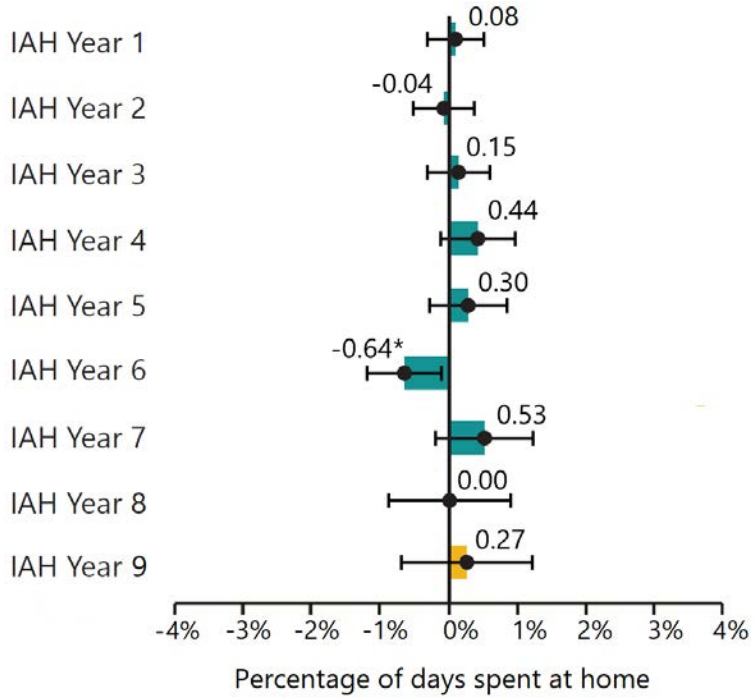
comparison beneficiaries from the same geographic areas as IAH beneficiaries. However, because IAH beneficiaries had a much lower rate of entering institutional long-term care than comparison beneficiaries in the year before the demonstration (2011), they may have had less opportunity than comparison beneficiaries to reduce long-term care use. In addition, the estimated effect on the probability of entering institutional long-term care may be overstated because the trends in this outcome between IAH and comparison groups were not parallel before the start of the demonstration.

4.4. Effects of IAH on the days beneficiaries spent at home

A variety of health events can require beneficiaries to leave their homes to seek hospital, emergency, or rehabilitative services. Spending days away from home because of health problems has physical, mental, emotional, and financial consequences for beneficiaries and adds complications for their caregivers (Graf 2006; Lee et al. 2018). In addition, many patients consider time spent at home to offer better quality of life relative to time spent in a hospital or SNF (Groff et al. 2016; Jerath et al 2019). We measured the number of days IAH and comparison beneficiaries spent at home while they were eligible to participate in IAH to analyze whether IAH affected the proportion of time beneficiaries stay at home per year. We defined a day that a beneficiary stayed home as any day in which there was no inpatient admission, SNF or ED visit, or observation stay (days spent in institutional long-term care count as days at home). See Appendix A for more details.

IAH did not affect the number of days beneficiaries spent at home in Year 9. Before the demonstration, among the seven sites participating in Year 9, IAH beneficiaries spent about 88 percent of their days at home and comparison beneficiaries spent about 84 percent of their days at home. The percentage of days at home increased by a similar amount for the two groups during the demonstration, to about 91 percent for IAH and 87 percent for comparisons in Year 9, leading to an estimated effect of IAH that was close to zero (0.27 percent) (Exhibit 4.4). This effect in Year 9 was similar to results from the previous two years of the COVID-19 pandemic and throughout the demonstration. On average over all nine years of the demonstration, IAH did not increase the percentage of days beneficiaries spent at home (0.11 percentage points, not statistically significant) (Exhibit C.18).

Exhibit 4.4. IAH did not increase the percentage of days beneficiaries spent at home in Year 9



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects in each year were estimated using the sites that participated in that year (seven sites in Years 8 and 9, 10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5). The differences between Years 5 to 9 represent the change in participating sites and any differences in the effects of the IAH payment incentive and home-based primary care over time. The horizontal lines represent 90 percent confidence intervals.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 level

4.5. Performance on quality measures used to calculate IAH incentive payments

In addition to analyzing the effect of IAH on quality using claims-based outcomes, we conducted a descriptive analysis of how IAH practices performed on quality measures required for the IAH demonstration. To be eligible for an incentive payment in Year 9, IAH practices had to meet performance thresholds for at least three of six quality measures (Exhibit 4.5). To determine their performance on these measures, the IAH implementation contractor used Medicare claims and enrollment data, along with site-reported information provided through the IAH Reporting System (also used to provide clinician identification numbers as discussed in Chapter 1). If a practice successfully met the thresholds for all six quality measures, it received the full maximum payment available. Practices that met the performance threshold for three, four, or five quality measures were awarded 50 percent, 67 percent, or 83 percent of the maximum payment, respectively. The payment amount did not vary based on how much a practice exceeded the performance threshold for a specific measure.

We expected that practices were driven by the incentive payment to demonstrate improvements or maintain high performance on the quality measures.

Exhibit 4.5. Quality measures used to calculate IAH incentive payments

Site-reported measures	Claims-based measures
Follow-up contact within 48 hours of hospital admissions, hospital discharges, and ED visits for at least 50 percent of these events[a]	All-cause hospital readmissions within 30 days less than or equal to average utilization in a similar population
Medication reconciliation in the home within 48 hours of hospital discharges and ED visits for at least 50 percent of these events[a]	Hospital admissions for selected ambulatory care-sensitive conditions less than or equal to average utilization in a similar population[b]
Patient preferences documented annually for at least 80 percent of IAH enrollees	ED visits for selected ambulatory care-sensitive conditions less than or equal to average utilization in a similar population[b]

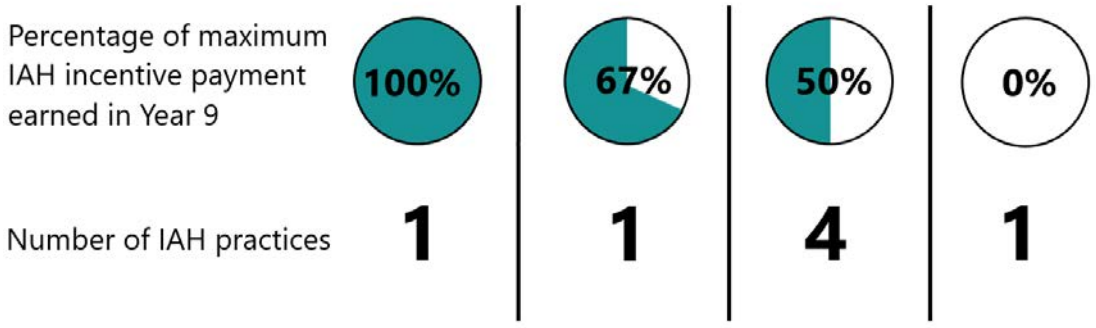
[a] Follow-up contact after hospital discharge or ED visit and medication reconciliation must take place in the patient's home or, during the COVID-19 public health emergency, via telehealth or telephone.

[b] Ambulatory care-sensitive conditions include diabetes, congestive heart failure, and chronic obstructive pulmonary disease. For more information about how the implementation contractor calculates the claims-based measures, see the methodology report on CMS's website (CMS 2021).

ED = emergency department.

Nearly all of the practices could have earned a larger incentive payment in Year 9 if they had met the performance threshold for more quality measures. One practice earned no payment in Year 9 because it met the performance threshold for only two of the six measures (Exhibit 4.6). Most practices (four) earned 50 percent of their maximum payment because they met the performance threshold for three of the six measures. This result was similar to Year 8, when six of the seven sites earned 50 percent of their maximum payment. Only one site achieved 100 percent of its maximum payment in Year 9.

Exhibit 4.6. In Year 9, six of the seven of the IAH practices earned less than their maximum incentive payment because they did not meet the performance threshold for several quality measures



Source: Data from the IAH implementation contractor.

As in Year 8 and most previous demonstration years, most practices did not meet the performance threshold for the three site-reported quality measures tied to payment in Year 9. Only one practice met the performance thresholds for all three-site reported measures tied to incentive payments (Exhibits 4.7 and B.4). Median performance on these measures fell well below their thresholds. Two practices met the performance threshold for follow-up contact within 48 hours and for documenting patient preferences annually, an increase from only one practice meeting these thresholds in Year 8. The additional practice improved performance from 45.0 to 53.9 percent for follow-up contact within 48 hours (required threshold was 50 percent) and from 66.4 to 92.2 percent for documenting patient preferences annually (required threshold was 80 percent). At the same time, five practices that had reported very low performance on the patient preferences measure in Year 8 (ranging from 2.5 to 7.8 percent) dropped to zero in Year 9. These were the same five practices that generally stopped updating the IAH Reporting System after Year 8.

Exhibit 4.7. Nearly all practices met the performance threshold for claims-based measures in Year 9, but most practices failed to meet the performance threshold for the three site-reported measures

	Lowest performance	Median performance	Highest performance	Threshold	Number of practices that met threshold
Site-reported measures					
Percentage with follow-up contact within 48 hours	4.1	6.4	71.4	50	2
Percentage with medication reconciliation within 48 hours	0	0	65.3	50	1
Percentage with patient preferences documented annually	0	0	94.6	80	2
Claims-based measures					
All-cause hospital readmissions within 30 days: ratio of observed to expected	0.85	0.72	0.62	<1	7
Hospital admissions for selected ambulatory care-sensitive conditions: ratio of observed to expected	1.06	0.59	0.34	<1	6
ED visits for selected ambulatory care-sensitive conditions: ratio of observed to expected	1.30	0.52	0.38	<1	6

Source: Data from the IAH implementation contractor.

Note: Failure to meet the performance threshold for a quality measure may reflect failure to meet the threshold level for the quality measure activity or a failure to document and report the activity in the IAH Reporting System established by the IAH implementation contractor, which would be reported as a zero in the exhibit.

ED = emergency department.

In a previous evaluation report, we highlighted several factors that could have affected performance on the 48-hour follow-up contact measure and the 48-hour medication reconciliation measure, including timely notification of beneficiary hospital admissions and ED visits and the availability of clinicians for after-hours and weekend visits.[10] Some practices noted that follow-up within 48 hours was not medically necessary for every beneficiary. Those practices exercised clinical judgment in assessing when a patient needed a follow-up visit within 48 hours or when a visit within 72 or 96 hours would meet the patient's needs. The practice that met the thresholds for the 48-hour follow-up contact and medication reconciliation measures reported, during interviews early in the demonstration, that they received automated notification of hospital admissions or ED visits and electronic health records. It is possible that burdens imposed by the ongoing COVID-19 pandemic could have contributed to one practice's failure to meet the thresholds for these measures in Years 8 and 9 after having successfully met them in Year 7 and earlier years. Finally, in the early years of the demonstration, practices reported challenges collecting data and submitting data to the IAH Reporting System. Some practices had to hire new data analysis staff, and others expanded the responsibilities of existing staff to try to meet these requirements for quality measure reporting. Therefore, it is possible that some practices were conducting 48-hour follow-up contacts, reconciling medications within 48 hours, and discussing preferences with at least some of their patients but not consistently documenting these activities and submitting evidence of meeting the threshold.

The seven practices that participated in Years 8 and 9 consistently met the performance threshold for all of the claims-based measures of hospital admissions, all-cause hospital readmissions measures, and ED visits throughout Years 1 to 8. In Year 9, however, six practices met the thresholds for only two of these measures: hospital admissions for selected ambulatory care-sensitive conditions and ED visits for selected ambulatory care-sensitive conditions.

[10] For more information, refer to the evaluation report covering Year 4 of the IAH demonstration.

5. Which effects of the IAH demonstration were new or notable in Year 9?

The IAH demonstration aimed to reduce Medicare spending by reducing hospital use and improving health outcomes for Medicare beneficiaries who are chronically ill and functionally limited (Public Law 111-148). When considering whether the IAH demonstration met its stated goals, the evaluation considered the size and consistency of the direction (increase or decrease) of the estimated effects of IAH on outcomes in addition to their statistical significance. This report primarily covers effects in Year 9 of the demonstration, but we also examined how results in Year 9 compared with other years during the COVID-19 pandemic, Years 7 and 8, and whether effects during the pandemic differed from estimated effects before the pandemic. We also explored whether IAH may have been more effective in Year 9 for certain subgroups of beneficiaries. Finally, we considered implications of the decline in demonstration participation and other limitations of the evaluation.

We did not find strong and consistent evidence that IAH met its goals in Year 9 to reduce spending and hospital use and improve health outcomes, which is similar to our findings in Year 8. IAH may have reduced total Medicare spending in Year 9, but the result was not statistically significant, and the results are not generalizable beyond the unique circumstances of the pandemic. In addition, after accounting for payments CMS paid to IAH sites, IAH may have *increased* net spending in Year 9—despite most practices earning no more than half of the maximum incentive payment in Year 9 because of poor performance on some quality measures. IAH did not reduce hospital admissions or unplanned readmissions, nor did it reduce potentially avoidable hospitalizations or ED visits in Year 9. However, we did find evidence that IAH reduced the probability of dying of any cause in Year 9.

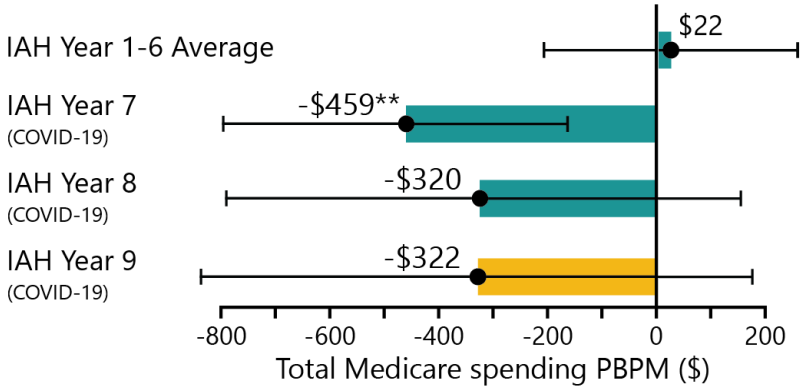
To what extent did the IAH demonstration meet its goals of reducing spending and hospital use and improving health outcomes across all three years (IAH Years 7 to 9) of the COVID-19 pandemic?

- Effects on spending were generally larger with more variability during the pandemic than before it.
- Across all three years of the pandemic, IAH may have slightly increased total net spending after accounting for CMS payments made to IAH providers.
- IAH did not reduce hospital admissions nor unplanned readmissions in any year of the COVID-19 pandemic, nor did it consistently reduce potentially avoidable hospitalizations or ED visits.
- IAH significantly reduced the probability of dying of any cause in all three years of the COVID-19 pandemic.

Throughout the COVID-19 pandemic, IAH and comparison group beneficiaries had similar rates of COVID-19 diagnosis and hospitalization, suggesting that any differences in effects of IAH during this time relative to years before the pandemic were probably not a direct result of COVID-19 or its complications. Still, across all three pandemic years, some patterns emerged. Effects on spending among sites that participated in the demonstration during the pandemic were larger than effects for these sites before the pandemic. For example, though effects on total spending were

not statistically significant in Years 8 or 9, effects on spending during each of the three years of the COVID-19 pandemic among the seven sites that participated in Years 8 and 9 were twice as large as any year before the pandemic for this same group. Effects in Year 7 (2020), when 10 sites participated, were the largest of any IAH year across the full nine years of the demonstration (Exhibit 5.1).

Exhibit 5.1. IAH reduced total spending during the COVID-19 pandemic (2020-2022) by more than it did prior to the pandemic



Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Data Warehouse.

Notes: Effects Years 1 to 6 were estimated using the 10 sites that participated during the pandemic. Effects in Years 7 to 9 were estimated using the sites that participated in that year (seven sites in Years 8 and 9 and 10 sites in Year 7). Differences between Years 1 to 6 and Years 7 to 9 represent the change in the effects of the IAH payment incentive and home-based primary care during the pandemic. The horizontal lines represent 90 percent confidence intervals.

*/**/*** The difference is statistically significant at the 0.10/0.05/0.01 levels.

PBPM = per beneficiary per month.

Effects on spending during the COVID-19 pandemic were concentrated mainly among beneficiaries dually eligible for Medicare and Medicaid. In Years 8 and 9, all of the effects on spending—statistically significant reductions around 18 percent in both years—were among dually eligible beneficiaries. Much of the reduction in total spending from Years 8 and 9 was related to large reductions in inpatient and SNF spending among dually eligible beneficiaries. In Year 7, among the 10 sites participating in that year, effects for dually eligible beneficiaries were also larger than non-dually eligible beneficiaries, though the difference between those two groups was not statistically significant.

Finally, starting in Year 7, IAH likely reduced the probability of dying of any cause. The effect was twice as large as any IAH year preceding the pandemic and was consistent across all three years of the pandemic. Effects on the probability of dying were not driven by direct effects of COVID-19 illness or hospitalization. The effect came mostly from larger increases in the probability of dying among the comparison group during COVID-19.

5.1. Limitations

Small numbers of participants could lead to imprecise results (large confidence intervals) and random fluctuations in estimated results. With a total of seven practices and 2,620 beneficiaries in Year 9, the small number of practices and beneficiaries hampered the evaluation's ability to robustly measure the effects of the demonstration. Congress limited the size of the demonstration, and practices withdrew from the demonstration over time, further decreasing the relatively small number of practices able to be evaluated. The number of practices decreased from 18 at the outset to 10 in Year 7 and seven in Years 8 and 9. With so few sites and beneficiaries, evaluation results could be subject to random fluctuations, which could lead to (1) larger deviations between the true and estimated effects of IAH and (2) wider confidence intervals, lessening the chance of an estimated effect being statistically significant. Indeed, in Year 9, when the evaluation sample was at its smallest, the estimated standard error for total spending was at its largest, leading to wide confidence intervals (Exhibit C.2a.).

Because of the small number of sites that participated in the demonstration, effects on total spending were partly driven by which sites participated in which years. In a prior report, we showed how removing a single site dramatically lowered effects on spending through Year 5.[11] In Year 9, results were more consistent when removing individual sites but showed some variation, including a larger and statistically significant reduction in total spending when removing one of the larger sites (Appendix Exhibit C.4).

Results are not generalizable to beneficiaries who do not meet IAH eligibility criteria, beneficiaries of other providers, or years not affected by the COVID-19 pandemic. The IAH demonstration showed how IAH affected outcomes for chronically ill and functionally limited Medicare fee-for-service beneficiaries treated by IAH practices participating in a given year. Attrition from the demonstration, combined with the fact that five of the seven practices that remained in Year 9 were operated by the same corporation, means that the results for Year 9 of the demonstration are unlikely to inform what may happen if the IAH payment incentive were extended to other providers. Furthermore, results for Year 9 cannot be generalized outside the COVID-19 pandemic. Despite the ways that 2022 differed from 2020 and 2021 (such as increased protection due to vaccination, prior infection, or both and the availability of antiviral therapy), the public health emergency continued through 2022. Cases of COVID-19 illness and related mortality remained high in 2022 (particularly early in the year), affecting many aspects of health care during that time. In other words, results during the pandemic are unlikely to inform what effects would be in non-pandemic years.

[11] For more information, refer to the evaluation report covering Year 5 of the IAH demonstration.

The longer the demonstration, the higher the risk of confounding in the estimated effects. The difference-in-differences methodology used for the evaluation removed any consistent influence of unmeasured factors on outcomes from the estimated effects (see Appendix A for details on the methodology). This approach worked by using the year before the demonstration as a baseline to account for pre-demonstration differences between the IAH and comparison groups. For example, it is plausible that in the year before the demonstration, a larger share of IAH beneficiaries were permanently homebound than comparison beneficiaries, but we cannot measure this characteristic using administrative data. Under a difference-in-differences methodology, our inability to measure homebound status does not pose a risk of bias in the estimated effects as long as (1) the association between being permanently homebound and outcomes such as spending and death did not change since before the demonstration and (2) the share of beneficiaries who were permanently homebound did not change differentially for the IAH and comparison groups from before the demonstration to a given demonstration year. Because the pre-demonstration baseline year (2011–2012) ended nearly 10 years before Year 9, there was a long period of time during which factors other than the payment incentive may have affected outcomes differently for IAH and comparison beneficiaries.

Furthermore, five of the seven IAH sites stopped updating clinician identification numbers that the evaluation used to identify IAH beneficiaries for the evaluation. Thus, the evaluation might not include all beneficiaries who otherwise would have been included had these five IAH practices kept their clinician identification numbers up to date. If these potentially missing beneficiaries were different in unobservable ways than those in the evaluation sample, results for Year 9 may have an increased risk of bias.

Beginning in Year 7, the COVID-19 pandemic may have driven changes in unobserved factors that confounded the estimated effects. The COVID-19 pandemic systemically disrupted beneficiaries' patterns of seeking care and clinicians' delivery of care. As one example, the share of beneficiaries new to an IAH practice changed between the year preceding the COVID-19 pandemic and the years during the pandemic. Among the seven practices that participated in Years 8 and 9, in the year before the COVID-19 pandemic (Year 6), 34 percent of IAH beneficiaries were new patients of an IAH practice. Among those same practices during the pandemic (Years 7 to 9), the percentage of IAH beneficiaries who were new to an IAH practice declined (31 percent in Year 7, 29 percent in Year 8, and 32 percent in Year 9).

The decrease in the share of new IAH beneficiaries during the COVID-19 pandemic may have been related to a temporary reduction in the number of new patients accepted by some IAH practices or from fewer hospital admissions, which can be a precipitating factor to starting home-based primary care. Being new to an IAH practice was associated with higher total spending relative to existing beneficiaries, perhaps because patients sometimes begin home-based primary care after a recent

health event, which often increases spending in the subsequent months. But because we did not know which beneficiaries in the comparison group were new patients of their respective providers, we could not account for any changes in the share of new beneficiaries between the IAH and comparison groups that could confound the estimated effects of IAH on outcomes such as spending.

The difference-in-differences study design would account for any difference in the share of new beneficiaries in the IAH and comparison groups if we had reason to believe that that any such difference in the share was constant before and during the demonstration. But we observed a change in the share of IAH beneficiaries who were new patients during the COVID-19 pandemic without knowing the impact on the comparison beneficiaries, which the study design cannot account for. Thus, the results during the pandemic may be partly attributable to changes in the share of beneficiaries new to an IAH practice, as driven by the disruptive effects of the COVID-19 pandemic.

5.2. Mechanisms for how IAH could have affected outcomes differently during the COVID-19 pandemic

There are two mechanisms by which IAH could have affected outcomes differently in Year 9 than it did in demonstration years preceding the COVID-19 pandemic:

1. Changes in care delivery by IAH practices *because of the IAH payment incentive*, and which could have had larger (or smaller) effects on outcomes during the COVID-19 pandemic than in previous years
2. Changes in the relative effectiveness of home-based primary care for IAH beneficiaries *because of the COVID-19 pandemic and public health emergency* declared by the U.S. Department of Health and Human Services, which continued into 2022 and affected many aspects of health care during that time

As we concluded in the evaluation reports covering Years 7 and 8, it is unlikely that changes in care delivery IAH practices made in response to the payment incentive were the most important factor influencing outcomes in Year 9. It is more likely that the pandemic changed the relative effectiveness of home-based primary care. The Year 7 and Year 8 reports offer more detail on these potential mechanisms, including examples and additional discussion.[12]

5.3. Discussion of new and notable findings in Year 9

Many of the results from Year 9 were consistent with findings from the first two years of the COVID-19 pandemic, Years 7 and 8. In this section, we discuss findings that were new or particularly noteworthy in Year 9.

[12] For more information, refer to the evaluation report covering Year 7 of the IAH demonstration and the evaluation report covering Year 8 of the IAH demonstration.

In Year 9, IAH beneficiaries had a lower percentage of primary care visits via telehealth or telephone than comparison beneficiaries, which is different from what we observed in the first two years of the COVID-19 pandemic. At the start of the pandemic, IAH beneficiaries received 38.6 percent of their primary care visits via telehealth or telephone, while comparison beneficiaries received just 27.7 percent. By Year 9, this trend had reversed, with IAH beneficiaries receiving just 11.0 percent of primary care visits as telehealth or telephone visits compared to 17.2 percent in the comparison group. Fewer telehealth and telephone visits in Year 9 for IAH beneficiaries led to a smaller but still meaningful difference in the total number of primary care visits relative to comparison beneficiaries.

The high initial take-up and subsequent decline of telehealth and telephone visits for IAH beneficiaries demonstrates IAH practices' willingness and ability to adjust their care strategies to meet the needs of IAH beneficiaries during the pandemic. The quick return to in-person visits indicates the high value that IAH beneficiaries and clinicians place on them. As we discussed in Chapter 2, in-person home-based primary care visits help the IAH beneficiary, caregiver, and clinician develop a trusting relationship and effective communication, and they offer an opportunity for clinicians to gather information about beneficiaries' care needs that clinicians cannot obtain remotely, such as identifying safety improvements at home to reduce the risk of falling and medication storage and organization.

Despite fewer telehealth and telephone visits, IAH beneficiaries continued to have more total primary care visits than comparison beneficiaries in Year 9 (9.1 versus 5.8 visits). Additional primary care visits may have increased access to care, increased trust and improved communication between beneficiaries and IAH practices, and reduced loneliness—all of which could have reduced mortality or total spending in Year 9 (though the estimated reduction in total spending in Year 9 was not statistically significant).

Similar findings during all three years of the COVID-19 pandemic strengthens confidence that IAH prevented some deaths during the pandemic. In Year 9, IAH reduced the probability of dying of any cause by 2.4 percentage points (15.0 percent). This result was consistent with results in Years 7 and 8, nearly twice as large as in any pre-pandemic year, and was not driven by direct effects of COVID-19 illness or hospitalization. Because the IAH demonstration is small, there is some concern that results from any single year which differ substantially from results in other years could be because of random differences in outcomes and not caused by the demonstration itself. However, with consistent results during all three years of the COVID-19 pandemic, including Year 9, evidence that IAH reduced the probability of dying during the pandemic is much stronger than any single year result alone.

The effects of IAH on the probability of dying during the COVID-19 pandemic may have been driven by several mechanisms. First, IAH beneficiaries may have received more consistent care than comparison beneficiaries during the COVID-19 pandemic,

including through telehealth and telephone visits. These additional telehealth and telephone visits, which probably replaced some in-person visits, particularly early in the pandemic, may have kept IAH beneficiaries relatively healthier and prevented more serious complications. Furthermore, IAH beneficiaries, through the trust they built with their IAH providers, may have felt more comfortable seeking care for acute conditions during the COVID-19 pandemic when comparison beneficiaries may have been uncertain about the relative risks of managing existing health concerns and being exposed to COVID-19. Seeking care earlier may reduce the risk of dying, and it may also help explain some of the (non-significant) increase in hospital admissions during Years 8 and 9. Second, in general, loneliness and feelings of social disconnection increased among older Medicare beneficiaries during the COVID-19 pandemic (Cabin 2021; Holaday et al. 2022). Those factors are associated with an increased risk of sickness and death (Courtin and Knapp 2017; Perissinotto et al. 2012). As a result of more frequent visits from their IAH providers, IAH beneficiaries may have felt less isolated during this time than comparison beneficiaries. Even in 2022, after lockdowns had ended, older adults with chronic conditions and functional limitations were still at higher risk of negative health outcomes, as cases of COVID-19 illness were high, particularly in early in the year. Comparison beneficiaries may have felt less supported by their providers and may have continued to isolate or ignore acute or ongoing medical concerns.

Effects on spending were concentrated among those dually eligible for Medicare and Medicaid. In Year 9, all of the estimated effect on total spending occurred among dually eligible beneficiaries (-$856 PBPM for duals versus $74 PBPM for non-duals, and the difference between the two was statistically significant). This result is consistent with findings from Year 8 (-$838 PBPM for duals versus $94 PBPM for non-duals), strengthening the evidence that IAH reduced spending in this group during the pandemic.

The largest consistent drivers of reductions in total spending during the COVID-19 pandemic were reductions in inpatient and SNF spending among dually eligible beneficiaries. In Year 9, IAH reduced inpatient spending for dually eligible beneficiaries by 24.6 percent, compared to a 12.8 percent *increase* in inpatient spending for non-dually eligible beneficiaries. Decreased inpatient spending among dually eligible beneficiaries did not translate to similarly sized reductions in hospital admissions (a reduction of just 2.7 percent, not statistically significant). That IAH led to no difference in hospital admissions but reduced inpatient spending for dually eligible beneficiaries suggests that the severity of hospitalizations for dually eligible IAH beneficiaries was lower than it was for dually eligible comparison beneficiaries. Medicare spending for a hospital admission is typically higher if a beneficiary has a complication or comorbidity or a major complication or comorbidity.[13] The severity of hospitalizations might have been lower for dually eligible IAH beneficiaries

[13] Comorbidity refers to a condition that existed before admission. Complication refers to a condition that occurred after admission.

because, through more frequent visits or more comprehensive care, IAH practices were better able to manage their patients' ongoing chronic conditions during the pandemic.

Another major driver of the reduction in total spending among dually eligible beneficiaries was SNF spending (40 percent reduction in Year 9). Shortening or avoiding a SNF stay during the pandemic may have been a high priority for dually eligible beneficiaries and their caregivers and clinicians, since these beneficiaries may have been at higher risk of negative health outcomes during the COVID-19 pandemic. IAH clinicians may have developed relationships with home health agencies and provided encouragement that allowed dually eligible IAH beneficiaries to feel confident that they would receive timely and effective care at home from the IAH practice and a home health agency in lieu of a SNF.

Among dually eligible beneficiaries and the full sample, we found that effects in Year 9 were more favorable for hospital admissions preceded by a visit to the ED (larger reduction among dually eligible beneficiaries and smaller increase among the full sample). This finding suggests that more of the hospital admissions that IAH beneficiaries had in Year 9 were planned or direct admissions by their IAH clinician, relative to the comparison group. It may be that IAH beneficiaries, through the trust they built with their IAH providers during the pandemic, felt more comfortable returning to the hospital for planned procedures than comparison beneficiaries, or that comparison beneficiaries delayed going to the hospital more often, leading to increased complications.

IAH reduced outpatient spending in Year 9 (-$134 PBPM), though the size of the effect in Year 9 was considerably larger than other years of the demonstration during or before the pandemic. As we noted in Chapter 3, outpatient spending includes a wide range of services such as outpatient ED visits, facility charges for hospital-based physician visits, and renal dialysis facilities. In Year 9, relative to Year 8, spending for these services declined by 14.4 percent for IAH beneficiaries and increased by 1.0 percent for the comparison group. Perhaps IAH clinicians steered beneficiaries toward using home health (where spending among IAH beneficiaries increased by 6.1 percent from Year 8 to Year 9) as a substitute for some outpatient rehabilitation services, though that explanation is not consistent with other years of the demonstration where home health spending declined. Furthermore, in this case, differential pre-demonstration trends may have accounted for some or all of the estimated reduction in outpatient spending, which lowers our confidence that IAH caused the estimated reduction in outpatient spending.

5.4. Conclusion

This evaluation provides comprehensive and robust estimates of the effects of IAH on spending and other outcomes by the seven IAH practices that participated in the ninth year of the demonstration (third year of the COVID-19 pandemic). Limited

evidence suggested that a change in the relative effectiveness of home-based primary care from IAH practices may have favorably affected some spending and mortality outcomes in Year 9. However, in general, we did not find strong and consistent evidence that IAH met its goals to reduce total Medicare spending net of incentive payments, lower hospital use, and improve health outcomes in Year 9. Because participation in the demonstration declined to just seven practices in Year 9 and because of the unique circumstances of the COVID-19 pandemic, results from this report are not generalizable beyond the pandemic nor to other home-based primary care providers.

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