Evaluation of the Independence at Home Demonstration

An Examination of Year 7, the First Year of the COVID-19 Pandemic

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Laura Kimmey, Jason Rotter, Joseph Lovins, Rachel Kogan

Contributing authors: Linda Barterian, Claire Burkhardt, Valerie Cheh, Christine Cheu, Irna May Connor, Tyler Fisher, Margaux Flemming, Lauren Vollmer Forrow, David Jones, Scott Ode, Maya Palakal, Tyler Rose, Beny Wu

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Mathematica
1100 First Street, NE, 12th Floor
Washington, DC 20002-4221
Telephone: (202) 484-9220
Facsimile: (202) 863-1763
Project Director: Laura Kimmey

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The Independence at Home (IAH) demonstration is 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 quality of care for chronically ill and functionally limited Medicare beneficiaries. Participating home-based primary care practices can earn incentive payments if (1) their patients' Medicare spending is less than a given spending target and (2) their performance on selected quality measures meets specified thresholds. IAH began in 2012 with 18 participants, 14 of which were included in the evaluation. By Year 7, 10 participants remained. IAH Year 7 was 2020, coinciding with the first year of the COVID-19 pandemic.

IAH beneficiaries received more ambulatory visits and home health services than comparison beneficiaries in Year 7, and these health care services may have been more valuable for attending to health needs during the pandemic than in earlier years. IAH beneficiaries had 28 percent more ambulatory visits in Year 7 than comparison beneficiaries. Primary care played a larger role in IAH beneficiaries' health care than for comparison beneficiaries. Neither IAH nor comparison beneficiaries experienced a substantial decrease in spending for primary care services during the first year of the COVID-19 pandemic. However, IAH and comparison beneficiaries both experienced a decrease in spending for specialty care—a decrease that was much larger for comparison beneficiaries. Relative to comparison beneficiaries, IAH beneficiaries had a higher share of primary care visits by telehealth or telephone while also having more in-person primary care visits. Finally, many IAH beneficiaries used home health services extensively; these are services provided under the Medicare home health benefit, which requires a beneficiary to be homebound and in need of intermittent skilled nursing care or physical therapy, speech-language pathology, or occupational therapy services.

IAH probably reduced total Medicare spending in Year 7, but the estimated reduction of $459 per beneficiary per month (10.7 percent) cannot be generalized outside of the first year of the pandemic or to other home-based primary care practices. The effect of IAH on spending in Year 7 was considerably larger than in Year 6, which was driven by an increase in spending for comparison beneficiaries and a small decrease in spending for IAH beneficiaries from Year 6 to Year 7. Effects on spending in Year 7 were concentrated among the two-thirds of beneficiaries who required assistance from another person with most or all activities of daily living, such as feeding. Many of these beneficiaries were mostly or completely homebound and needed frequent interactions with health care providers and extensive support from paid or unpaid caregivers. The average annual effect over all seven years of the demonstration was -$200 per beneficiary per month, which was

not statistically significant and was based on varying numbers of practices across the years.

Multiple factors may have contributed to the effect of IAH on spending in Year 7. Although IAH did not reduce total hospital admissions in Year 7, it may have reduced potentially avoidable hospital admissions and hospital admissions preceded by an emergency department (ED) visit. In addition, fewer ambulatory visits among the comparison group may have contributed to poorer management of chronic conditions and relatively more hospital use and inpatient spending for the comparison group in Year 7. IAH may have reduced the probability of dying of any cause in Year 7, which could have accounted for some of the effect on spending because spending tends to be higher in the months before death. The rate of COVID-19 diagnosis was similar for IAH and comparison beneficiaries, and effects on total spending were not affected by differences in COVID-19 diagnosis or hospitalization.

Because of substantial changes in health care delivery and beneficiaries' health and social support during the COVID-19 pandemic, **home-based primary care from IAH practices may have been relatively more effective during Year 7 than in earlier years**. For example, IAH beneficiaries had a primary care visit every five weeks on average. Frequent visits from the IAH practice may have prevented ED visits and subsequent hospital admissions more often than in a typical year; this is because IAH beneficiaries may have been more willing to contact the IAH practice if they were unsure whether their symptoms required emergency care because of the risk of exposure to COVID-19 in the ED and the possibility of long wait times in the ED during the pandemic.

In sum, IAH likely reduced spending in Year 7 by a substantial amount, although the true effect on total spending could have been much smaller (or larger) than the estimate of -$459 per beneficiary per month. This estimated effect was concentrated among beneficiaries who needed assistance from another person with most or all activities of daily living and was partly due to reduced spending on hospital admissions. Because changes in the relative effectiveness of care for IAH and comparison beneficiaries may have played a large role in Year 7 and because of limitations to the evaluation, interpretation of results in Year 7 must include an understanding that effects reflect the first year of the COVID-19 pandemic. These results cannot be generalized to other years or to providers other than the 10 practices that participated in IAH Year 7.

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 is to test a payment incentive and service delivery model for providing home-based primary care to chronically ill and functionally limited Medicare beneficiaries. Home-based primary care features primary care clinicians providing services 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 direct home-based primary care teams with the goal of reducing health care spending and improving health outcomes.

The legislation authorizing IAH requires an independent evaluation to determine the impact of the demonstration on beneficiaries' Medicare spending and other health-related outcomes. This report describes the evaluation's findings through the seventh year of the IAH demonstration. It is the latest addition to our previous evaluation reports, which covered the first six years of the demonstration.[1]

1.1. Background on the IAH demonstration

The IAH demonstration provides incentives to home-based primary care practices that meet certain requirements to encourage lower-cost, higher-quality care. As part of the IAH demonstration, practices can earn incentive payments if their patients' Medicare spending is below the practice's target spending level and the practice meets required standards for a set of quality measures. They were expected to lower spending by providing timely, coordinated care to patients as they need it, especially after an emergency department (ED) visit or hospital discharge. In turn, the patients are expected to be healthier by preventing exacerbations of chronic conditions and treating acute conditions promptly, decreasing the need for costly ED visits and hospital admissions. For the demonstration to produce savings for the Medicare program, there must be a

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 partly) for the purpose of providing physician services
- Have experience providing home-based primary care to patients with several chronic illnesses
- Make in-home primary care visits and be available 24/7
- Use electronic medical records, remote monitoring, and mobile diagnostic technology
- Provide services to at least 200 IAH-eligible beneficiaries each year
- Report information on patients, services provided, and quality measures to CMS

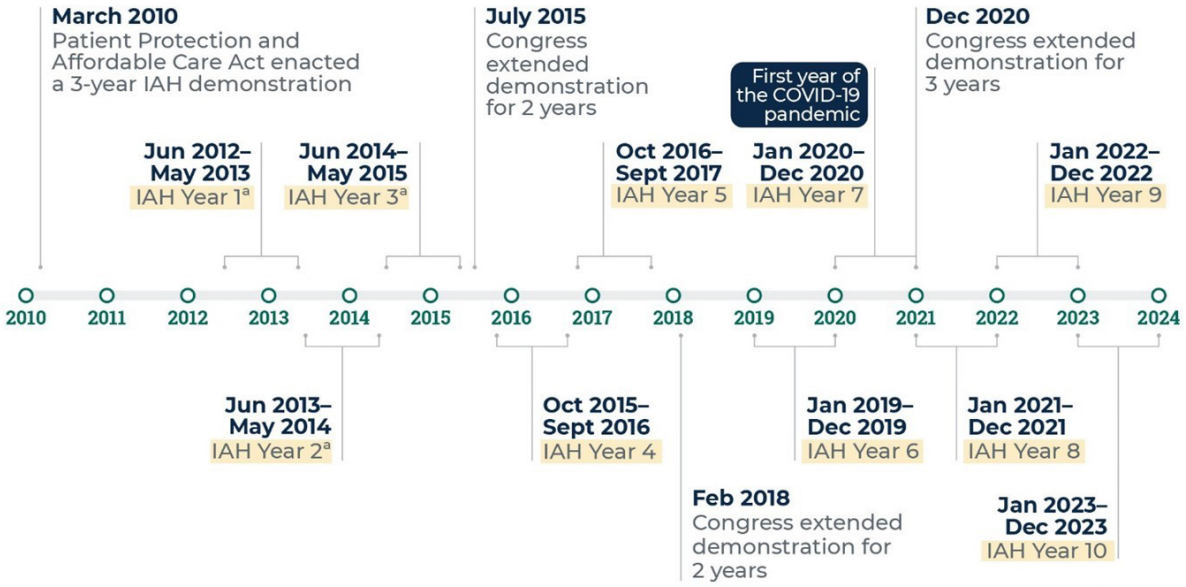
[1] IAH evaluation reports are available at https://innovation.cms.gov/initiatives/independence-at-home/.

reduction in Medicare spending for patients of IAH practices compared with similar beneficiaries who did not receive home-based primary care, and the reduction in Medicare spending must be larger than the incentive payments paid by CMS to IAH practices.

The law enacting the IAH demonstration describes the eligibility requirements for practices and beneficiaries. Demonstration practices must have experience delivering home-based primary care and have teams led by physicians or nurse practitioners; the teams can also include physician assistants, clinical staff, and other health and social services staff (Exhibit 1.1). The practices must adhere to guidelines consistent with providing high-quality home-based primary care.

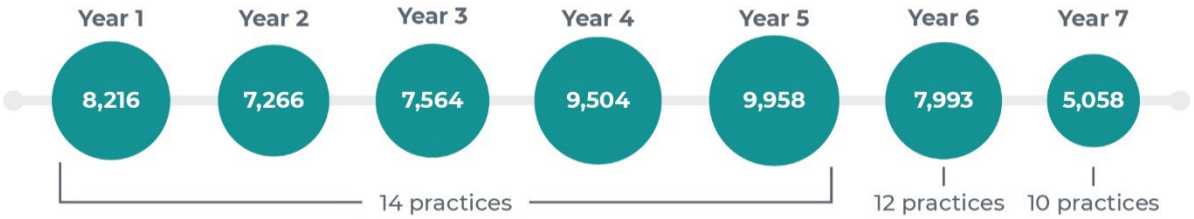
The demonstration began in June 2012 and was originally intended to last three years but has been extended by Congress three times (Exhibit 1.2). The demonstration began with 15 participants, and CMS added three participants in September 2012. We refer to each of these participants as practices (or sites), though some of the 18 were consortia that consisted of multiple organizations with different ownership. In subsequent years, some participants withdrew from the demonstration. Four of the 18 practices left the demonstration before Year 4 (Exhibit A.1 in Appendix A), and we could not include these practices in the evaluation sample. Of the 14 practices included in the evaluation sample, two left the demonstration after completing Year 5 in September 2017, and two left after Year 6 (Exhibit 1.3). Thus, 14 practices contributed to the evaluation sample in Years 1 to 5, 12 practices in Year 6, and 10 practices in Year 7. One consortium that consists of three organizations is among the list of 10 practices in Year 7.

Exhibit 1.2. Key dates related to the IAH demonstration



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

Exhibit 1.3. Number of IAH beneficiaries and participating practices in the evaluation sample by year



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

Notes: The numbers of IAH beneficiaries and participating practices in the evaluation sample are displayed by demonstration year. The demonstration originally included 18 practices, but the evaluation sample excludes four practices that left the demonstration before Year 4. The evaluation sample is not constrained by the statutory limit on IAH enrollment (10,000 beneficiaries in Years 1–5 and 15,000 in Years 6–7). For more information about differences between the evaluation sample and the list of beneficiaries enrolled in the demonstration, see Appendix A.

All sites met the demonstration organizational requirements listed in Exhibit 1.1, but they had different structural characteristics and different approaches to delivering care, such as the extent to which the practices were integrated with other health care providers. Five of the 10 practices that participated in Year 7 are part of the Visiting Physicians Association, a corporation whose leadership team has sought to standardize operations and care delivery across all participating practices. Two practices that participated in Year 7 began the demonstration privately owned and not attached to an overarching health system or corporation. The remaining three practices that participated in Year 7 (including a consortium of three locations with different ownership) are part of health systems affiliated with a university or medical school. Compared with other practices, the practices embedded in academic health systems could potentially obtain more technical, managerial, and financial resources to implement the demonstration and manage patient care.

Exhibit 1.4. 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

Beneficiaries who receive home-based primary care from the IAH practices are eligible for the demonstration if they meet several criteria related to their health and use of health care (Exhibit 1.4). 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]

1.2. Summary of previous evaluation reports

In our previous evaluation reports, we found no compelling evidence that the IAH payment incentive[3] affected the delivery of care in a way that measurably reduced total Medicare spending or hospital use in Years 1 to 6. In the report on the evaluation of the demonstration through Year 5, the estimated reduction in spending was $330 per beneficiary per month (PBPM); this estimated reduction was statistically significant, but it was driven by a single influential site that stopped delivering home-based primary care after the end of the year.[4] Without that site, the estimated effects were much smaller and not statistically significant in Year 5 or across the five years. We did not include that site (or another site that left the demonstration after Year 5) in our analysis of Year 6. In Year 6, the estimated effect of the IAH payment incentive on total spending was a reduction of $41 PBPM, and it was not statistically significant. In other words, results from the first six years of IAH provide no compelling evidence that the payment incentive affected the delivery of care in a way that measurably reduced total Medicare spending or hospital use.[5] We cannot directly compare these results with other studies of home-based primary care because no other studies have examined the effect of a payment incentive like the one used in IAH on outcomes for beneficiaries receiving home-based primary care.

1.3. Evaluation of Year 7

1.3.1. 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. Under this design, we estimated effects as the change in outcomes for beneficiaries meeting IAH eligibility criteria and receiving care from IAH practices before and after the start of the demonstration, relative to the change during the same period for a comparison group that did not receive home-based primary care and were matched to IAH

[2] As shown in Exhibit 1.3, the increase in the enrollment cap was inconsequential in Year 6 and 7 because each of the practices that participated in the demonstration in those years had fewer than 8,000 patients enrolled in the demonstration.

[3] We could not examine the effects of the provision of home-based primary care from IAH practices and the IAH payment incentive in a single analysis. For more information, refer to the evaluation report covering Years 1 to 4 of the IAH demonstration.

[4] For more information, refer to the evaluation report covering Years 1 to 5 of the IAH demonstration.

[5] For more information, refer to the evaluation report covering Years 1 to 6 of the IAH demonstration.

beneficiaries based on beneficiary characteristics. The matched comparison group consists of beneficiaries who 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 nine years: two fixed pre-demonstration years and seven demonstration years. Appendix A contains additional details on the data, sample, and methods.

1.3.2. Change in participating sites

The change in the number of participants noted earlier in this chapter affected estimation and interpretation of results. Unless otherwise noted, effects in all years were estimated using the sites that participated in the given years (10 sites in Year 7, 12 sites in Year 6, and 14 sites in Years 1 to 5).

1.3.3. Implications of the COVID-19 pandemic for the evaluation of IAH

IAH Year 7 ran from January to December 2020. The U.S. Department of Health and Human Services (HHS) declared a public health emergency due to COVID-19 on January 31, 2020. The COVID-19 pandemic and the public health emergency declared by HHS continued through the rest of 2020 and profoundly affected all aspects of health care during that time. Despite this disruption, we chose not to change our difference-in-differences impact design largely because we select matched comparison group beneficiaries from the same geographic areas as IAH beneficiaries. Thus, IAH beneficiaries and their matched comparisons should have experienced similar area-level factors that could have contributed to exposure to COVID-19 and affected spending and health care use during the pandemic.

How might the COVID-19 pandemic have influenced the estimated effect of IAH in Year 7, the first year of the 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

The systemic changes to health care delivery and society more broadly as a result of the COVID-19 pandemic undoubtedly affected IAH beneficiaries in Year 7. If home-based primary care through IAH practices became relatively more (or less) effective at reducing spending during the first year of the COVID-19 pandemic relative to care received by the comparison group, then the estimated effect in Year 7 would reflect this change. Therefore, Year 7 is unlike previous IAH demonstration years, and its evaluation results must be interpreted accordingly. In Year 7, the estimated effects reflect *both* of the following during the first year of the pandemic:

- Any effects of changes in care delivery by IAH practices because of the IAH payment incentive, which was the focus of the evaluation in Years 1 to 6.
- Any changes in the relative effectiveness of home-based primary care for IAH beneficiaries.

1.4. Overview of the report

The findings in this report reflect a rigorous evaluation of the effects of IAH through Year 7, with Year 7 reflecting the experiences of chronically ill and functionally limited Medicare beneficiaries receiving home-based primary care from an IAH practice during the first year of the COVID-19 pandemic. In Chapter 2, we analyze how IAH practices provided care during the first year of the COVID-19 pandemic. We then examine the effects of the IAH demonstration on Medicare spending and hospital use through Year 7 in Chapter 3. In Chapter 4, we conclude by summarizing results, describing limitations, and discussing the key findings from the report.

2. How did IAH practices provide care during the first year of the COVID-19 pandemic?

Key takeaways

- The home-based primary care provided by IAH practices had several features that differed from typical office-based care, and those features may have been especially valuable during the COVID-19 pandemic.
- IAH beneficiaries had 28 percent more total ambulatory visits in Year 7 than comparison beneficiaries.
- Primary care played a larger role in IAH beneficiaries' health care than for comparison beneficiaries. Neither IAH nor comparison beneficiaries experienced a substantial decrease in spending for primary care services during the first year of the COVID-19 pandemic. IAH and comparison beneficiaries both experienced a decrease in spending for specialty care services—a decrease that was much larger for comparison beneficiaries.
- Relative to comparison beneficiaries, IAH beneficiaries had a higher share of primary care visits by telehealth or telephone while also having more in-person primary care visits.
- Many IAH beneficiaries used home health services extensively, and IAH practices tended to have close relationships with home health agencies.
- Performance on quality measures stayed about the same during the first year of the COVID-19 pandemic. Most IAH practices did not meet the performance threshold for at least two of the six quality measures tied to payment in Year 7, even though doing so would have increased the amount of their incentive payments.

Given widespread disruption in health care delivery during the first year of the COVID-19 pandemic, it is important to understand how IAH practices provided care during Year 7, whether IAH practices changed the way they delivered care in Year 7 relative to earlier years, and how any such changes for the IAH group compare to changes among the comparison group. To explore these questions, we used data from four sources: (1) Medicare claims data to construct measures of service provision in Year 7 and earlier years (see Appendix A for details); (2) qualitative data we collected during interviews in Years 1 to 6 with administrators, clinicians, and staff of IAH practices as well as staff of external organizations who work with IAH practices (see Appendix A for details); (3) survey data to assess care delivery during the COVID-19 pandemic collected by the IAH implementation contractor from the seven practices that continued in the demonstration after Year 7; and (4) data from the IAH implementation contractor regarding practices' performance on quality measures used as part of calculating incentive payments for the demonstration.

2.1. Background on home-based primary care

The home-based primary care provided by IAH practices had several features that differed from typical office-based care, and those features may have been especially valuable during the COVID-19 pandemic. Home-based primary care from an IAH practice typically has several features that are either inapplicable to office-based primary care or less likely to be offered by an office-based primary care provider, such as providing access to care without the physical burden of leaving the house and allowing a clinician to obtain valuable information not obtained during office visits (Exhibit 2.1). Comparison beneficiaries visited office-based primary care practices or may have relied on other settings such as urgent care or specialty care. Therefore, the features of home-based primary care could have led to meaningful differences in care between IAH and comparison beneficiaries, especially those features that may have been more valuable during the COVID-19 pandemic (such as not requiring the beneficiary to travel outside the home).

> "[When doing medication reconciliation in the home], you actually see what the patients have on hand and what they're taking … [the home is] about the only place you can get a really robust medication reconciliation."
>
> *– IAH clinician*

> "These doctors, they're in [the patient's home] and they're seeing what the patient has or doesn't have, what the social issues are."
>
> *– Home health agency staff member who worked with an IAH practice*

Most IAH beneficiaries and their caregivers expressed a preference for home-based primary care when surveyed earlier in the demonstration.[6] About 83 percent of IAH beneficiaries surveyed liked receiving in-home care somewhat more or a lot more than primary care at an office or a clinic. Similarly, 84 percent of caregivers of IAH beneficiaries surveyed—a group that included paid and unpaid family members and friends as well as paid personal care attendants and home health staff—preferred that the beneficiary receive primary care at home.

Exhibit 2.1. Common features of home-based primary care from 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. Also, during the COVID-19 pandemic, having visits at home reduced beneficiaries' exposure to COVID-19 and other infectious diseases outside the home. In addition to providing home visits, IAH practices tend to arrange a variety of other services to be provided in the home, such as x-rays, ultrasound exams, and blood draws.

[6] For more information, refer to the evaluation report covering Years 1 to 4 of the IAH demonstration.

Exhibit 2.1 *(continued)*

Feature	Description or example
Allows the clinician to obtain information not obtained in an office visit that may improve health care, avoid accidents, or address health-related social needs.	Examples may include observing how beneficiaries and their caregivers communicate, learning how medications are stored and organized, 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.	During the first year of the COVID-19 pandemic, a trusting clinician relationship may have been especially valuable because there was substantial uncertainty about how to reduce the risk of contracting COVID-19 and which symptoms of the disease required emergency 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.
Offers 24/7 access to the primary care team, as required by the IAH demonstration.	24/7 access may have been especially valuable during the COVID-19 pandemic, as beneficiaries and caregivers sought to avoid urgent care centers and EDs to reduce the risk of contracting COVID-19.

ED = emergency department.

"[The beneficiary] has to be transported [to the doctor's office] by bus or van with a lift or ramp. This is exhausting and takes more time than in a private car. [The IAH team] coming to the house is much more comfortable for him and me. They send portable equipment like x-rays and [ultrasound], and nurses check his blood thinner and report back by phone. He has [home health agency] therapists and nurses both in to help. That is a big help to us both.

– Caregiver of an IAH beneficiary

2.2. Overview of ambulatory visits received by IAH and comparison beneficiaries

IAH beneficiaries had 28 percent more ambulatory visits in Year 7 than comparison beneficiaries. On average, IAH beneficiaries had three more ambulatory visits in Year 7 than comparison beneficiaries when accounting for primary and specialty care received in person, by telehealth, or by telephone (Exhibit 2.2). IAH beneficiaries received about two out of every three in-person visits at home, while comparison beneficiaries had virtually zero in-person visits at home. The higher number of telehealth and telephone visits for IAH

In this report, we refer to telehealth visits as those that include real-time audio and video communication between the clinician and the patient. Telephone visits include only real-time audio.

beneficiaries reflects more frequent substitution of these modes of care for in-person visits.

Exhibit 2.2. IAH beneficiaries received more ambulatory care in Year 7 relative to comparison beneficiaries

	IAH beneficiaries	Comparison beneficiaries
In-person home visits	5.7	<0.1
In-person office visits	3.0	8.1
Telehealth and telephone visits	5.1	2.8
Total ambulatory visits	**13.9**	**10.9**

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

Notes: Unadjusted results weighted to reflect number of months eligible. Numbers may not sum to total because of rounding. Measures include primary and specialty care. Visits for IAH beneficiaries include visits from all clinicians, not just IAH practices. See Appendix A for additional details.

2.3. Details regarding ambulatory visits received by IAH and comparison beneficiaries

2.3.1. Frequency of primary and specialty care visits

Primary care played a larger role in IAH beneficiaries' health care than for comparison beneficiaries. IAH beneficiaries received twice as many primary care visits from primary care physicians and non-physician clinicians and somewhat fewer specialty care visits than comparison beneficiaries in Year 7. IAH beneficiaries had 10.9 primary care visits and comparison beneficiaries had 5.5 visits on average in Year 7 (Exhibit 2.3), translating to approximately one primary care visit every five weeks for IAH beneficiaries and every nine weeks for comparison beneficiaries. This difference predated the IAH demonstration and the pandemic.[7]

At the same time, specialty care played a larger role in comparison beneficiaries' health care than for IAH beneficiaries. IAH beneficiaries averaged one specialty care visit every 17 weeks, while comparison beneficiaries had one every 10 weeks. In Year 7, specialty care accounted for about 50 percent of total visits for comparison beneficiaries, in contrast to about 22 percent for IAH beneficiaries.

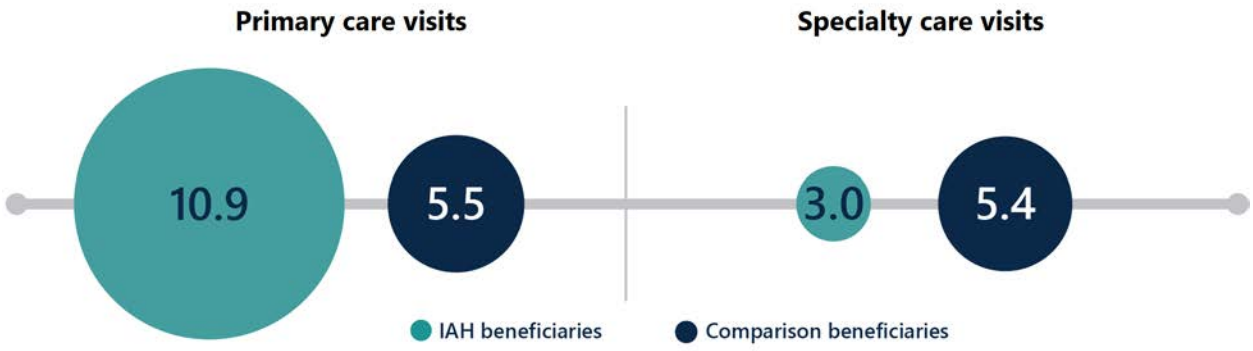
Since both groups had a similar prevalence of chronic conditions,[8] these data suggest the way chronic conditions were managed differed between IAH and comparison beneficiaries. IAH beneficiaries probably relied on primary care clinicians

[7] We observed similar differences in the number of primary care visits between IAH and comparison beneficiaries in several demonstration years before the pandemic, as well as in the two years before the IAH demonstration. For more information, refer to the evaluation report covering Years 1 to 4 of the IAH demonstration.

[8] For example, about 44 percent of both groups had more than nine chronic conditions (Exhibit A.12).

from IAH practices to manage their chronic conditions to a larger extent than comparison beneficiaries relied on primary care clinicians. For example, for patients with congestive heart failure, IAH practices (and other primary care clinicians) could regularly monitor patient status and adjust medications as appropriate in response to weight gain, breathlessness, or physical findings of worsening heart failure.

Exhibit 2.3. IAH beneficiaries received many more primary care visits and somewhat fewer specialty care visits than did comparison beneficiaries in Year 7



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

Notes: Unadjusted average results weighted to reflect number of months eligible. 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, not just IAH practices. While the same is true for specialty care visits, IAH practices consisted solely of primary care clinicians and therefore did not contribute to specialty care visits. See Appendix A for additional details.

In Year 7, IAH beneficiaries were nearly five times as likely as comparison beneficiaries to receive chronic care management (CCM) services during at least one month from an IAH practice: 29.1 percent of IAH beneficiaries compared with only 6.1 percent of comparison beneficiaries.[9] In addition to the number of visits IAH and comparisons beneficiaries received, we examined whether IAH beneficiaries were more likely to receive CCM services than comparison beneficiaries. CCM eligibility requires a beneficiary to have multiple chronic conditions that are expected to last at least 12 months or until the beneficiary's death or that place them at significant risk of death, exacerbation, or functional decline. Reimbursement for CCM services is intended to compensate clinicians and their practices for care coordination services that occur outside of visits. CCM services require development of a comprehensive care plan for the beneficiary and spending a minimum of 20 minutes per month on services such as supporting beneficiaries in achieving health

[9] Infrequent provision of CCM services to comparison beneficiaries reflects a broader trend of very infrequent billing for these services among beneficiaries eligible for the CCM services (Agarwal et al. 2022). It is possible that some comparison (and some IAH) beneficiaries received services that would have qualified for CCM reimbursement, but the provider did not submit a claim for those services.

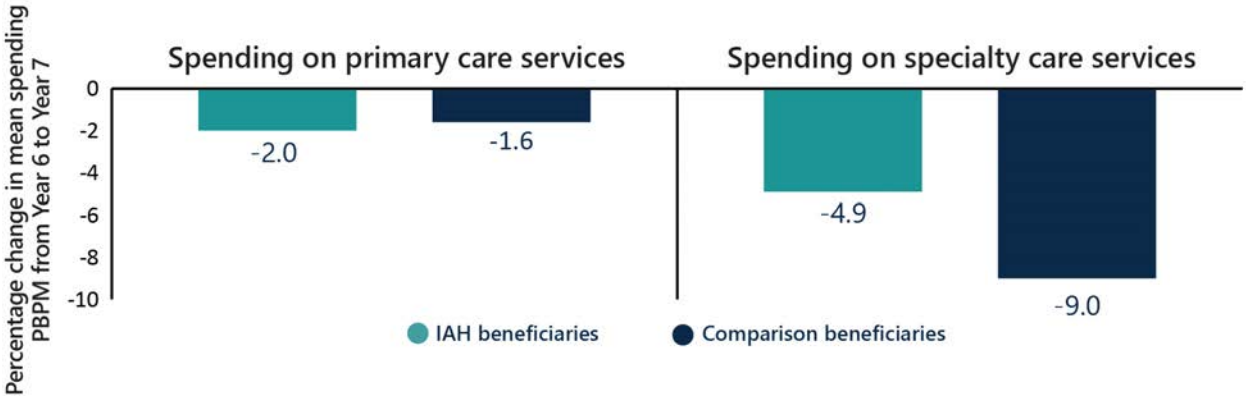
goals, around-the-clock access to care and health information, managing care transitions, and coordinating with clinicians and other providers inside and outside of the billing clinician's office. CCM services are billed by primary care clinicians more often than specialists (CMS 2022).

IAH and comparison beneficiaries were similarly likely to benefit from CCM services, because they all met IAH eligibility criteria. Much higher use of CCM services, along with a larger number of total ambulatory visits, suggests that IAH beneficiaries may have had more of their CCM needs fulfilled than comparison beneficiaries in Year 7.

Neither IAH nor comparison beneficiaries experienced a substantial decrease in spending for primary care services during the first year of the COVID-19 pandemic. Spending for primary care in outpatient, office, and home settings (including visits made by telehealth or telephone) decreased by 2.0 percent for IAH beneficiaries and 1.6 percent for comparison beneficiaries between Years 6 and 7 (Exhibit 2.4). Although there were widespread reports of primary care offices closing or reducing services early in the COVID-19 pandemic (Corlette et al. 2021), none of the IAH practices reported temporary closures or reducing practice hours during the pandemic. Avoiding these interruptions to primary care during the pandemic enabled IAH practices to continue building trust through regular visits with patients and caregivers, which IAH practices have stated is essential to avoiding ED visits and hospital admissions. One IAH clinician reported that trust is "the secret sauce."

IAH and comparison beneficiaries both experienced a decrease in spending for specialty care services—a decrease that was much larger for comparison beneficiaries. Spending for specialty care in outpatient, office, and home settings (including visits made by telehealth or telephone) decreased by 4.9 percent for IAH beneficiaries and 9.0 percent for comparison beneficiaries between Years 6 and 7. As noted previously in this chapter, specialty care played a larger role in the total visits received by comparison beneficiaries than for IAH beneficiaries, so the decrease in spending on specialty care may have affected comparison beneficiaries' health negatively in Year 7.

Exhibit 2.4. Though primary care spending for IAH and comparison beneficiaries did not change notably during the first year of the COVID-19 pandemic, both groups experienced a decrease in spending for specialty care services—a decrease that was much larger for comparison beneficiaries



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

Notes: Unadjusted average results weighted to reflect number of months eligible. Spending on services reflects spending incurred during ambulatory visits with clinicians (home, office, telehealth, and telephone). Spending on primary care services for IAH beneficiaries includes claims from all primary care clinicians, not just those in IAH practices. While the same is true for spending on specialty care services, IAH practices consisted solely of primary care clinicians and therefore did not contribute to spending on specialty care services. See Appendix A for additional details.

PBPM = per beneficiary per month.

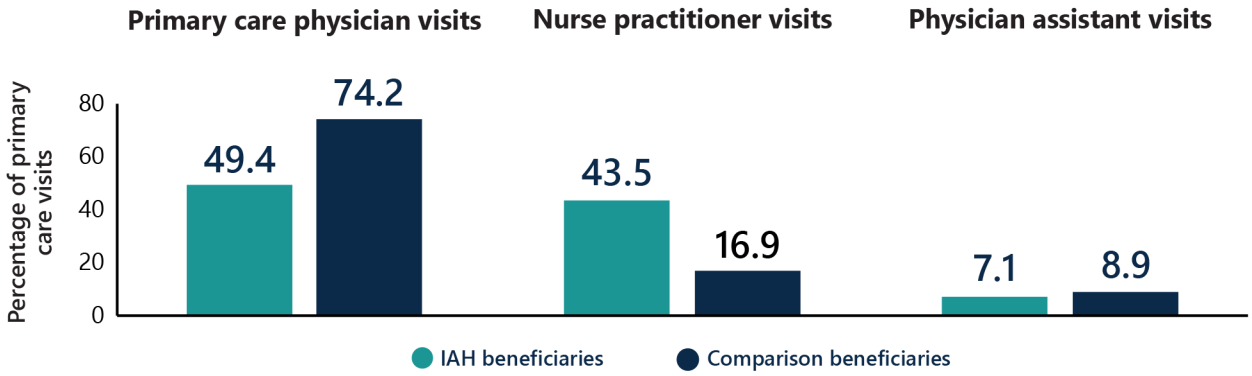
2.3.2. Type of clinician who provided primary care

To receive an incentive payment during the demonstration, Congress required IAH sites to achieve a level of Medicare spending for their beneficiaries that was lower than an estimated spending target (see Appendix A for more details on the incentive payment calculation). To gain insights into whether IAH sites may have attempted to change to less costly modes of care, we examined whether practices made visits with less expensive clinicians (including in-person, telehealth, and telephone visits). In many states, nurse practitioners (NPs) and physician assistants (PAs) are authorized to treat patients without direct supervision of physicians, allowing them to make visits independently. Reimbursement from fee-for-service (FFS) Medicare is lower for a visit made by an NP or PA than a physician.

IAH beneficiaries received a larger share of visits from NPs than comparison beneficiaries. In Year 7, IAH beneficiaries received close to half of their primary care visits from NPs; primary care visits were performed by primary care physicians 49.2 percent of the time and by NPs 43.5 percent of the time (Exhibit 2.5). Comparison beneficiaries, on the other hand, received care from primary care physicians 74.2 percent of the time and from NPs 16.9 percent of the time. Both groups received less than 10 percent of visits from PAs.

IAH practices increased their reliance on NPs during the demonstration. At the average IAH practice, the share of visits provided by NPs increased by 14.9 percentage points from Year 2 to Year 7 (28.5 to 43.5 percent), and the share provided by primary care physicians decreased by 19.9 percentage points (69.1 percent to 49.4 percent) (Exhibit A.5). This finding is consistent with research showing that NPs are largely responsible for recent growth in clinicians making home-based primary care visits (Yao et al. 2021). In addition, care provided by PAs, which accounted for 2.3 percent of visits in Year 2, increased to 7.1 percent in Year 7. Since primary care spending did not decrease appreciably from Year 6, these results likely suggest increasing substitution of NPs and, to a lesser extent, PAs, for some visits previously made by physicians.

Exhibit 2.5. IAH beneficiaries received a larger share of primary care visits from nurse practitioners and a smaller share from primary care physicians than did comparison beneficiaries in Year 7



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

Notes: Unadjusted results weighted to reflect number of months eligible. IAH beneficiaries' visits reflect care from IAH practices only. Comparison beneficiaries' visits reflect care from all providers. Results reflect home and office visits as well as telehealth and telephone visits. See Appendix A for additional details.

2.3.3. Receipt of in-person, telehealth, and telephone visits

During the COVID-19 public health emergency, CMS issued a temporary waiver that allowed eligible providers to provide certain services via telehealth and telephone.[10] Prior to the public health emergency, Medicare beneficiaries were not permitted to receive telehealth visits from their homes nor to receive telephone visits, except in

[10] For more information on waivers for health care providers during the public health emergency, including services provided by telehealth and telephone, see https://www.cms.gov/files/document/covid-19-emergency-declaration-waivers.pdf. Some of the services added on an interim basis to the Medicare telehealth list during the public health emergency were made permanent for 2021. For more information about these changes, see https://www.cms.gov/newsroom/fact-sheets/final-policy-payment-and-quality-provisions-changes-medicare-physician-fee-schedule-calendar-year-1.

limited circumstances.[11] Not surprisingly, IAH and comparison beneficiaries had all of their visits in person in Year 6.

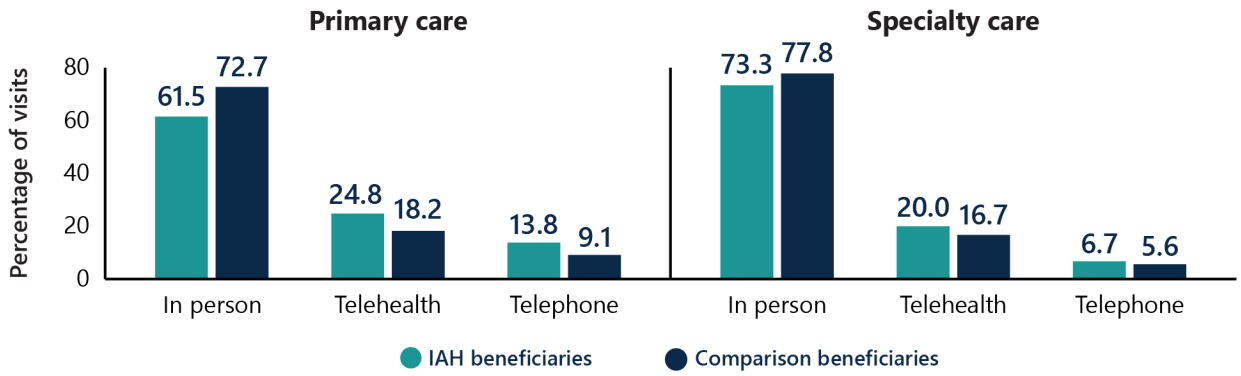
> "[Our preference] is to get in home for a face-to-face visit. Much more information able to be gathered with eyes/ears in home environment. ...[Telehealth was an] excellent check-in tool for our most vulnerable population but typically required technology help from a caregiver or family member."
>
> *– IAH practice survey respondent*

In a survey of the seven practices that continued in the demonstration after Year 7, IAH practices reported successes and challenges with telehealth visits during the COVID-19 pandemic. Although some providers reported preferring in-person visits, conducting visits via telehealth and telephone helped practices continue to follow up with patients amidst staffing challenges and patients' and caregivers' concerns about exposure to COVID-19. Two practices reported converting from in-person to telehealth visits quickly—one within five days and another within two weeks—without shutting down operations while setting up the telehealth platform. However, functional status limitations, cognitive impairment, and other issues made it difficult for many beneficiaries to use telehealth (and sometimes the telephone) on their own.

Relative to comparison beneficiaries, IAH beneficiaries had a higher share of primary care visits by telehealth or telephone while still having more in-person primary care visits. While the average IAH beneficiary had most (61.5 percent) primary care visits in person, the share of primary care visits that occurred in person was higher for the comparison group (72.7 percent) (Exhibit 2.6). However, IAH beneficiaries still had considerably more in-person primary care visits than comparison beneficiaries (an average of 6.7 and 4.0 visits, respectively) because they had more total primary care visits. IAH beneficiaries had a larger share of primary care visits via telehealth (24.8 percent) and telephone (13.8 percent) than the comparison group (18.2 percent and 9.1 percent, respectively). In both groups, the average beneficiary had about three-quarters of specialty care visits in person.

[11] Prior to the public health emergency in 2020, Medicare only paid for telehealth when the person receiving the service was in a designated rural area and when they left their home and went to a clinic, hospital, or certain other types of medical facilities for the service.

Exhibit 2.6. Relative to comparison beneficiaries, IAH beneficiaries received a smaller share of visits in person and a larger share via telehealth or telephone in Year 7



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

Notes: Unadjusted results weighted to reflect number of months eligible. Primary care visits for IAH beneficiaries include visits from all primary care clinicians, not just IAH practices. While the same is true for specialty care visits, IAH practices consisted solely of primary care clinicians and therefore did not contribute to specialty care visits. Results reflect home and office visits as well as telehealth and telephone visits. See Appendix A for a description of visit measures.

2.4. Use of home health services by IAH and comparison beneficiaries

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 provided by IAH practices). Beneficiaries who receive these home health services are eligible to receive social work and aide services through home health. Admission to home health can happen after discharge from an inpatient facility such as a hospital or skilled nursing facility or from the

> "[With the IAH practice] I feel like the communication is more effective than most of the other practices…a lot of it has to do with the relationship. [The IAH practice] knows and trusts our judgment…they are quick to respond to us…. In one particular situation, there was a caregiver that was just very concerned, and the home-based provider had a good rapport, a good relationship with the caregiver. We were able to all meet together, and obviously, that's not something that would ever happen in a clinic setting. And it allowed our nurse to begin to build that relationship with the caregiver. The patient was able and the caregiver was able to see, we're on the same team, so you can trust us."
>
> *– Home health agency staff member who worked with an IAH practice*

community (Wysocki and Cheh 2019). 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.

Many IAH beneficiaries used home health services extensively, and IAH practices tended to have close relationships with home health agencies. Several IAH clinicians reported in interviews we conducted earlier in the demonstration that communication and coordination with home health agencies was an important part of preventing or responding to acute problems. Respondents at IAH practices reported communicating regularly with home health agency staff about changes in patients' conditions and patients' recent hospital or ED use. Likewise, home health agency staff often reported in interviews we conducted earlier in the demonstration that they could access the IAH home-based primary care clinician directly or through a single point of contact with IAH staff who knew the beneficiaries firsthand.

As in prior years, a larger share of IAH beneficiaries (90.8 percent) used home health relative to comparison beneficiaries (79.6 percent) in Year 7 (Exhibit 2.7). Also, IAH beneficiaries had 19.4 percent higher home health spending than comparison beneficiaries in Year 7, which represents an increase of more than 40 percent since Year 6, when the gap between IAH and comparison beneficiaries was 13.5 percent. The difference in home health spending between IAH and comparison beneficiaries was probably because IAH beneficiaries had more home health episodes and more home health visits per episode than comparison beneficiaries.[12]

Exhibit 2.7. In Years 6 and 7, a larger share of IAH beneficiaries used home health services than comparison beneficiaries, and IAH beneficiaries who used any home health services spent more on home health

	IAH beneficiaries	Comparison beneficiaries	Relative difference
Percentage of beneficiaries who used home health services			
Year 6	90.1%	76.4%	17.3%
Year 7	90.8%	79.6%	14.1%
Average home health spending PBPM for beneficiaries who used home health services			
Year 6	$774	$682	13.5%
Year 7	$832	$697	19.4%

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH beneficiaries in all IAH practices that participated in Year 7 and matched comparison beneficiaries.

Notes: Unadjusted results weighted to reflect number of months eligible.

PBPM = per beneficiary per month.

[12] We observed earlier in the demonstration that IAH beneficiaries tended to have many more days covered by a home health episode and many more home health visits than comparison beneficiaries. For more information, refer to the evaluation report covering Years 1 to 4 of the IAH demonstration.

2.5. Performance of IAH practices on quality measures used to calculate incentive payments in Year 7

2.5.1. Background

To be eligible to receive an incentive payment in Year 7, an IAH practice must have met performance thresholds for six quality measures (Exhibit 2.8). The IAH implementation contractor used Medicare claims and enrollment data and site-reported data to calculate performance by each site on these six measures.[13] If a practice met the thresholds for all six quality measures tied to payment, then it earned the entire available maximum payment. If a practice achieved the performance threshold for three, four, or five quality measures, it earned, respectively, 50 percent, 67 percent, or 83 percent of the maximum payment. As long as a practice met the performance threshold for a given measure, the payment did not vary by how much a practice exceeded the performance threshold.

Exhibit 2.8. 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]	Hospital admissions for selected ambulatory care-sensitive conditions less than or equal to average utilization in a similar population[b]
Medication reconciliation in the home within 48 hours of hospital discharges and ED visits for at least 50 percent of these events[a]	ED visits 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	All-cause hospital readmissions within 30 days less than or equal to average utilization in a similar population

[a] Follow-up contact after hospital discharge or ED visit and medication reconciliation are required to 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.

In this section, we describe the extent to which quality measure performance changed over time in the demonstration and compare quality measure performance with practices' improvement efforts reported during interviews. We would expect that if practices were motivated by the incentive payment, they would improve on the quality measures over time or maintain already high performance. Furthermore, if meeting the quality measures helps reduce Medicare spending, we expect to find decreased spending as the sites improved their quality measure performance. The performance measure and qualitative data reflect the 10 practices that participated in

[13] These site-level measures reflect beneficiaries enrolled in the demonstration; see Appendix A for information about differences between the implementation contractor's count of IAH enrollees and the IAH beneficiaries we include in the evaluation sample.

Year 7, including one consortium consisting of three sites.[14] We interviewed one clinician and one practice administrator from each practice from November 2019 to February 2020 (the end of Year 6 and beginning of Year 7). These interviews predated the COVID-19 pandemic; the goal of the interviews was to identify any changes that practices made in their approaches to delivering care to IAH beneficiaries and meeting demonstration quality-of-care requirements between this time and the previous round of interviews in April 2017 (during Year 5). We also examined survey data collected by the IAH implementation contractor from the seven practices that continued in the demonstration after Year 7, which examined care delivery during the COVID-19 pandemic.

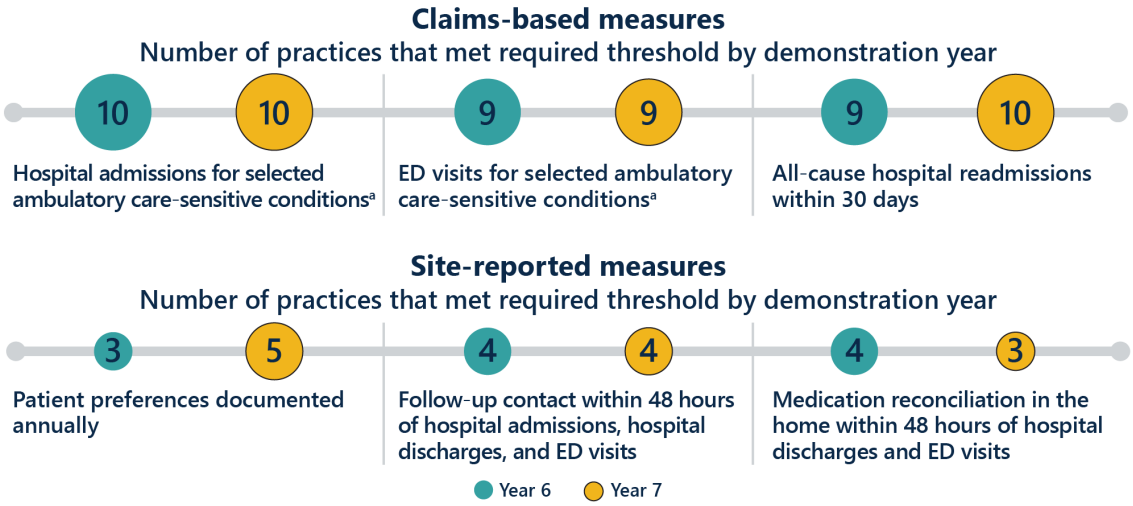
During interviews, most practices reported continuing existing care delivery processes during Year 6 and the 15-month gap in the demonstration that preceded Year 6. The majority of practices reported that they were already providing care that was largely consistent with IAH demonstration requirements and quality measures before participating in IAH. Several practices noted that delivering care in a manner that meets IAH quality measures had become their standard of care across all patients. In Year 6, a few practices reported using new formal risk-stratification processes to identify patients that may be at high risk for hospital or ED use. Once a patient is identified as high risk, the patient receives additional care management services, such as frequent check-in calls. In addition, a majority of practices reported an increased focus on documenting medication reconciliation and patient preferences more consistently in Year 6 in response to poor performance on these quality measures in earlier demonstration years.

2.5.2. Performance on quality measures tied to incentive payments in Year 7

Performance on the claims-based measures tied to incentive payments was high in Year 6, and performance remained high during Year 7, despite the COVID-19 pandemic. Practices' performance on claims-based quality measures may reflect their ongoing efforts to sustain changes made earlier in the demonstration to reduce preventable hospital admissions and ED visits. In Year 7, all 10 sites met the performance threshold for the hospital admissions and all-cause hospital readmissions measures, and nine sites met the threshold for the ED measure (Exhibit 2.9). Performance was similar to Year 6, when 10 sites met the threshold for the hospital admissions measure and nine sites met the performance threshold for the all-cause hospital readmissions and ED measures. Two practices that implemented new formal risk-stratification processes reduced the ratio of observed-to-expected readmissions in Year 7—including one practice that had not met the performance threshold for this measure in Year 6.

[14] We report quality measure performance data for the consortium as a single practice.

Exhibit 2.9. As in Year 6, nearly all of the 10 practices met the required threshold for claims-based measures tied to incentive payments in Year 7, and most practices did not meet the required threshold for site-reported measures



Source: Data from the IAH implementation contractor.

[a] Ambulatory care-sensitive conditions include diabetes, congestive heart failure, and chronic obstructive pulmonary disease.

ED = emergency department.

Most of the 10 IAH practices did not meet the performance threshold for at least two of the three site-reported quality measures tied to incentive payments in Year 7. If the sites were trying to maximize their incentive payments, we would expect to see improvements in meeting the site-reported measures—unless they were already meeting the required performance threshold for all three measures. The only area that showed some improvement since Year 6 was documentation of patient preferences. Practices were required to discuss treatment preferences with patients and document these preferences in the medical record at least once each year. Early in the demonstration, practices showed high performance on this measure; at least nine of the 10 practices met the threshold in Years 1 to 3. Performance was considerably poorer in Years 4 to 6, dropping to a low of three practices meeting the threshold in Year 6. Performance on this measure improved somewhat in Year 7, with five practices meeting the threshold and two others improving performance but missing the threshold of 80 percent by 2 percentage points or less. One practice that achieved the threshold for the patient preferences measure in Year 7 after missing it in Year 6 embedded an advance care planning assessment in the electronic health record and provided ongoing education to clinicians about conducting the assessment during a patient's annual wellness visit.

> "It was very difficult to meet the 48-hour visit [during the COVID-19 pandemic]. If we had to do by telephone/telehealth video, if patient didn't answer phone, etc. we missed an opportunity."
>
> *– IAH practice survey respondent*

As in earlier years, only four practices met the threshold for the 48-hour follow-up visit measure in Years 6 and 7, and the other six practices had very poor performance in both years—reporting follow-up visit rates below 10 percent. A variety of factors may have affected a practice's performance on the follow-up visit measure, such as whether the practice received timely notification of a beneficiary having a hospital admission or ED visit and whether the practice had clinicians who made after-hours and weekend visits (see Appendix Exhibits A.3 and A.4 for practice-level information on these and other characteristics). However, continued very poor performance on the follow-up visit measure by several practices—along with none of these six practices reporting changes in approaches to provide and document follow-up visits during interviews late in Year 6 and early in Year 7—indicates that at least some of these six practices did not consider performance on this measure to be a priority. Similarly, only three practices met the threshold for medication reconciliation in Year 7, and half of the practices reported never completing medication reconciliation in the home within 48 hours of discharge. The COVID-19 pandemic may have added burden on practices that made it difficult for them to meet performance thresholds for follow up and medication reconciliation within 48 hours.

3. What were the effects of the IAH demonstration on Medicare spending, hospital use, and health outcomes during the first year of the COVID-19 pandemic?

Key takeaways

- IAH likely reduced total Medicare spending in Year 7, but the estimated reduction of $459 PBPM (10.7 percent) cannot be generalized outside of the first year of the pandemic or to other home-based primary care practices.
- The effect of IAH on spending in Year 7 was considerably larger than in Year 6. From Year 6 to Year 7, total spending decreased by 1.3 percent for IAH beneficiaries, whereas spending increased by 4.3 percent for comparison beneficiaries. These results may reflect changes in the relative effectiveness of home-based primary care for IAH beneficiaries.
- Effects in Year 7 were concentrated among the two-thirds of beneficiaries who required help from another person with most or all activities of daily living (ADLs) (-$704 PBPM, -14.0 percent), such as eating and dressing.
- COVID-19 diagnoses and COVID-19 hospitalizations did not play a direct, material role in the effects of IAH in Year 7.
- Although IAH did not reduce total hospital admissions in Year 7, it may have reduced potentially avoidable hospital admissions (-5.7 percent, not statistically significant) and hospital admissions preceded by an ED visit (-7.4 percent, not statistically significant). The demonstration did not reduce unplanned readmissions or outpatient ED visits in Year 7.
- IAH may have reduced the probability of dying of any cause in Year 7 (-2.4 percentage points), which could have accounted for some of the effect on total spending. IAH did not affect entry into institutional long-term care.

3.1. Effects of IAH on Medicare spending

The IAH demonstration provides a financial incentive for practices participating in the demonstration to lower total Medicare spending for their IAH-eligible patients. Each year, practices can earn an incentive payment if their patients' Medicare spending is below the practice's estimated spending target and the practice meets performance thresholds for six quality measures. In the first six years of the demonstration, we interpreted the effects on Medicare spending calculated by the evaluation as effects of the IAH payment incentive. However, **we interpret effects in Year 7 as the effects of IAH *during the first year of the pandemic*.** These estimates may reflect effects of two types of changes:

- Changes in care delivery IAH practices made in response to the payment incentive (the focus of the evaluation of IAH Years 1 to 6).
- Changes in the relative effectiveness of home-based primary care for IAH beneficiaries.

It is unlikely that changes in care delivery IAH practices made in response to the payment incentive was the most important factor driving the estimated effects of IAH in Year 7. Results from the first six years of IAH provide little evidence that the payment incentive affected the delivery of care in a way that measurably and consistently reduced total Medicare spending. We learned of no major changes in care delivery by IAH practices in Year 6 or the preceding year that may have led to a larger effect of the payment incentive in Year 7. In addition, health care service use and many other aspects of daily life changed dramatically during the first year of the COVID-19 pandemic. It is more likely that changes in the relative effectiveness of care during the pandemic played a large role in the Year 7 results. We discuss both types of changes in Chapter 4.

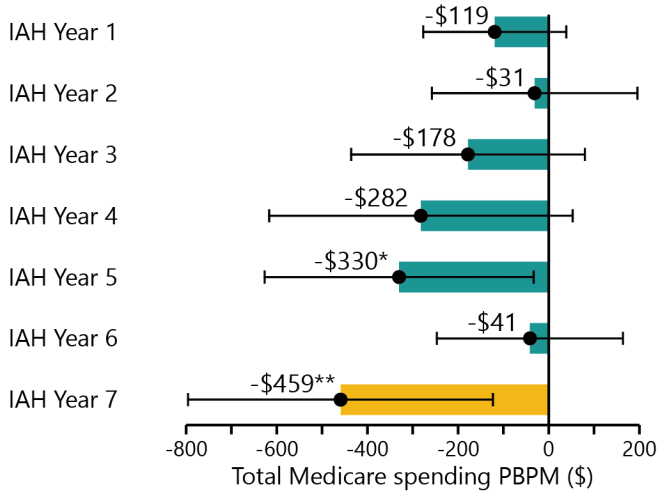
3.1.1. Effects on spending

We estimated a large, statistically significant reduction in total Medicare spending in Year 7, but the COVID-19 pandemic makes it difficult to estimate the extent to which the IAH demonstration contributed to the reduction. On average, IAH reduced total spending by $459 PBPM (10.7 percent) in Year 7, which was statistically significant (Exhibit 3.1). This estimate cannot be generalized outside of the first year of the pandemic or to other home-based primary care practices. In addition to uncertainty in the results caused by circumstances of the COVID-19 pandemic (discussed in Chapter 4), our estimates also had a large degree of statistical uncertainty; there was a 90 percent probability that the reduction in total spending in Year 7 was between -$756 PBPM and -$134 PBPM (Exhibit B.3).

Across all seven years, the average annual effect on total spending was not statistically significant (-$200 PBPM; 90% confidence interval [-$422, $23]) (Exhibit B.7).[15] We also estimated the average annual effect removing one IAH site at a time to test the influence of individual sites. Most results removing one site at a time were consistent with the full sample; however, removing the site that stopped providing home-based primary care after Year 5 substantially reduced the estimate to -$44 PBPM (90% confidence interval [-$243, $155]). Like the estimated effect for Year 7 alone, results that combine effects during and prior to the COVID-19 pandemic cannot be generalized to other home-based primary care practices or to periods not affected by the pandemic.

[15] See Appendix A for more details on the estimated average annual effect on total spending.

Exhibit 3.1. IAH likely reduced total Medicare spending in Year 7



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

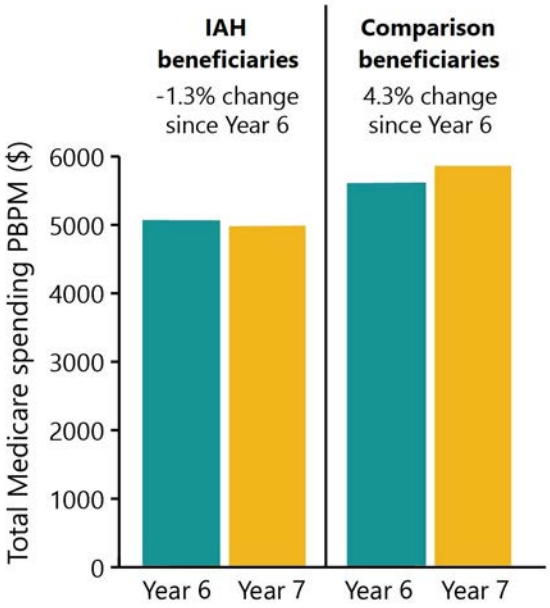
Notes: Differences between Years 5, 6, and 7 represent the change in participating sites as well as any differences before and during the COVID-19 pandemic in the effects of the IAH payment incentive and home-based primary care. The horizontal lines represent 90 percent CIs. Across all seven years, the average annual reduction in total spending was not statistically significant (-$200 PBPM; 90% CI [-$422, $23]). Effects cannot be generalized to other home-based primary care practices or to periods not affected by the pandemic.

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

CI = confidence interval; PBPM = per beneficiary per month.

The Year 7 estimate of -$459 PBPM was considerably larger than the estimated effect of the IAH payment incentive in Year 6 for the 12 sites that participated in Year 6 (-$41 PBPM; Exhibit B.2b). Although two sites left the IAH demonstration after Year 6, we attribute little of the difference in effects between the two years to the change in sample. Among the 10 sites that participated in both Years 6 and 7, the estimated effect of the IAH payment incentive in Year 6 was -$148 PBPM (Exhibit B.2a). While this effect is somewhat larger than what we estimated in the full Year 6 sample of 12 sites (-$41 PBPM), it is still substantially smaller than the Year 7 effect of -$459 PBPM. From Year 6 to Year 7, total spending for IAH beneficiaries decreased by 1.3 percent, whereas spending for comparison beneficiaries increased by 4.3 percent (Exhibit 3.2). That spending for IAH beneficiaries fell while spending for comparison beneficiaries rose may instead reflect changes in the relative effectiveness of care for IAH and comparison beneficiaries during the first year of the COVID-19 pandemic.

Exhibit 3.2. From Year 6 to Year 7, total spending increased for comparison beneficiaries while spending for IAH beneficiaries decreased slightly



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

Note: Data reflect the IAH practices that participated in Year 7.

PBPM = per beneficiary per month.

In Year 7, IAH may have lowered total Medicare spending on net by $4.2 million more than total incentive payments made to IAH practices during the first year of the COVID-19 pandemic. The evaluation's approach to assess the effect of the demonstration on Medicare spending necessarily differs from the approach CMS uses to calculate incentive payments for IAH practices. The incentive payments are outlays from CMS to practices as a reward for participation in the demonstration and should be accounted for by the evaluation to calculate the estimated effect of the demonstration net of the incentive payments.

CMS's incentive payment calculation is based on whether the IAH practices had lower Medicare spending than their estimated spending target. The incentive payment spending target reflects projected spending for Medicare beneficiaries who were not eligible for IAH, and the incentive payment calculation does not account for any spending difference that predated the demonstration, whereas the evaluation does account for this difference. Differences in objectives (calculating incentive payments versus evaluating the effect of the demonstration relative to a counterfactual) as well as analytic approaches means that the incentive payments that CMS reported during the demonstration are not equivalent to the aggregate spending reductions reported as gross estimated effects of the IAH demonstration. See Appendix A for more

information about differences between the calculation of effects on spending for the evaluation and incentive payments to IAH practices.

In Year 7, we estimated the gross aggregate effect of IAH on total Medicare spending by multiplying our statistically significant estimate of -$459 PBPM by the total number of beneficiary months to produce a gross aggregate spending reduction of $22.6 million (Exhibit 3.3). CMS made incentive payments to practices totaling $18.4 million in Year 7. After accounting for the incentive payments, the evaluation estimated a net aggregate reduction in Medicare spending of $4.2 million.

Exhibit 3.3. In Year 7, IAH may have lowered total Medicare spending in aggregate by $4.2 million more than total incentive payments made to IAH practices during the first year of the COVID-19 pandemic

	Total Medicare spending			
Year	Gross aggregate effect	90 percent confidence interval	Incentive payments to IAH practices	Net aggregate effect
Year 1	−$9,448,124	−$22,116,947; $3,220,699	$11,668,023	$2,219,899
Year 2	−$2,162,808	−$18,115,610; $13,789,994	$5,322,343	$3,159,535
Year 3	−$12,854,270	−$31,623,671; $5,915,131	$7,219,783	−$5,634,487
Year 4	−$25,442,886	−$55,868,337; $4,982,565	$8,095,010	−$17,347,876
Year 5	−$31,350,990*	−$59,793,938; −$2,908,042	$6,855,823	−$24,495,167
Year 6	−$3,190,507	−$19,231,594; $12,850,579	$11,050,083	$7,859,576
Year 7 (COVID-19)	−$22,648,708**	−$39,330,128; −$5,967,287	$18,490,834	−$4,157,874

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Warehouse. Incentive payment results are provided by CMS at https://innovation.cms.gov/initiatives/independence-at-home.

Notes: Gross aggregate 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 to the outlays of incentive payments as costs to CMS. Differences between Years 5, 6, and 7 represent the change in participating sites as well as any differences in the effects of the IAH payment incentive and home-based primary care during the pandemic, so results cannot be generalized to other years or home-based primary care providers.

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

3.1.2. Subgroup analyses

To better understand the large estimated effect of IAH in Year 7, we explored effects on total and inpatient 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 during the pandemic. These subgroups were defined by (1) need for assistance from another person with ADLs, (2) dual Medicare and Medicaid coverage, (3) race, (4) age, (5) chronic conditions, and (6) original reason for Medicare entitlement (Exhibit B.6a). We considered individual

subgroups to be different if the effects of IAH in Year 7 were statistically different between categories within the subgroups.

The effect of IAH on spending was concentrated among beneficiaries with severe functional impairments. Among beneficiaries requiring assistance with most or all (five or six) ADLs, IAH reduced total Medicare spending by $704 PBPM (-14.0 percent), which was statistically different from a reduction of just $14 PBPM (-0.4 percent) for beneficiaries requiring assistance with two to four ADLs (Exhibit 3.4). Similarly, effects on inpatient spending for these beneficiaries were significantly larger than effects for beneficiaries requiring assistance with fewer ADLs (Exhibit B.6b). All beneficiaries in our sample required assistance from another person with at least two of six ADLs. However, the two-thirds of IAH and comparison beneficiaries who required assistance with most or all ADLs may have been especially vulnerable to negative health outcomes during the first year of the pandemic. As with the full sample, the estimated effect of IAH on spending for beneficiaries who required assistance with five or six ADLs did not materially change when we controlled for a COVID-19 diagnosis or hospitalization (Exhibit B.6c). None of the other subgroups had statistically significant differences between the groups.

Exhibit 3.4. Effects on total spending in Year 7 were concentrated among the two-thirds of beneficiaries who required assistance from another person with most or all ADLs

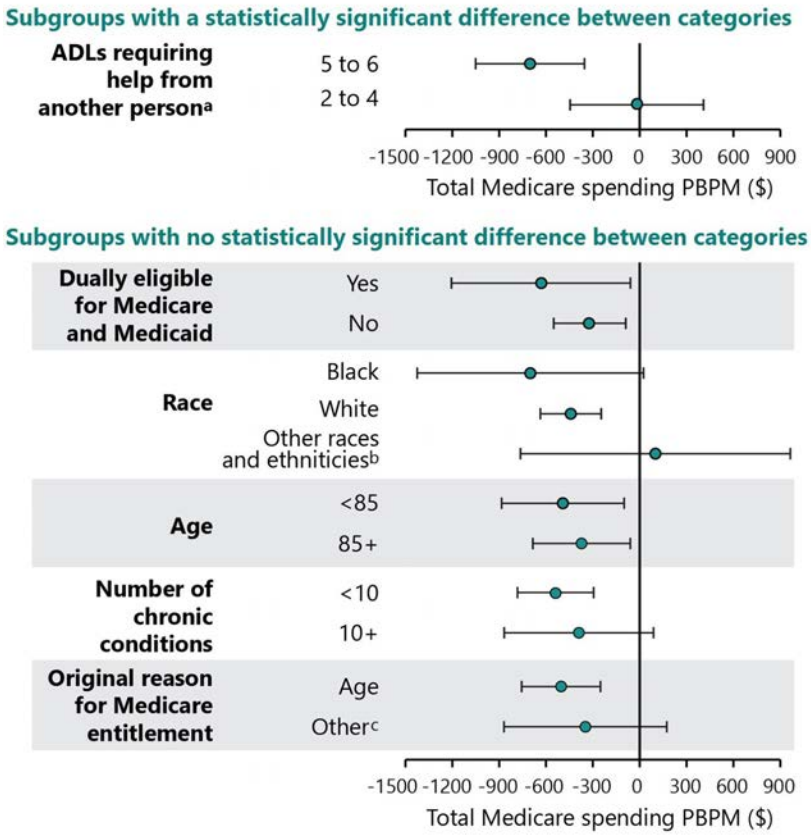


Exhibit 3.4 *(continued)*

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

Notes: Circles show estimated effects of IAH in Year 7 for beneficiaries in labeled subgroup. The horizontal lines represent 90 percent confidence intervals. Subgroup sample sizes are presented in Appendix B. Results cannot be generalized to other years or home-based primary care providers.

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

[b] The estimate for the other races and ethnicities subgroup, which includes Hispanic beneficiaries, is based on only 375 IAH beneficiaries in Year 7. Because of the small sample size, we interpret this result with caution.

[c] Original reason for Medicare entitlement category other includes entitlement due to disability, end-stage renal disease, or both.

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

3.1.3. Influence of COVID-19 diagnoses and hospitalizations and additional sensitivity analyses

COVID-19 diagnoses and COVID-19 hospitalizations did not play a direct, material role in the effects of IAH in Year 7. Although the COVID-19 pandemic affected the use of health care nationally in 2020, including among IAH beneficiaries, we did not find strong evidence that COVID-19 diagnosis or hospitalization rates directly affected the Year 7 IAH results. In Year 7, IAH beneficiaries were slightly less likely to be diagnosed with COVID-19 than comparison beneficiaries (14.5 percent and 16.0 percent, respectively) and had a similar share of hospital admissions related to COVID-19 (6.1 percent and 5.8 percent, respectively). The estimated effect of IAH on spending did not materially change when we controlled for a COVID-19 diagnosis or hospital admission (Exhibits B.5a and B.5b). Because comparison beneficiaries resided in the same geographic regions as IAH beneficiaries, we do not expect that a particular area's experience with COVID-19 (for example, high or low transmission) influenced the results. However, the COVID-19 pandemic may have generally changed factors that affect health outcomes and spending such as access to care, loneliness, and support from family and friend caregivers—changes which IAH and comparison groups may have experienced differently, as we describe in Chapter 4.

We conducted several other sensitivity analyses to better understand the Year 7 results, all of which support the finding of a large decrease in total spending in Year 7. See Appendix A for details on these analyses:

- Results in Year 7 were not driven by any one site or by sites with the largest number of IAH beneficiaries. To explore these potential explanations for the Year 7 results, we (1) estimated the effect of IAH on total Medicare spending in Year 7 leaving out one practice at a time from the sample (Exhibit B.7) and (2) used 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 (Exhibit B.8a).

- Results did not differ when we accounted for Merit-Based Incentive Payment System adjustments given to practices that participate in CMS initiatives (Exhibit B.9). To examine this possibility, we removed these adjustments, which are applied automatically to claims, from our total spending measure and estimated the effect of IAH on this alternate measure.
- Results were not meaningfully different when we accounted for IAH practice participation in accountable care organizations (ACOs). Though many IAH practices had joined an ACO by Year 7 and may have made care delivery changes that affected their ACO patients and their IAH patients, controlling for ACO participation produced similar results (Exhibit B.10a).

3.1.4. Categories of spending

About half of the estimated reduction in total Medicare spending came from a large, statistically significant reduction in inpatient spending (-$245 PBPM, -14.5 percent) (Exhibit B.4a). Inpatient spending includes spending for short-stay and critical access hospitals as well as psychiatric hospitals, long-term care hospitals, and inpatient and outpatient rehabilitation facilities. Relative to Year 6, inpatient spending for IAH beneficiaries remained similar (less than 1.0 percent increase), whereas inpatient spending increased from Year 6 to Year 7 for comparison group beneficiaries (about 6.9 percent increase). We examined whether the effect on inpatient spending in Year 7 was driven by changes in the use of long-term care hospitals or inpatient rehabilitation facilities, which are infrequently used but costly. Neither of these settings were the main factor driving reductions in inpatient spending; the reductions were mainly from short-stay and critical access hospitals.

We also estimated a statistically significant reduction in outpatient spending (-$68 PBPM, -27.7 percent) and notable but not statistically significant reductions in clinician/supplier spending (-$61 PBPM, -8.7 percent), skilled nursing facility spending (-$63 PBPM, -10.4 percent), and hospice spending (-$23 PBPM, 14.1 percent). Effects on spending for home health and durable medical equipment were smaller and not statistically significant.

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. This motivation could be in place because less hospital use could lead to higher incentive payments by allowing a site to (1) reduce total Medicare spending (as we explain further in Appendix A) or (2) achieve the required performance threshold for quality measures that reflect hospital use (as we explain further in Chapter 2). IAH practices made several changes during the demonstration that they hoped would reduce hospital

admissions and ED visits.[16] Although we learned of no major changes in care delivery by IAH practices after Year 5, several practices reported minor changes aimed at reducing hospital use. A few practices implemented new formal risk stratification processes to identify patients at high risk for hospital admissions and provide additional care management services to those patients. More than half of the practices reported changing care team meetings to focus on patients with the highest rates of hospital use, such as analysis of electronic health record data. We examined whether care delivery changes such as these—in conjunction with IAH practices' delivery of home-based primary care during the pandemic more generally—affected hospital use during Year 7, the first year of the COVID-19 pandemic. To understand these potential effects, we measured changes in hospital admissions (total, potentially avoidable, and those preceded by an ED visit), outpatient ED visits (total and potentially avoidable), and the probability of unplanned, all-cause 30-day hospital readmission.

Although the demonstration probably did not reduce total hospital admissions by a meaningful amount in Year 7, it may have reduced potentially avoidable hospital admissions and hospital admissions that began with an ED visit. Hospital admissions fell in both IAH and the comparison group in Year 7, and the decrease was larger for the IAH group (-15.1 percent) than the comparison group (-8.0 percent) (Exhibit B.11a). Although the estimated effect of IAH on hospital admissions was small and not statistically significant (-33 admissions per 1,000 beneficiaries, -1.9 percent), other results showing reductions in certain types of hospital admissions may have contributed to the large reduction in inpatient spending. For example, hospital admissions preceded by an ED visit (-7.4 percent) as well as potentially avoidable hospital admissions (-5.9 percent) both showed larger effects than the -1.9 percent we estimated for hospital admissions (Exhibits 3.5, B.11a, and B.13a) and was especially true among beneficiaries requiring assistance with five or six ADLs (Exhibits B.12 and B.14).

Exhibit 3.5. Reductions in certain types of hospital admissions may have contributed to the large effect of IAH on inpatient spending

	Inpatient spending	Hospital admissions	Potentially avoidable hospital admissions	Hospital admissions preceded by an ED visit
All beneficiaries	-14.5%*	-1.9%	-5.9%	-7.4%
Beneficiaries requiring help with 5 or 6 ADLs	-20.3%***	-6.4%	-9.1%	-12.1%***

[16] For more information, refer to the evaluation report covering Years 1 to 4 of the IAH demonstration.

Exhibit 3.5 *(continued)*

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

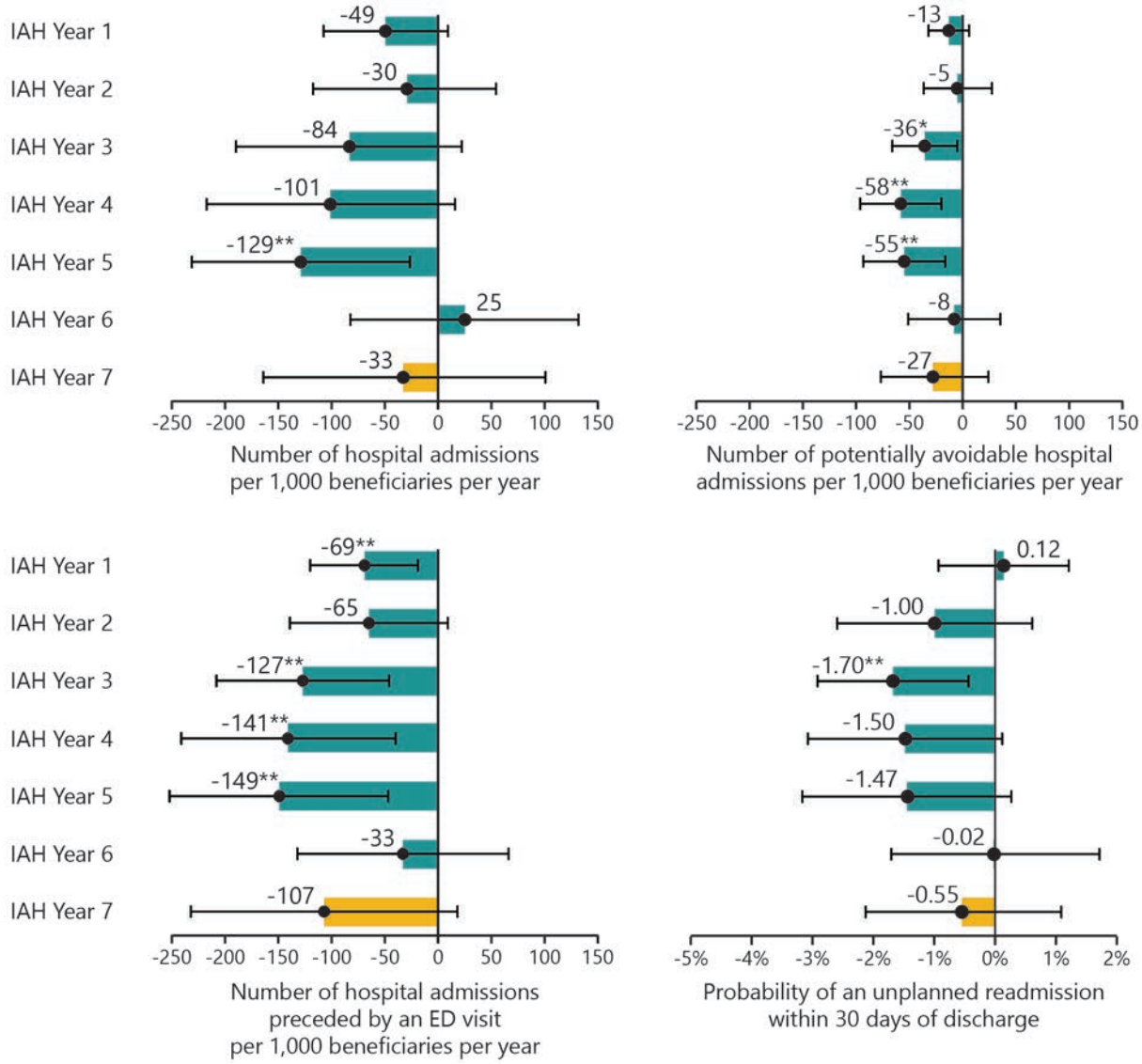
Notes: Effects shown in this table are from Year 7 only. Results cannot be generalized to other years or home-based primary care providers.

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

ADLs = activities of daily living. ED = emergency department.

The demonstration had no measurable effect on the probability of unplanned readmission (-3.4 percentage points, not statistically significant) in Year 7 (Exhibit 3.6).

Exhibit 3.6. IAH did not reduce the number of total hospital admissions or probability of unplanned readmission but may have reduced other types of hospital admissions in some demonstration years



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

Exhibit 3.6 *(continued)*

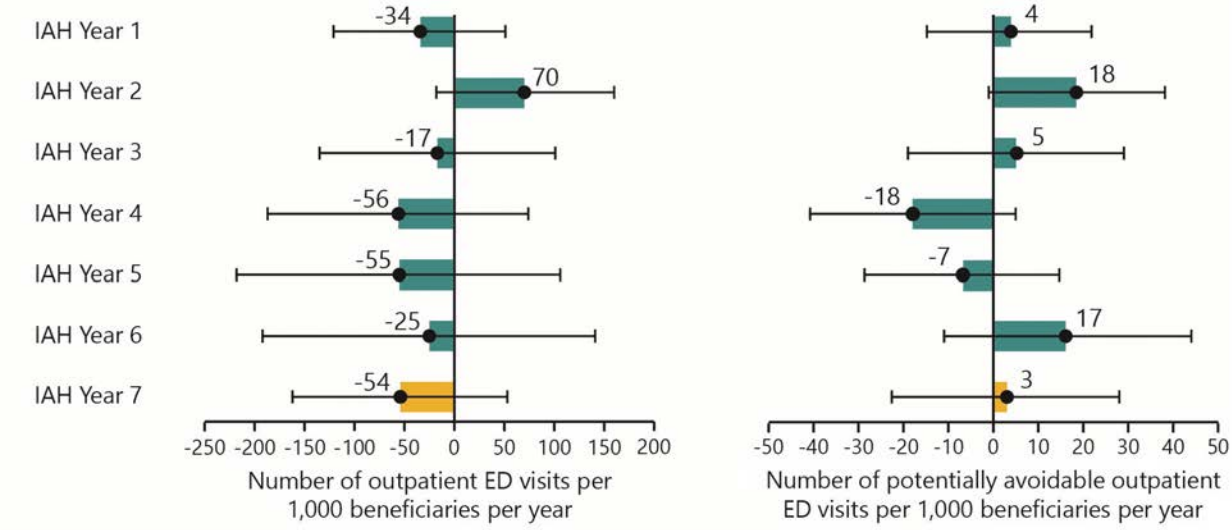
Notes: Differences between Years 5, 6, and 7 represent both the change in participating sites as well as any differences in the effects of the IAH payment incentive and home-based primary care over time. Results cannot be generalized to other years or home-based primary care providers. The horizontal lines represent 90 percent confidence intervals.

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

ED = emergency department.

The demonstration did not reduce outpatient ED visits or potentially avoidable outpatient ED visits in Year 7. Outpatient ED visits refer to ED visits that were not followed by a hospital admission or observation stay. From Year 6 to Year 7, outpatient ED visits decreased in the IAH and comparison groups by similar amounts. The estimated effect of IAH on outpatient ED visits was a reduction of 54 per 1,000 beneficiaries (-3.8 percent) in Year 7, which was not statistically significant (Exhibit 3.7). IAH had no statistically significant effect on potentially avoidable outpatient ED visits (1.4 percent).

Exhibit 3.7. IAH did not reduce outpatient ED use or potentially avoidable outpatient ED use in any demonstration year



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

Notes: Differences between Years 5, 6, and 7 represent both the change in participating sites as well as any differences in the effects of the IAH payment incentive and home-based primary care over time. Results cannot be generalized to other years or home-based primary care providers. The horizontal lines represent 90 percent confidence intervals.

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

ED = emergency department.

3.3. Effects of IAH on health outcomes

As a final step in our examination of factors that may have contributed to the large estimated impact on total spending in Year 7, we examined the effects of IAH on death and entry into institutional long-term care. End-of-life care is often costly, and if IAH reduced the death rate during the pandemic for IAH beneficiaries relative to comparison beneficiaries, less end-of-life care could explain some of the difference in spending. In every demonstration year, IAH practices also may have an incentive to encourage high-cost patients to enter long-term care because residence in such a facility removes them from the calculation of incentive payments for the demonstration.

IAH may have reduced the probability of dying of any cause by 2.4 percentage points in Year 7 (Exhibit 3.8)—a relatively large effect that probably explains some, but certainly not all, of the effect on total spending. Similar to total spending, much of the difference between Years 6 and 7 came from an increase in the probability of death among comparison beneficiaries (3.9 percentage points), while the probability of death for IAH beneficiaries was similar between Years 6 and 7 (an increase of 0.8 percentage points) (Exhibit B.15a). However, we interpret effects on death rate with more caution than the other results for Year 7 because we observed a large and changing difference between IAH and comparison beneficiaries in the probability of death during the two years before the demonstration.[17] The concern is that results could be driven by these changes before the demonstration that persisted, instead of effects of IAH. That said, the direction of those changes would not predict the estimated effects in Year 7 of a 2.4 percentage point reduction in the probability of death, which suggests Year 7 effects are not driven by differences in baseline trends alone. Furthermore, it is plausible that care from IAH practices had a larger effect on preventing death during the first year of the pandemic than in pre-pandemic years.

These results raise the question of how much of the estimated effect of IAH on total spending may be explained by the potential effect on the death rate and spending among decedents. Descriptive analyses of unadjusted total spending in Years 6 and 7 suggest the following (Exhibit B.17):

[17] The difference in the death rate between IAH and comparison beneficiaries two years before the demonstration (8.6 percentage points) was statistically different from the difference one year before the demonstration (6.7 percentage points). The changing difference in the death rate before the demonstration began violates a key assumption we rely on to estimate effects of IAH. As a result, it reduces our confidence that comparison beneficiaries from the Year 7 sample serve as good estimates of what would have happened to IAH beneficiaries in the absence of the demonstration with respect to the probability of death.

- A considerably larger increase in the death rate for comparison beneficiaries than IAH beneficiaries from Year 6 to Year 7 likely contributed to the estimated effect of IAH on total spending, because unadjusted spending was substantially higher among comparison decedents ($10,942 PBPM) than among those who did not die ($4,884 PBPM).
- Unadjusted per-beneficiary spending for decedents from Year 6 to Year 7 was largely similar for IAH (3.3 percent) and comparison beneficiaries (4.6 percent), which suggests effects on spending did not come from changes in the per beneficiary cost of care near the end of life that differed for the two groups.
- Beneficiaries who did not die also contributed to the estimated effect of IAH on total spending. There was a 1.1 percent *increase* in unadjusted total spending from Year 6 to 7 for comparison beneficiaries who did not die, while spending *decreased* by 2.2 percent among IAH beneficiaries who did not die.

In summary, the evidence supports the notion that both the death rate and changes in spending among non-decedents (but not necessarily changes in spending among those who died) contributed to the estimated effects of IAH on total spending in Year 7.

Effects on the death rate during Year 7 of the demonstration were generally not driven by rates of COVID-19 diagnosis or hospitalization (Exhibits B.16a and B.16b). Controlling for whether a beneficiary had a COVID-19 hospitalization led to a somewhat smaller estimated reduction in the death rate (1.7 percentage points), but the effect was still large in magnitude relative to recent years and was statistically significant.

Exhibit 3.8. IAH may have reduced the probability of dying but did not reduce the probability of entering long-term care in Year 7

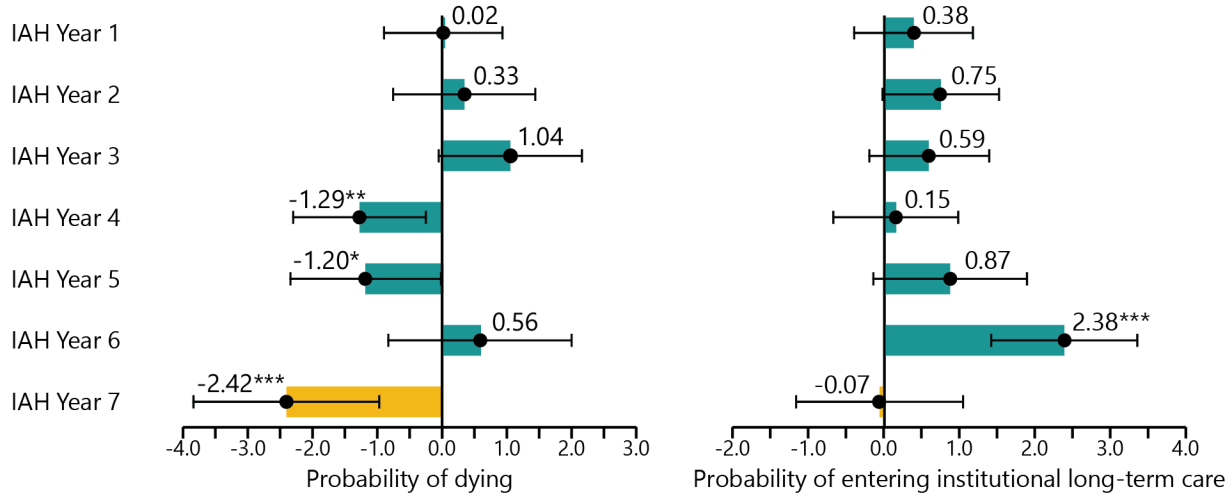


Exhibit 3.8 *(continued)*

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

Notes: Differences between Years 5, 6, and 7 represent the change in participating sites as well as any differences before and during the COVID-19 pandemic in the effects of the IAH payment incentive and home-based primary care. Results cannot be generalized to other years or home-based primary care providers. The horizontal lines represent 90 percent confidence intervals.

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

We found no evidence that IAH affected the probability of entering institutional long-term care in Year 7 (-0.07 percentage points; Exhibit 3.7). Both IAH and comparison beneficiaries may have sought to avoid entering institutional long-term care during Year 7 due to the risk of contracting COVID-19 and restrictions on visitors imposed by many facilities. However, this result deviates from Year 6, where we estimated a statistically significant increase in the probability of entering institutional long-term care (2.4 percentage points). We interpret results for the probability of entering long-term care with caution, however, because, as with death, we observed statistically significant pre-demonstration differences between IAH (mostly unchanged) and comparison trends (downward trend) that could have caused bias.

4. Limitations and discussion

4.1. Summary of results

In this evaluation report, Mathematica examined the effects of IAH during Year 7 (2020), which was the first year of the COVID-19 pandemic. We estimated a relatively large, statistically significant reduction in total Medicare spending in Year 7, but the COVID-19 pandemic makes it difficult to estimate the extent to which the IAH demonstration contributed to the reduction. The effect of IAH on spending in Year 7 was considerably larger than in Year 6. The change since Year 6 was driven by an increase in spending for comparison beneficiaries and a small decrease in spending for IAH beneficiaries from Year 6 to Year 7. Effects on spending in Year 7 were concentrated among the two-thirds of beneficiaries who required assistance from another person with most or all ADLs. These results cannot be generalized outside of the first year of the COVID-19 pandemic or to other home-based primary care practices.

Multiple factors may have contributed to the effect of IAH on spending in Year 7. Although IAH did not reduce total hospital admissions in Year 7, it may have reduced potentially avoidable hospital admissions and hospital admissions preceded by an ED visit. IAH beneficiaries received more ambulatory visits and home health services than comparison beneficiaries, which could have contributed to the effect of IAH on spending in Year 7. IAH beneficiaries had 28 percent more ambulatory visits in Year 7 than comparison beneficiaries. Primary care played a larger role in IAH beneficiaries' health care than for comparison beneficiaries. Relative to comparison beneficiaries, IAH beneficiaries had a higher share of primary care visits by telehealth or telephone while also having more in-person primary care visits. IAH and comparison beneficiaries both experienced a decrease in spending for specialty care services—a decrease that was much larger for comparison beneficiaries. Finally, many IAH beneficiaries used home health services extensively; these are services provided under the Medicare home health benefit, which requires a beneficiary to be homebound and needing intermittent skilled nursing care or physical therapy, speech-language pathology, or occupational therapy services. IAH may have reduced the probability of dying of any cause in Year 7, which could have accounted for some of the effect on spending because spending tends to be higher in the months before death. The rate of COVID-19 diagnosis was similar for IAH and comparison beneficiaries, so the effects on total spending were not affected by differences in COVID-19 diagnosis or hospitalization.

We would expect that if practices were motivated by the incentive payment, they would improve on the quality measures tied to the incentive payment over time or maintain high performance and continue to participate in the demonstration. However, as in Year 6, most IAH practices did not meet performance thresholds for at

least two of the six quality measures tied to payment in Year 7—even though doing so would have increased the amount of their incentive payments. Furthermore, eight of the 18 original participants ended their participation in the demonstration by the beginning of Year 7. This high level of attrition suggests a lack of ability or desire to participate in the demonstration as presently structured.

4.2. Limitations

The demonstration and the evaluation have several limitations, some of them new in Year 7, that should be considered when reviewing the results.

Small numbers of participants can lead to random fluctuations in estimated results. Because Congress limited the size of the demonstration, the number of participating practices was small, and the number of beneficiaries who met the demonstration criteria was a subset of those practices' patients. Over time, the number of practices has gotten even smaller (from 18 at the outset to 10 in Year 7), as sites left the demonstration. With such small numbers of participants, evaluation results could be subject to random fluctuations, which could lead to (1) larger deviations from the true mean (that is, estimated effects that differ from the unknown true effect of IAH) and (2) wider confidence intervals (that is, less chance of an estimated effect being statistically significant).

Results are not generalizable to beneficiaries who do not meet IAH eligibility criteria, patients of other providers, or years not affected by the COVID-19 pandemic. The IAH demonstration shows only how IAH affected outcomes for chronically ill and functionally limited Medicare fee-for-service beneficiaries who received home-based primary care from the small number of practices that participated in the demonstration. Attrition from the demonstration, combined with the fact that five of the 10 practices that remained in Year 7 are operated by the same corporation, means that the results for Year 7 of the demonstration are unlikely to inform what might happen if the demonstration were extended to other providers. Furthermore, results for Year 7 cannot be generalized outside of the first year of the COVID-19 pandemic.

The longer the demonstration, the higher the risk of bias in the estimated effect—particularly because the COVID-19 pandemic may have affected the IAH and comparison groups in different ways. The difference-in-differences methodology we use removes any consistent influence of unmeasured factors on outcomes (see Appendix A for details on the methodology). This approach works by using a baseline to account for pre-demonstration differences between the IAH and comparison groups. However, the extended length of the demonstration results in a baseline that ended nearly eight years before Year 7 (2011–2012). Over that time period, factors other than the payment incentive may have affected outcomes differently for IAH and comparison beneficiaries—especially during the pandemic—

which would have confounded the estimated effects. The COVID-19 pandemic affected the ways providers delivered care and patients sought care, caregivers' ability to provide support for ADLs and other needs, and other factors such as beneficiaries' health status and levels of activity, stress, and loneliness. Some of these unmeasured factors may have changed differently for the IAH and comparison groups in ways we could not measure. Even if unmeasured factors did not change differently for the two groups, these factors may have influenced spending and other outcomes differently during the first year of the pandemic than in earlier years.

One example of a change that may have caused confounding in the estimated effect of IAH in Year 7 is that the share of IAH beneficiaries who were new patients of the IAH practice decreased by about 8 percent from Year 6 to Year 7 (from 34.3 percent in Year 6 to 31.7 percent in Year 7).[18] Because new patients have higher levels of total and inpatient spending than existing patients of IAH practices,[19] the spending trajectory for the IAH beneficiaries in Year 7 decreased relative to the IAH beneficiaries in Year 6. It is unlikely that the spending trajectory of the comparison group changed in the same way as the IAH group. This is because although IAH and comparison beneficiaries had a hospital admission within the same time frame, only the IAH group was limited to new and existing patients of a set of primary care practices. Therefore, the share of patients who switched primary care practices in the comparison group—a possible indicator of unmeasured factors that affect the spending trajectory—would be smaller than the 31.7 percent of IAH beneficiaries who were new patients in Year 7.

Another example may be related to the larger decrease in spending on specialty care services for comparison beneficiaries. The fact that IAH beneficiaries began receiving home-based primary care from an IAH practice may signal that they (or their caregivers) are more inclined to work actively to obtain needed health care than comparison beneficiaries. This potential unmeasured difference between IAH and comparison beneficiaries in care-seeking behavior may have existed in all demonstration years. However, if care-seeking behavior influenced health care use and spending differently during Year 7 because of disruptions in health care delivery

[18] These numbers reflect only the 10 practices that participated in Year 7. The decrease in the share of IAH beneficiaries who were new patients of the IAH practice might have had multiple contributing factors, such as fewer hospital admissions during the first year of the pandemic (because hospital admissions are sometimes a precipitating factor to a beneficiary starting home-based primary care) and temporary reductions in the number of new patients accepted by some IAH practices.

[19] In Years 6 and 7, new patients of IAH practices had about 15 to 30 percent higher total and inpatient spending PBPM than existing patients of IAH practices. Spending on readmissions and skilled nursing facility services may have contributed to this differential because a higher share of new IAH patients (close to 43 percent in Years 6 and 7) had a hospital admission in the previous month relative to existing IAH patients (35 percent in Years 6 and 7).

during the pandemic, then it could have confounded the estimated effects of IAH in Year 7.

4.3. Discussion of the estimated effects for Year 7

As we noted earlier in this chapter, the large estimated effect of IAH on total spending in Year 7 differs considerably from the effect in earlier years, most likely driven by the disruptions in health care and society as a whole during the first year of the COVID-19 pandemic. In this section, we explore possible factors that may have contributed to the estimated effects of IAH in Year 7.

4.3.1. Background on beneficiaries who required help with most or all ADLs

Beneficiaries who required help with most or all ADLs had considerably worse health and functional status than other beneficiaries, which may have put them at especially high risk of poor outcomes during the first year of the pandemic. As we described in Chapter 3, effects on spending in Year 7 were concentrated among the two-thirds of beneficiaries who required assistance from another person with most or all ADLs. All beneficiaries in the evaluation sample had multiple functional impairments that required assistance from another person and multiple chronic conditions, but IAH beneficiaries who needed assistance with most or all ADLs were nearly five times as likely as those who needed assistance with fewer ADLs to have quadriplegia and more than twice as likely to have a pressure ulcer (commonly called a bedsore) with necrosis through to muscle, tendon, or bone or with full thickness skin loss (Exhibit 4.1). They were also considerably more likely to have atherosclerosis of the extremities with ulceration or gangrene (blocked arteries in the legs), stroke, hemiplegia or hemiparesis (partial or complete loss of strength on one side of the body), dementia with behavioral complications, and malnutrition. Comparison beneficiaries who needed help with most or all ADLs had similar levels of impairment as IAH beneficiaries who needed help with most or all ADLs; for example, 15.9 percent had dementia with behavioral complications, and 6.7 percent had a pressure ulcer with necrosis through to muscle, tendon, or bone.

Many of these conditions indicate a need for frequent interactions with a primary care practice and extensive or around-the-clock support from paid or unpaid caregivers such as family members, friends, personal care attendants, and home health staff. Also, many beneficiaries who require help from another person with most or all ADLs are mostly or completely homebound, because leaving home requires considerable and taxing effort for them. Changes in the relative effectiveness of care for IAH and comparison beneficiaries may have been concentrated among beneficiaries who required help from another person with most or all ADLs, which may help explain why effects on spending in Year 7 were concentrated among this group.

Exhibit 4.1. IAH beneficiaries who required help from another person with most or all ADLs had considerably worse health and functional status than those who required help with fewer ADLs

Measure	IAH beneficiaries who required help with 5–6 ADLs, percentage	IAH beneficiaries who required help with 2–4 ADLs, percentage	Difference, relative percentage
Quadriplegia	9.7	1.7	479.7
Pressure ulcer with necrosis through to muscle, tendon, or bone	6.6	1.4	356.4
Pressure ulcer with full thickness skin loss	11.7	5.7	103.0
Atherosclerosis of the extremities with ulceration or gangrene	7.2	4.2	72.0
Stroke	17.9	11.1	61.9
Hemiplegia or hemiparesis	18.1	10.8	68.0
Dementia with behavioral complications	15.6	11.1	40.3
Malnutrition	29.8	23.8	25.4

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH beneficiaries in all IAH practices that participated in Year 7.

Note: All beneficiaries in our sample required assistance from another person with at least two of six ADLs.

ADLs = activities of daily living.

4.3.2. How the IAH payment incentive could have affected outcomes during the first year of the COVID-19 pandemic

There are two mechanisms by which IAH could have affected outcomes differently in Year 7 than in Year 6: (1) changes in care delivery IAH practices made in response to the payment incentive, the focus of the evaluation of IAH Years 1 to 6, and (2) changes in the relative effectiveness of care for IAH and comparison beneficiaries during the first year of the COVID-19 pandemic.

It is unlikely that changes in care delivery IAH practices made in response to the payment incentive was the most important factor driving large estimated effects of IAH in Year 7. Results from the first six years of IAH provide little evidence that the payment incentive affected the delivery of care in a way that measurably and consistently reduced total Medicare spending. Also, we learned of no major changes in care delivery by IAH practices in Year 6 or the preceding year that may have led to a larger effect of the payment incentive in Year 7. It is possible that some changes made during Years 1 to 5 of the demonstration in response to the payment incentive had a somewhat larger effect on outcomes during the first year of the pandemic. However, IAH practices reported that their basic model of care was unchanged during the demonstration, which suggests that the large effect of IAH on total spending in Year 7 was more likely driven by changes in increased effectiveness of strategies employed before the demonstration began.

4.3.3. How the relative effectiveness of care for IAH and comparison beneficiaries could have changed during the first year of the COVID-19 pandemic

Changes in the relative effectiveness of care for IAH and comparison beneficiaries may have been a key contributor to the large effect of IAH on spending in Year 7. The relative effectiveness of care could have changed as a result of (1) new strategies IAH practices adopted during the pandemic, (2) increased effectiveness of strategies that IAH practices have used before the IAH demonstration began, or (3) changes in care experienced by the comparison group that did not affect the IAH group.

How might the relative effectiveness of care for IAH and comparison beneficiaries have changed during the first year of the COVID-19 pandemic?

- IAH practices may have used new strategies to change care delivery.
- Care delivery approaches that IAH practices have used before the demonstration began may have been more effective.
- The comparison group may have experienced changes in care that did not affect the IAH group because of efforts by IAH practices.

4.3.3.1. New strategies IAH practices adopted during the pandemic

IAH practices may have changed care delivery during the first year of the pandemic. Because one-third of older adults reported delayed medical care in the first year of the pandemic (Zhong et al. 2022), the fact that IAH beneficiaries received a smaller share of visits in person and a larger share via telehealth or telephone in Year 7 may suggest that IAH practices were able to pivot to telehealth and telephone visits more quickly than providers who cared for beneficiaries in the comparison group. Pivoting quickly to telehealth and telephone visits may have led to fewer delays in care for IAH beneficiaries relative to the comparison group.

4.3.3.2. Increased effectiveness of strategies that IAH practices have used before the IAH demonstration began

Home-based primary care provided by IAH practices has several features that differed from typical office-based care, and those features may have been especially valuable during the COVID-19 pandemic. The following examples show how IAH practices' existing care delivery approaches may have affected spending differently than in past years.

IAH practices provided frequent primary care visits. As we describe in Chapter 2, although neither IAH nor comparison beneficiaries had a notable change in spending for primary care services from Year 6 to Year 7, IAH beneficiaries had twice as many primary care visits as comparison beneficiaries in Year 7. On average, IAH beneficiaries had a primary care visit every five weeks, whereas comparison beneficiaries had a primary care visit every nine weeks. Frequent visits from the IAH practice, whether in-person, by telehealth, or by telephone, may have affected outcomes differently during the first year of the pandemic for multiple reasons.

First, frequent visits from the IAH practice may have prevented ED visits and subsequent hospital admissions more often than in a typical year. In Year 7, IAH beneficiaries may have been more willing to contact the IAH practice if they were unsure whether their symptoms required emergency care. Most IAH practices highlighted to their patients and caregivers the importance of contacting the practice before going to the ED so that a clinician could evaluate the patient's symptoms and determine whether an ED visit was necessary or whether care could be delivered in the home. Despite these efforts, in a survey Mathematica conducted early in the demonstration, about 30 percent of IAH beneficiaries reported they would prefer to visit the ED instead of contacting the IAH practice; common reasons included believing that the ED was the best place when they were unsure whether a problem is serious or their caregiver preferring that the beneficiary go to the ED. IAH beneficiaries might have been more willing to contact the IAH practice before going to the ED in Year 7 than in previous years because of the risk of exposure to COVID-19 and the possibility of long wait times in the ED.

> "Yes, we can take care of this here, you don't have to go to the hospital—we can get somebody out here with a chest x-ray… we're going to take care of it and we'll do exactly the same thing that they would do at the hospital."
>
> *– IAH clinician*

Also, because many forms of social interaction decreased or temporarily ended during the first year of the pandemic, frequent visits from the IAH practice may have reduced loneliness and feelings of social disconnection more than in a typical year. In general, loneliness and feelings of social disconnection increased among older Medicare beneficiaries in the first year of the pandemic (Cabin 2021; Holaday et al. 2022), and they are associated with an increased risk of sickness and death (Courtin and Knapp 2017; Perissinotto et al. 2012). Frequent visits from the IAH practice may have been especially valuable for beneficiaries who required assistance from another person with most or all ADLs. As a result of being mostly or completely homebound, these beneficiaries may have been more at risk to experience increases in loneliness and feelings of social disconnection during the first year of the pandemic than those who needed assistance with fewer ADLs.

IAH beneficiaries used home health services extensively, and IAH practices had strong working relationships with home health agencies. A larger share of IAH beneficiaries used home health services than comparison beneficiaries. Also, IAH beneficiaries who used any home health services spent more on home health than comparison beneficiaries. Among beneficiaries who required assistance from another person with most or all ADLs—the group that drove the impact of IAH on total spending in Year 7—IAH beneficiaries had 19.0 percent higher home health spending than comparison beneficiaries in Year 7 (Exhibit 4.2). This difference represents an increase of about one-quarter since Year 6, when the gap between IAH and

comparison beneficiaries was 15.1 percent. IAH practices' outreach to their beneficiaries and communication with home health agencies—approaches they also used before the pandemic—may have helped IAH beneficiaries feel more comfortable allowing home health agency staff in their homes during the pandemic than comparison beneficiaries.

There are multiple reasons to think that, compared with prior years, use of home health services by IAH beneficiaries in Year 7 may have played a larger role in preventing or slowing declines in health and functional status and thereby preventing more ED visits and subsequent hospital admissions. These include the following:

- Many home health staff provide timely updates to IAH practices on changes in beneficiaries' health and functional status. These updates may have been more valuable in Year 7 because beneficiaries were at increased risk of deteriorating health and functional status in the first year of the pandemic; also, because caregiver availability changed for many older adults during the first year of the pandemic (Bell et al. 2022; Federman et al. 2021; Leggett et al. 2022; Reckrey et al. 2022), some changes in health and functional status may have gone unreported to the IAH practice if not for home health staff.
- Frequent visits from a home health agency may have combined with the higher number of primary care visits for IAH beneficiaries to reduce loneliness and feelings of social disconnection, which are associated with an increased risk of sickness and death.
- Some home health agencies have reported spending more time with patients than usual in the first year of the pandemic—for example, ensuring medications were accessible and taken properly, encouraging patients to be physically active, and providing education regarding the pandemic (Bell et al. 2022).

Exhibit 4.2. Among beneficiaries who required help from another person with most or all ADLs, IAH beneficiaries had higher home health spending in Year 7 than comparison beneficiaries, and the increase from Year 6 to Year 7 was larger for IAH beneficiaries

Measure	IAH beneficiaries	Comparison beneficiaries	Difference
Average home health spending PBPM, Year 6	$817	$710	15.1%
Average home health spending PBPM, Year 7	$903	$759	19.0%

Source: Mathematica's analysis of data from the IAH implementation contractor and Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH beneficiaries in all IAH practices that participated in Year 7.

Notes: Unadjusted results weighted to reflect number of months eligible.

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

4.3.3.3. Changes in care experienced by the comparison group that did not affect the IAH group

The third, and final, way that the relative effectiveness of care for IAH and comparison beneficiaries may have changed during the first year of the COVID-19 pandemic is that the comparison group may have experienced changes in care that did not affect the IAH group because of efforts by IAH practices.

Comparison beneficiaries may have had less support than usual to manage their chronic conditions, while support for IAH beneficiaries may not have changed. In a survey of IAH beneficiaries in the first few years of the IAH demonstration, 72 percent of respondents who reported needing medical care outside the home said that the IAH practice provided some or a lot of help when making plans to get such care.[20] IAH practices may have continued their usual approaches to help their patients obtain specialty care, while primary care clinicians for comparison beneficiaries may have offered less support than usual. Among beneficiaries who required assistance from another person with most or all ADLs, the decrease in spending on specialty care services from Year 6 to Year 7 was more than three times as large for comparison beneficiaries (-11.6 percent) as it was for IAH beneficiaries (-3.3 percent). The large decrease in specialty care spending for comparison beneficiaries may have negatively affected management of their chronic conditions, particularly because specialty care accounted for a substantially larger share of ambulatory visits for comparison beneficiaries (50 percent) than for IAH beneficiaries (22 percent). Poorer management of chronic conditions may have contributed to relatively more hospital use and inpatient spending for the comparison group in Year 7.

4.4. Conclusion

Given that no study design can alleviate all of the evaluation's limitations imposed by the demonstration, available data, and the first year of the COVID-19 pandemic, this evaluation provides the most robust estimate of the effect of IAH in the first year of the pandemic. When considering whether the IAH demonstration met its stated goals in Year 7—to reduce Medicare spending and improve health outcomes—we considered the size and consistency of the direction (increase or decrease) of the estimated effects of IAH. We also considered mechanisms by which the relative effectiveness of care for IAH and comparison beneficiaries may have changed during the first year of the pandemic.

[20] For more information, refer to the evaluation report covering Years 1 to 4 of the IAH demonstration.

We conclude that IAH likely reduced spending in Year 7 by a substantial amount, although the true effect on total spending could have been much smaller or larger than the estimate of -$459 PBPM. This estimated effect was concentrated among beneficiaries who needed assistance from another person with most or all ADLs and was partly a function of reduced spending on hospital admissions. Because changes in the relative effectiveness of care for IAH and comparison beneficiaries may have played a large role in Year 7, and because of the limitations we describe in this chapter, interpretation of results in Year 7 must include an understanding that effects reflect the first year of the COVID-19 pandemic. These results cannot be generalized to other years or to providers other than the 10 practices that participated in IAH Year 7.

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