

Evaluation of the Independence at Home Demonstration

An Examination of the First Five Years

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I. INTRODUCTION

Section 3024 of the Patient Protection and Affordable Care Act (Public Law 111-148) enacted the Independence at Home (IAH) demonstration in 2010, which was intended to test a payment incentive and service delivery model for providing home-based primary care to chronically ill and functionally limited Medicare beneficiaries. 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 expenditures and improving health outcomes.

The legislation requires an independent evaluation to determine the impact of the demonstration on beneficiaries' Medicare expenditures and other health-related outcomes. This report describes our evaluation findings of the effects of the demonstration payment incentive through the fifth year of the IAH demonstration. It updates our previous evaluation report, which covered the first four years (Kimme et al. 2019).¹

A. Background on the IAH demonstration

Under current policy, the Medicare fee schedule provides a higher payment for primary care visits in a patient's home than in a clinician's office, regardless of the patient's health status. The IAH demonstration seeks to provide incentives to providers of home-based primary care who meet certain requirements in order to encourage lower cost, higher quality care. As part of the IAH demonstration, practices can earn incentive payments if their patients' Medicare expenditures are below the practice's target expenditures and the practice meets required standards for a set of quality measures. For the demonstration to produce cost savings for the Medicare program, there must first be a sufficient reduction in Medicare spending for patients of IAH practices compared with similar beneficiaries who did not receive home-based primary care. This reduction in Medicare spending and the cost of incentive payments paid by CMS must net out to lower overall spending.

Exhibit I.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 in providing home-based primary care to patients with several chronic illnesses
- Make in-home primary care visits and be available around the clock every day
- 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 The previous evaluation report is available at <https://innovation.cms.gov/initiatives/independence-at-home/>.

The law enacting the IAH demonstration describes the eligibility requirements for both practices and beneficiaries. Demonstration practices must have experience delivering home-based primary care and have teams led by physicians or nurse practitioners; the teams may also include physician assistants, clinical staff, and other health and social services staff. The practices must also adhere to guidelines consistent with providing high quality home-based primary care (Exhibit I.1). Beneficiaries who receive 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 I.2). Congress limited the demonstration to 10,000 beneficiaries.

The demonstration began with 15 sites in June 2012, and CMS added three sites in September 2012 for a total of 18 sites (Exhibit I.3). Four sites left the demonstration before Year 4. Thus, 14 sites contributed to this evaluation report. Year 5 of the demonstration ended in September 2017; however, Congress extended the demonstration for two more years as part of the Bipartisan Budget Act of 2018, and Year 6 began on January 1, 2019.

Exhibit I.2. Requirements for beneficiaries to participate in 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

All practices met the demonstration organizational requirements, as listed in Exhibit I.1. However, they had different structural characteristics and different approaches to delivering care. For example, the extent to which the practices were integrated with other health care providers varies. Five practices are part of the Visiting Physicians Association, which has a corporate leadership team that has sought to standardize operations and care delivery across all participating practices. Four practices are privately owned and not attached to an overarching health system or corporation. The remaining seven practices (including a consortium of three individual practices) are part of health systems affiliated with a university or medical school. Compared with other practices, the practices embedded in larger health systems had the potential to obtain more technical, managerial, and financial resources to implement the demonstration and manage patient care.

Exhibit I.3. IAH demonstration practices and number of beneficiaries by year

Demonstration practice location	IAH Year 1	IAH Year 2	IAH Year 3	IAH Year 4	IAH Year 5
	June 2012 – May 2013	June 2013 – May 2014	June 2014 – May 2015	October 2015 – September 2016	October 2016 – September 2017
Practices that participated in Years 1–5					
Austin, Texas	911	684	601	686	574
Boston, Massachusetts ^a	183	166	157	149	136
Brooklyn, New York	371	410	505	1,055	991
Cleveland, Ohio ^a	268	316	337	331	378
Dallas, Texas ^b	1,373	993	994	1,344	1,264
Durham, North Carolina	828	1,066	1,267	1,705	1,974
Flint, Michigan ^b	1,542	969	991	1,607	1,641
Jacksonville, Florida ^b	780	654	497	504	874
Lansing, Michigan ^b	524	526	702	652	611
Long Island, New York ^a	246	220	220	235	288
Milwaukee, Wisconsin ^b	514	553	634	575	489
Portland, Oregon	161	144	138	171	180
Richmond, Virginia (3 practices) ^{a,c,d}	290	311	280	277	323
Wilmington, Delaware ^a	25	254	241	213	235
Total IAH beneficiaries in analyses in this report	8,216	7,266	7,564	9,504	9,958
Practices that left the demonstration^e					
Atlanta, Georgia (2 practices) ^c	60	---	---	---	---
Chicago, Illinois (7 practices) ^{c,d}	202	---	---	---	---
Louisville, Kentucky	1,698	2,264	2,647	---	---
Stuart, Florida (2 practices) ^{c,d}	356	---	---	---	---

Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2011–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse.

^a These practices participated in health systems affiliated with a university or medical school.

^b These practices participated as part of the Visiting Physicians Association.

^c These practices participated as consortia.

^d Richmond, Chicago, and Stuart started Years 1 to 3 on September 1.

^e Practices that left the demonstration because they could no longer meet the demonstration requirements are excluded from the analyses in this report. Atlanta, Chicago, and Stuart left the demonstration during Year 2. Louisville left the demonstration after Year 3.

B. Background on home-based primary care

Home-based primary care can be delivered to many types of patients with diverse health care needs. The IAH demonstration was specifically designed to deliver home-based primary care to chronically ill and functionally limited older adults who have trouble accessing office-based care (see Exhibit I.2 for patient eligibility criteria). Only IAH practices’ patients who fit that

description were included in the demonstration. The goal was to ensure access to good primary care and prevent the need for care from an emergency department (ED) or hospital.

Although some previous research suggests that home-based primary care for chronically ill elderly patients reduces expenditures (Beck et al. 2009; De Jonge et al. 2014; Edes et al. 2014), other research found that expenditures were higher for IAH-eligible patients receiving home-based primary care compared with similar patients receiving office-based care (Kimmey et al. 2019). Also, a systematic review of nine studies of home-based primary care among older adults showed little evidence that this care reduced hospital utilization (Stall et al. 2014).

These conflicting results of the effect of home-based primary care on expenditures could be due to differences in study design, differences in the model of home-based primary care provided to participants, or both. Previous research shows substantial variation in how IAH practices provide home-based primary care and the settings in which they operate (Kimmey et al. 2019; Klein et al. 2017), and there may be even more variation among non-IAH practices (Leff et al. 2015). For example, two of the studies that showed expenditure reductions focused on a well-defined model operating within a single health system. By contrast, the study by Kimmey and colleagues, which showed higher costs for home-based primary care, included all practices that provided home-based primary care, regardless of the model of care offered.

C. Overview of the report

This evaluation report examines the effects of the IAH demonstration payment incentive on Medicare expenditures and key outcomes of health care use in each demonstration year through Year 5. We used a rigorous study design that accounted for trends before and during the demonstration in outcomes among IAH-eligible beneficiaries who received home-based primary care from IAH practices and IAH-eligible beneficiaries who did not receive home-based primary care. We also describe changes the IAH practices made to improve their performance and examine beneficiaries' and caregivers' satisfaction with the care they received from IAH practices.

II. WHAT WERE THE EFFECTS OF THE DEMONSTRATION PAYMENT INCENTIVE THROUGH YEAR 5?

This chapter presents the estimated effects of the payment incentive in terms of Medicare expenditures, hospital use, quality of care, and potential unintended consequences. It also describes beneficiaries' and caregivers' satisfaction with the care they received from IAH practices during the demonstration.

To examine the effects of the payment incentive, we conducted a difference-in-differences analysis of annual cross-sections of beneficiaries who met the IAH eligibility criteria. We measured the demonstration's effect as the change in IAH practices' patient outcomes after netting out any change from other trends in the health care system underway before and during the demonstration, as observed in the comparison group. The estimated effect reflects only the change in outcomes resulting from the payment incentive.

We refer to the beneficiaries who received care from an IAH practice as "IAH beneficiaries" or "the IAH group." The matched comparison group consisted of beneficiaries who met the same IAH eligibility criteria and lived in the same geographic area as the IAH beneficiaries but did not receive home-based primary care. We constructed a sample for each of seven years: two pre-demonstration years and five post-demonstration years. To examine beneficiaries' and caregivers' satisfaction with the care they received from IAH practices, we collected information from patients and their caregivers through a survey. To identify changes the IAH practices made to improve their performance overall and on quality measures tracked as a condition of participation in the demonstration, we collected information from practices each year about how they operated and identified the changes they made. For more information on the data, sample and methods we used for the analysis, see Appendix A.

The estimated reductions in total Medicare expenditures and some types of hospital use grew over time. However, most of these reductions were not statistically significant, and one practice that discontinued participation in the demonstration after Year 5 and no longer provides home-based primary care accounted for most of the estimated reductions. The following are key takeaways of the effects of the payment incentive:

- **The IAH payment incentive might have reduced total Medicare expenditures over the five years, but the estimated decrease was not statistically significant.** The estimated effect of IAH on total Medicare expenditures over the five years was a reduction of about \$200 (4.6 percent) per beneficiary per month (PBPM), which was not statistically significant. Because of the small sample size of the demonstration, we estimated that any reduction in expenditures smaller than \$306 PBPM would be unlikely to be statistically significant.
- **The IAH payment incentive reduced Medicare expenditures in Year 5—an effect that appeared to be driven by drops in hospital admissions and ED visits—but one practice that no longer provides home-based primary care greatly affected these estimates.** The estimated Year 5 effect was a statistically significant reduction of \$330 PBPM (7.5 percent). Consistent with this estimated effect, the number of hospital admissions fell by 129 per 1,000 beneficiaries per year (7.0 percent), and the number of ED visits fell by 201 per 1,000

beneficiaries per year (6.9 percent) in Year 5—both statistically significant results. However, one practice influenced the Year 5 effect much more than any other practice. When we excluded that practice from the sample, the estimated effects on expenditures and hospital use were much smaller and were not statistically significant.

- **The IAH payment incentive reduced the number of ED visits over the five years but did not appear to change the number of hospital admissions.** The demonstration had a statistically significant effect on ED visits over the five years, with the number of ED visits falling by 142 per 1,000 beneficiaries per year (4.9 percent). But the estimated effect on hospital admissions over the five years was not statistically significant.
- **The IAH payment incentive was associated with statistically significant reductions in potentially avoidable hospital admissions in Years 3 to 5, but it had no discernible effect on potentially avoidable ED visits or on the chance of having an unplanned readmission.** As with the expenditures and other outcomes in Year 5, the estimated effect on potentially avoidable hospital admissions was much smaller and was not statistically significant when we excluded the aforementioned practice that no longer provides home-based primary care.
- **We found no evidence that the IAH payment incentive affected the mortality rate or probability of entry into institutional long-term care.**
- **Most IAH practices did not perform well on the three practice-reported quality measures or did not value them enough to report for purposes of the demonstration.**
- **A large majority of patients and their caregivers reported high levels of satisfaction with home-based primary care, found it accessible, and said that clinicians take their opinions into account.**

A. Effects of the payment incentive on Medicare expenditures

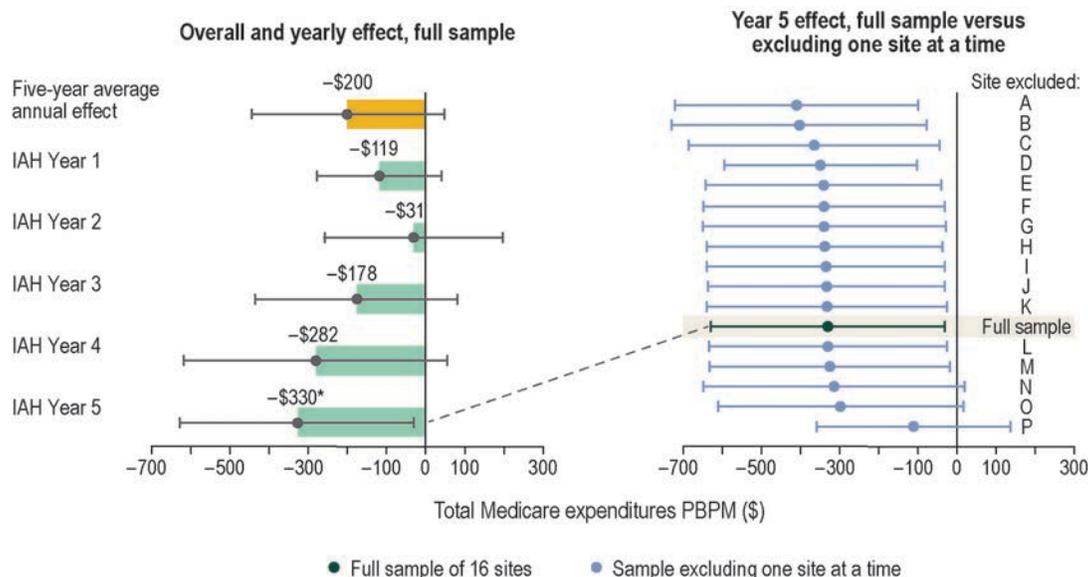
1. Overall effect

The payment incentive did not lead to a statistically significant reduction in Medicare total expenditures over the demonstration’s first five years. For the average participating beneficiary, expenditures decreased by \$200 PBPM, or 4.6 percent of the IAH beneficiaries’ mean expenditures in the year before the demonstration (Exhibit II.1). The confidence interval for the estimates was large and included zero, and thus we could not be sure that the demonstration reduced expenditures. In other words, the payment incentive might have reduced total expenditures by \$200 PBPM across the five years. But because of the limited number of sites and beneficiaries in the demonstration—a design feature driven by the congressionally imposed cap on beneficiaries—the evaluation was unlikely to detect an effect of this size as statistically significant.

The estimated reduction of \$200 PBPM was largely driven by reduced expenditures for inpatient care (-\$118 PBPM), but again, this estimate was not statistically significant (Appendix B, Exhibit B.2). Moreover, we did not find any impacts on most other types of expenditures—including physician services, outpatient services, skilled nursing facilities, home health services,

and hospice—over the five years. The only exception was a reduction in expenditures for durable medical equipment (DME), which was statistically significant (Appendix B, Exhibit B.4). The five-year effect of the demonstration on DME expenditures was an estimated -\$28 PBPM (18.8 percent). The changes made by some IAH practices, such as providing timely follow-up visits after hospital discharges and ED visits, might have prevented unnecessary or duplicative orders for DME, but we had no direct qualitative evidence to support this hypothesis.

Exhibit II.1. Estimated effect of the IAH payment incentive on Medicare expenditures, for all five years and by year



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2009–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH and matched comparison group beneficiaries in all IAH practices that participated in Year 5.

Notes: The total unweighted number of observations across all years was 295,292. The exhibit shows the five-year average annual effect and the estimated effect of each year. The horizontal lines represent 90 percent confidence intervals. If zero was within the confidence interval (denoted by horizontal lines), the estimated effect (denoted by dots) was not statistically significantly different from zero at the 90 percent confidence level. In this case, the large confidence intervals suggest that the estimated reductions in expenditures were associated with great uncertainty. When excluding one site at a time, we excluded separately each of the three sites in the Richmond-based consortium. Excluding Sites N, O, and P resulted in an estimated effect on total expenditures that was not statistically significant at the 90 percent confidence level. However, in contrast to the result without Site P, the estimated effects and confidence intervals when excluding Site N or O were similar to those of the full sample.

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

PBPM = per beneficiary per month.

2. Year 5 effect

In Year 5, the estimated reduction of \$330 PBPM for IAH beneficiaries—a reduction of 7.5 percent from average expenditures in the year before the demonstration—was statistically significant. We estimated a 79 percent chance of the payment incentive reducing Medicare expenditures by at least \$100 PBPM in that year (Appendix B, Exhibit B.3). To understand which practices drove this decrease, we re-estimated the regression, leaving out one practice at a

time.² Specifically, we estimated 16 regressions (treating each member of the Richmond-based consortium separately), with each regression excluding the IAH beneficiaries from one practice and their matched comparisons in all years. If all 16 regressions showed similar estimates as the main regression, we would conclude that all practices equally influenced the full sample estimate. On the other hand, if excluding a given practice substantially changed the estimated effect, we would conclude that the site strongly influenced the full sample estimate.

The estimated effects on total expenditures were similar when excluding any single practice, with one exception (Exhibit II.1). When we excluded one particular practice (Site P) from the regression, the estimated effect of IAH on expenditures in Year 5 was only -\$111 PBPM (Appendix B, Exhibit B.5); this amount represents about one-third of the full sample estimate (-\$330 PBPM) and was not statistically significant. On the other hand, when excluding each of the other 15 practices, the estimated effects were similar to the full sample estimate.³ This finding suggests that site P strongly influenced the estimated effect of the payment incentive on expenditures in Year 5. In fact, when we used an alternative weighting method that allowed each practice to equally influence the estimated effect in Year 5, the estimated effect calculated using the full sample of practices was fairly small (-\$131 PBPM) and not statistically significant (see Appendix C for detailed methods and results). This result provides further evidence that the estimated expenditure reduction in Year 5 was largely due to Site P.

Further analysis suggests that two factors contributed to Site P's large impact on the Year 5 full sample estimate. First, Site P had the most IAH-eligible beneficiaries of all practices in the baseline year (the year before the demonstration), making up about 18 percent of the sample. The sizeable influence of Site P at baseline matters because the Year 5 estimate reflects the difference in the change from baseline to Year 5 for IAH versus comparison beneficiaries.

Second, unlike most other IAH practices, IAH beneficiaries in Site P had much higher expenditures in the baseline year relative to their matched comparison beneficiaries (\$921 PBPM higher than the comparison; 17.6 percent higher). The expenditures of the two groups changed in opposite directions during the demonstration, and by Year 5, the IAH beneficiaries in Site P had slightly lower expenditures than the comparison beneficiaries did (-\$97 PBPM; 1.9 percent lower) in Year 5. In other words, the expenditures for the IAH beneficiaries in Site P decreased relative to their comparisons during the demonstration and because Site P was a large practice that served a particularly high-cost population in the baseline year, it greatly affected the estimated effect for the full sample.

² We could have estimated regressions separately for each site to obtain site-specific estimated effects. However, the statistical power for these regressions was too low with very small sample sizes at the site level. Estimating the regressions while excluding one site at a time enabled us to assess the influence of each site by comparing those estimates to the estimate from the full sample.

³ In addition to Site P, we also found that excluding Sites N and O resulted in an effect on total expenditures that was not statistically significant (Exhibit II.1). However, in contrast to the result without Site P, the estimated effects and confidence intervals when excluding Site N or O were similar to those of the full sample. Thus, the lack of statistical significance was likely driven by the smaller sample size after excluding those two practices.

The fact that one practice had such a strong impact on the result for the full sample suggests that the estimated effect of the payment incentive may change considerably in future demonstration years, depending on which practices remain in the demonstration. In fact, Site P was acquired by a larger organization in Year 3 of the demonstration, and the new owner stopped providing home-based primary care after the end of Year 5.

3. Aggregate effect

To estimate the aggregate effect of the payment incentive on expenditures across all IAH beneficiaries each year, we multiplied the PBPM expenditure reductions by the number of beneficiary months. Using the full sample, we found that the payment incentive might have reduced Medicare expenditures by about \$81.3 million over the five years, before accounting for the distribution of incentive payments to the IAH practices (Exhibit II.2). However, the 90 percent confidence interval was large, ranging from a cost decrease of approximately \$183.5 million to a cost increase of \$21.0 million, suggesting that the actual expenditure reduction could have been much more than \$81.3 million—or much less. The results also varied substantially depending on which practices we included in the estimation. For example, when excluding Site P, the aggregate results suggested an *increase* in Medicare expenditures of about \$4.3 million over the five years, with a 90 percent confidence interval ranging from -\$79 million to \$88 million (Appendix B, Exhibit B.6).

Exhibit II.2. Estimated aggregate effects of the IAH payment incentive on total Medicare expenditures and hospital use

	Total expenditures		Number of hospital admissions		Number of ED visits	
	Aggregate effect	90 percent CI	Aggregate effect	90 percent CI	Aggregate effect	90 percent CI
Year 1	-\$9,448,124	-\$22,116,947; \$3,220,699	-331	-766; 105	-794	-1,556; -32
Year 2	-\$2,162,808	-\$18,115,610; \$13,789,994	-174	-653; 304	-58	-632; 516
Year 3	-\$12,854,270	-\$31,623,671; \$5,915,131	-481	-1,075; 113	-903*	-1,794; -12
Year 4	-\$25,442,886	-\$55,868,337; \$4,982,565	-752	-1,618; 114	-1,504**	-2,493; -514
Year 5	-\$31,350,990*	-\$59,793,938; -\$2,908,042	-1,029**	-1,811; -248	-1,583**	-2,625; -542
Cumulative effect through Year 5	-\$81,277,070	-\$183,534,646; \$20,980,506	-2,784	-5,939; 371	-4,869***	-7,944; -1,794

Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2009–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH and matched comparison group beneficiaries in all IAH practices that participated in Year 5.

Notes: This exhibit shows the aggregate estimated effects for total Medicare expenditures, hospital admissions, and ED visits for IAH-eligible beneficiaries across all IAH practices in Years 1 through 5 of the demonstration. These calculations are based on the beneficiary-level estimates shown in Exhibits II.1, II.3, and II.4 and the number of IAH beneficiaries and beneficiary months in each year.

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

CI = confidence interval; ED = emergency department.

Despite the substantial uncertainty, comparing the aggregate results with the incentive payments made by CMS can shed light on the net savings (or costs) of the demonstration for Medicare. Over the first five years, CMS paid \$36,963,151 in incentive payments to IAH practices, whereas

we estimated that the incentive reduced expenditures cumulatively by \$81,277,070. The difference suggests an estimated net savings of \$44,313,919. But again, because the actual reduction in expenditures could have been much higher or lower than \$81,259,078, the actual net savings could have been much larger or smaller than \$44,313,919.

B. Effects of the payment incentive on hospital use

This section discusses the demonstration’s effect on hospital admissions and ED visits. In light of our findings on expenditures, we examined the influence of each individual practice on the estimated effects for the full sample.

As with total Medicare expenditures, we found no strong evidence that the demonstration reduced the number of hospital admissions over the five-year period (Exhibit II.3). However, the demonstration did have a statistically significant effect on ED visits, with the rate falling by 142 visits per 1,000 beneficiaries per year, or 4.9 percent (Exhibit II.4).

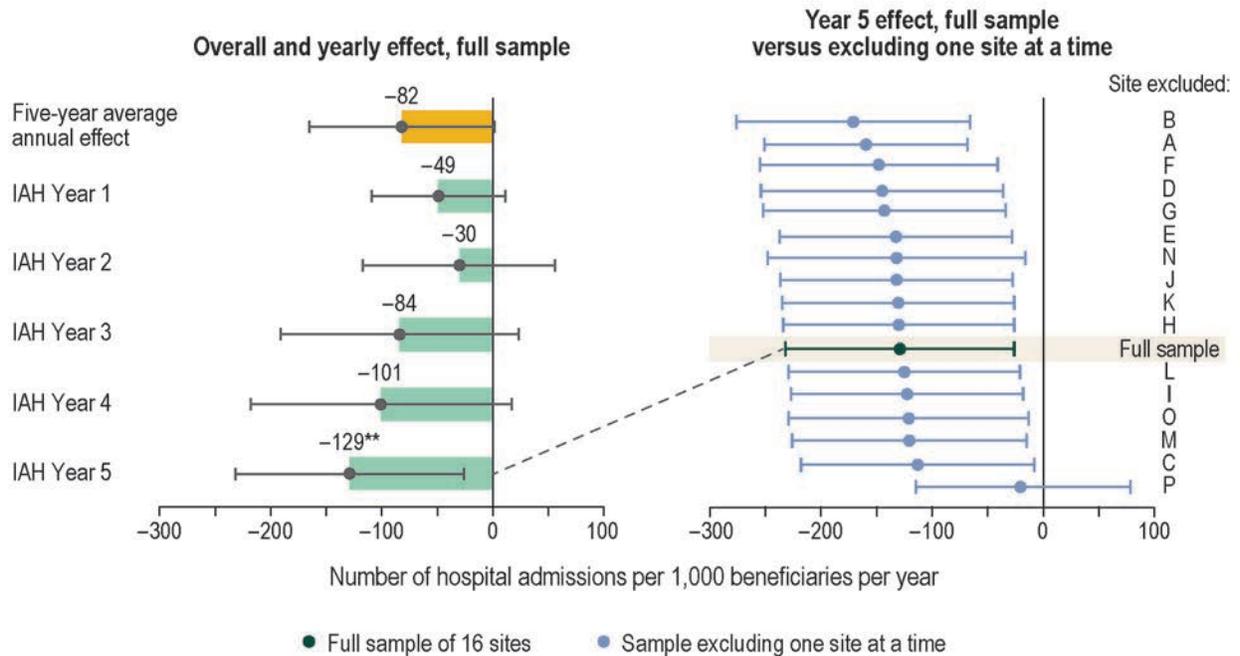
Also consistent with the effects on expenditures, the estimated effects of the payment incentive on reducing hospital care grew during Years 3 to 5. The payment incentive had no statistically significant effect on hospital admissions from Years 1 through 4, but the estimated effect grew in Year 5 and was statistically significant (a reduction of 129 admissions per 1,000 beneficiaries per year, or 7.0 percent). The growing difference in number of hospital admissions between IAH and comparison beneficiaries from Years 3 through 5 (Appendix B, Exhibit B.7) suggests that some IAH practices might have made changes that reduced hospital admissions.

The payment incentive was also associated with a statistically significant reduction of 201 ED visits per 1,000 beneficiaries per year (or 6.9 percent) among IAH beneficiaries in Year 5. This estimated effect was similar to the effect in Year 4, and it was larger in both Years 4 and 5 than in Year 3 (a statistically significant reduction of 153 ED visits, or 5.3 percent). The drop in total ED visits was mainly the result of a decrease in ED visits accompanied by a hospital admission, not outpatient ED visits (Appendix B, Exhibit B.7). This finding could mean that ED clinicians were less likely to admit a patient if they knew the patient would be closely followed by his or her primary care clinician (the IAH clinician) after hospital discharge. It could also suggest that some IAH beneficiaries’ chronic conditions were better managed than those of comparison beneficiaries.

The estimated decreases in ED visits and hospital admissions in Year 5 were generally consistent with our qualitative finding that the IAH sites sought to change their practices to improve care. In some cases, practices started and then discontinued strategies they deemed ineffective. But overall, many practices reported developing and continuing systematic approaches to following up rapidly on transitions in care—for example, by adding staff dedicated to tracking hospital admissions and discharges. Some practices also implemented quality improvement processes, and many of those practices said that their efforts extended beyond care and management of IAH patients to practice-wide changes such as tracking quality measures and auditing patients’ charts. In addition, some practices added social workers or other staff to coordinate care for their patients with other organizations; these practices reported that they improved relationships with

outside providers in an effort to reduce acute hospital care. However, we cannot rule out the possibility that IAH practices would have made some of the changes described above even without the demonstration.

Exhibit II.3. Estimated effect of the IAH payment incentive on hospital admissions, for all five years and by year

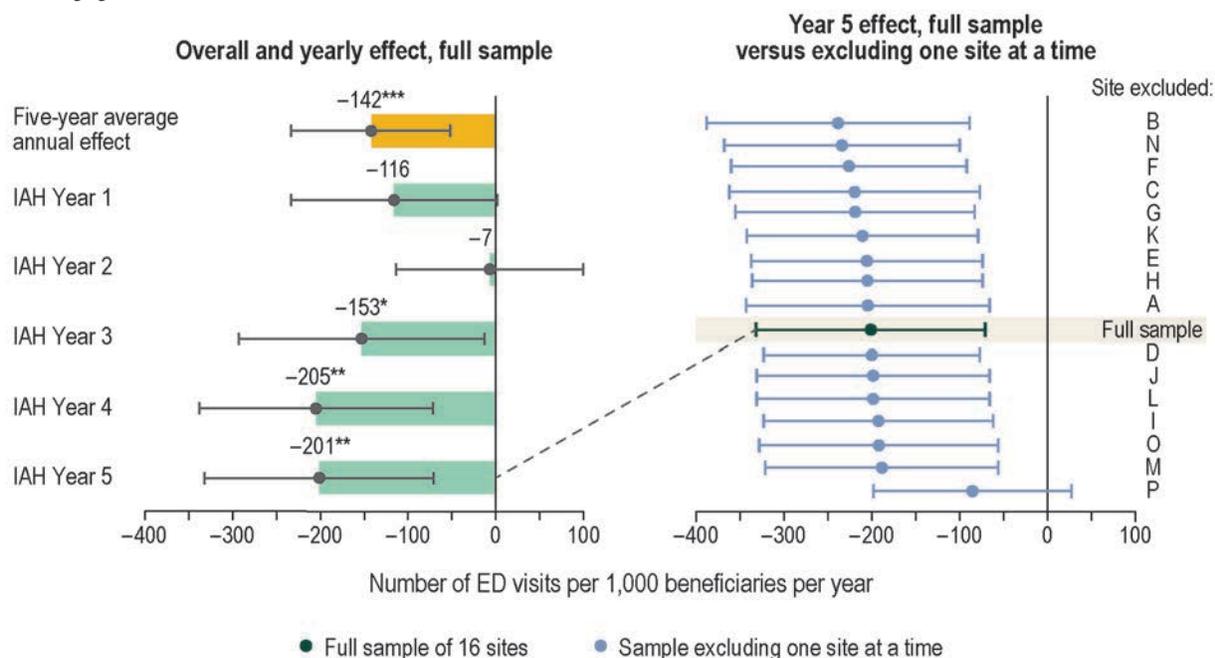


Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2009–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH and matched comparison group beneficiaries in all IAH practices that participated in Year 5.

Notes: The total unweighted number of observations across all years was 295,292. The horizontal lines represent 90 percent confidence intervals. If zero is within the confidence interval (denoted by horizontal lines), the estimated effect (denoted by dots) was not statistically significantly different from zero at the 90 percent confidence level. When excluding one site at a time, we excluded separately each of the three sites in the Richmond-based consortium. Excluding Site P resulted in an estimate effect on hospital admissions that was not statistically significant at the 90 percent confidence level.

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

Exhibit II.4. Estimated effect of the IAH payment incentive on ED visits, for all five years and by year



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2009–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH and matched comparison group beneficiaries in all IAH practices that participated in Year 5.

Notes: The total unweighted number of observations across all years was 295,292. The horizontal lines represent 90 percent confidence intervals. If zero is within the confidence interval (denoted by horizontal lines), the estimated effect (denoted by dots) was not statistically significantly different from zero at the 90 percent confidence level. When excluding one site at a time, we excluded separately each of the three sites in the Richmond-based consortium. Excluding Site P resulted in an estimate effect on ED visits that was not statistically significant at the 90 percent confidence level.

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

In all cases except one when we excluded beneficiaries in any single site from the sample, the estimated effects in Year 5 for hospital admissions and ED visits were similar to the estimated effects for the full sample, and they were statistically significant. The only exception was Site P; when excluding this site, the effects for hospital admissions and ED visits were much smaller and not statistically significant. The estimated reduction in admissions fell from 129 admissions per 1,000 beneficiaries per year for the full sample to only 20 admissions per 1,000 beneficiaries per year when excluding Site P. Likewise, the estimated reduction in ED visits fell from 201 ED visits per 1,000 beneficiaries per year for the full sample to 86 ED visits per 1,000 beneficiaries per year when excluding Site P.

This finding again indicates that Site P—due to its large size in the baseline period and decreases in hospital admissions and ED visits for IAH beneficiaries relative to the comparison group—had a major impact on the estimated effects of the demonstration on hospital use. Site P may have made changes in later demonstration years that led to less hospital use, but we found no strong qualitative evidence that tied the estimated reductions to specific changes in care delivery at the site.

In aggregate, among the 42,508 beneficiaries eligible for the demonstration during the first five years, we estimated that there were 2,784 fewer hospital admissions and 4,869 fewer ED visits (Exhibit II.2). We caution, however, that these estimates come from results that are not statistically significant, and there is considerable uncertainty around them. The true effects may have been much larger or smaller, and we cannot know with certainty if there was any effect.

C. Effects of the payment incentive on quality of care

1. Quality measures used to calculate incentive payments

To qualify for an incentive payment in each demonstration year, each practice must meet or exceed performance requirements on at least three of the six quality measures that are tied to the payment. Practices that meet requirements for fewer than three of the quality measures in a given year are not eligible for an incentive payment in that year. The quality measures are:

1. Follow-up contact within 48 hours of hospital admissions, hospital discharges, and ED visits for at least 50 percent of the events
2. Medication reconciliation in the home within 48 hours of hospital discharges and ED visits for at least 50 percent of the events
3. Patient preferences documented annually for at least 80 percent of IAH enrollees
4. Hospital admissions for selected ambulatory care-sensitive conditions less than or equal to average utilization in a similar population
5. ED visits for selected ambulatory care-sensitive conditions less than or equal to average utilization in a similar population
6. All-cause hospital readmissions within 30 days less than or equal to average utilization in a similar population

IAH practices reported data for the follow-up contact, medication reconciliation, and patient preferences process measures to the implementation contractor, and the contractor calculated the admission, ED, and readmission outcome measures using claims data. The implementation contractor used data for IAH enrollees to calculate performance on the six quality measures; for details about differences between the implementation contractor's count of IAH enrollees and the IAH beneficiaries used for the evaluation, see Appendix A. This section discusses whether performance on those measures improved over time and how the differences between practices may be related to the estimated effects of the demonstration on expenditures, admissions, and ED visits.

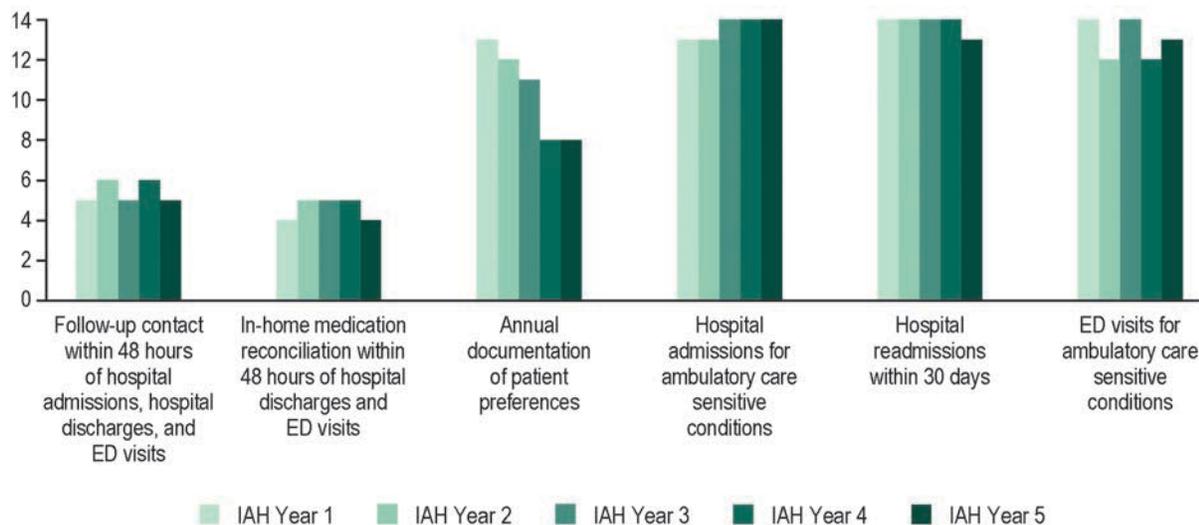
For five of the six measures, the number of practices that met the required standard for payment did not vary much over the five years (Exhibit II.5). The measure with the most variation over time was annual documentation of patient preferences; 13 of the 14 practices met the required standard for that measure in Year 1, but only 8 practices met the standard in Years 4 and 5. These results suggest that if the payment incentive affected performance on these measures, then the effect was constant for most practices on most measures. However, we cannot conclude that

the payment incentive affected performance because we do not have baseline data on these measures for IAH practices, nor do we have data for a comparison group.

In terms of follow-up contact and in-home medication reconciliation within 48 hours of hospital or ED use, reported performance differed widely across practices but was relatively constant over time within a practice (Exhibits II.6 and II.7). The five best-performing practices reported that they provided these services to at least 60 percent of their IAH enrollees on average from Years 1 through 5. But the eight worst-performing practices reported that they provided the services to 10 percent or less of their IAH enrollees, on average. Some of the worst-performing practices may have offered these services more often than reported, but they may not have been able to report them systematically. Alternatively, it is possible that some of the worst-performing practices could not (or chose not to) offer the services in most cases. For example, we were told during site visits that several IAH practices that were not part of a health care system or a regional health information exchange often did not know when their patients were admitted to or discharged from the hospital. Site P—the practice with the biggest impact on the full-sample results for expenditures, admissions, and ED visits—was one of the sites that reported low performance on follow-up contact and in-home medication reconciliation.

The results for documenting patient preferences differed markedly over time from the results for the other two process measures (follow-up contacts and in-home medication reconciliation). In Year 1, all but one of the practices exceeded the 80 percent threshold for documenting patient preferences, and the one practice that did not reach the threshold had a rate of 67 percent (Exhibit II.8). By Year 5, six practices fell below the 80 percent threshold, with three practices falling far below the threshold (40 percent or lower). Again, we do not know whether the sites whose performance worsened continued to gather most patients' preference information but did not report it—or if they gathered this information for fewer patients over time. Either way, the incentive did not motivate the sites to continue performing well on the patient preferences measure in the later years of the demonstration. The one practice that greatly influenced the full-sample results for expenditures, admissions, and ED visits (Site P) was the only practice that did not reach the threshold required for payment on the patient preferences measure in any year.

Exhibit II.5. Number of IAH practices that met standard required to receive incentive payment, by year and quality measure



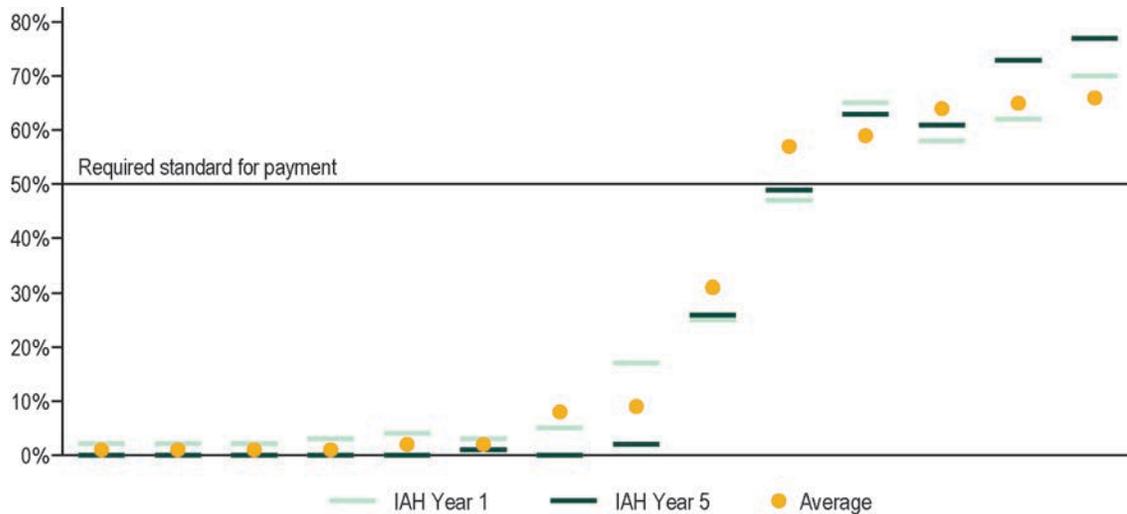
Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor.
 Note: These measures apply only to beneficiaries enrolled in the IAH demonstration.
 ED = emergency department.

Exhibit II.6. Percentage of IAH enrollees in each practice who received a follow-up contact from the IAH practice within 48 hours of hospital admission, hospital discharge, and emergency department visit, in IAH Years 1 and 5 and five-year average



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor.
 Notes: Each yellow circle indicates the average performance of an IAH practice over Years 1 to 5. Practices are ranked by average performance. The light green bar shows the practice’s performance in Year 1, and the dark green bar shows the its performance in Year 5. This measure applies only to beneficiaries enrolled in the IAH demonstration.

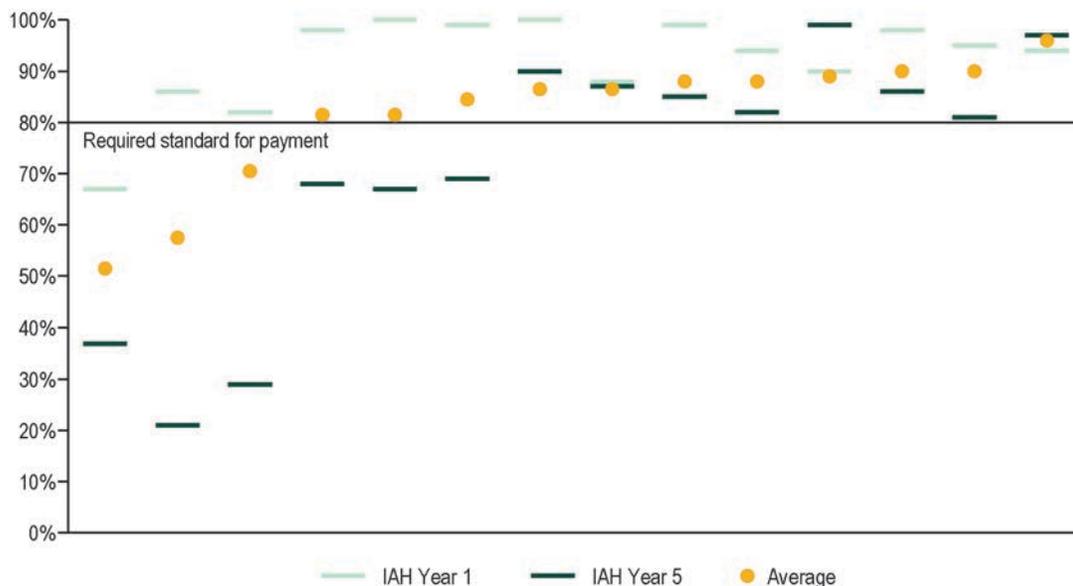
Exhibit II.7. Percentage of IAH enrollees in each practice who received in-home medication reconciliation from the IAH practice within 48 hours of hospital discharge and emergency department visit, in IAH Years 1 and 5 and five-year average



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor.

Notes: Each yellow circle indicates the average performance of an IAH practice over Years 1 to 5. Practices are ranked by average performance. The light green bar shows the practice’s performance in Year 1, and the dark green bar shows its performance in Year 5. This measure applies only to beneficiaries enrolled in the IAH demonstration.

Exhibit II.8. Percentage of IAH enrollees in each practice whose preferences were documented by the IAH practice, in IAH Years 1 and 5 and five-year average



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor.

Notes: Each yellow circle indicates the average performance of an IAH practice over Years 1 to 5. Practices are ranked by average performance. The light green bar shows the practice’s performance in Year 1, and the dark green bar shows its performance in Year 5. This measure applies only to beneficiaries enrolled in the IAH demonstration.

2. Estimated impacts on potentially avoidable hospital use, ED visits, and readmission

Using the same analytic approach we used for expenditures and hospital use, we examined whether practices reduced readmissions, potentially avoidable hospital admissions, and potentially avoidable ED visits in their efforts to meet the quality standards required to receive an incentive payment. We also examined any changes IAH practices made to care delivery to reduce overall expenditures.

The demonstration was associated with a statistically significant reduction in the number of potentially avoidable hospital admissions in Years 3 to 5, with an estimated reduction of 36 to 58 admissions per 1,000 beneficiaries per year (7.9 to 12.8 percent, Exhibit II.9). However, the number of potentially avoidable hospital admissions also changed during the two years before the demonstration in a way that was statistically significantly different for the IAH group versus the comparison group. In other words, the estimated effect of the demonstration on these admissions could be a result of different trends between the two groups in the pre-demonstration years—trends that may have continued into the demonstration.

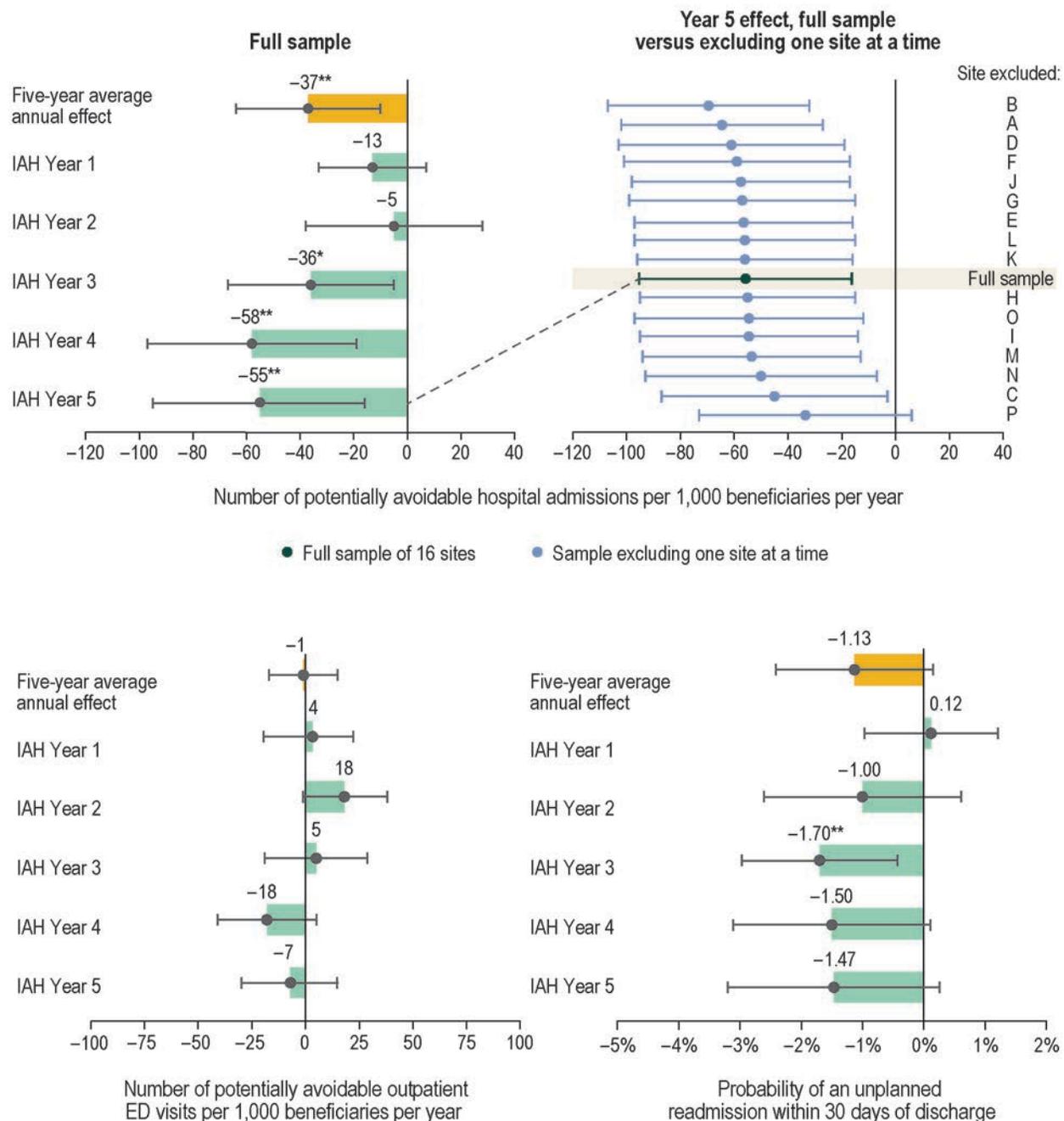
Since the estimated effect of the payment incentive on potentially avoidable hospital admissions in Year 5 was statistically significant, we examined the influence of each individual practice on the full sample result. Site P heavily influenced the estimated effect of the demonstration on potentially avoidable hospital admissions in Year 5. In Year 5, the estimated decrease in potentially avoidable admissions for the full sample was 58 per 1,000 beneficiaries per year. But when we excluded Site P, the estimated decrease was about half that size (33 per 1,000 beneficiaries per year), and the result was no longer statistically significant. Because of the twin threats of the pre-demonstration trend and the strong influence of Site P, we recommend using caution when interpreting these results.

We did not find evidence that the demonstration changed the number of potentially avoidable outpatient ED visits in any year (Exhibit II.9 and Appendix B, Exhibit B.8). As noted above, we found estimated reductions in ED visits accompanied by a hospital admission and potentially avoidable hospital admissions. If we assume that potentially avoidable hospital admissions are correlated with potentially avoidable ED visits that led to a hospital admission, these results suggest that the decrease in total ED visits may have been partly driven by a drop in potentially avoidable ED visits that led to a hospital admission.

Responses to our survey of IAH beneficiaries and caregivers provide some context for the practices not being able to change the number of potentially avoidable outpatient ED visits despite their attempt to respond to the IAH payment incentive. According to our survey, a sizable minority of beneficiaries and caregivers would prefer to visit the ED—instead of contacting the IAH practice—if they were unsure whether symptoms required emergency care. Beneficiaries commonly cited two reasons why they would not contact the IAH practice: (1) the beneficiary’s caregiver or someone else prefers that the beneficiary go directly to the ED, and (2) the beneficiary feels that the ED provides better and more convenient care when it is unclear whether a problem is serious.

Finally, we did not find consistent evidence that the demonstration was associated with changes in the chance of having an unplanned readmission over the five-year period (Exhibit II.9).

Exhibit II.9. Estimated effects of the IAH payment incentive on potentially avoidable use of care and on readmission, for all five years and by year



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2009–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH and matched comparison group beneficiaries in all IAH practices that participated in Year 5.

Exhibit II.9 continued

Notes: The total unweighted number of observations across all years was 295,292. The horizontal lines represent 90 percent confidence intervals. If zero was within the confidence interval (denoted by horizontal lines), the estimated effect (denoted by dots) was not statistically significantly different from zero at the 90 percent confidence level. The probability of unplanned readmission equals zero for beneficiaries who did not have a qualifying hospital discharge or an unplanned readmission within 30 days of a qualifying hospital discharge during the measurement period. When excluding one site at a time, we excluded separately each of the three sites in the Richmond-based consortium. Excluding Site P resulted in an estimate effect on potentially avoidable hospital admissions that was not statistically significant at the 90 percent confidence level.

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

ED = emergency department.

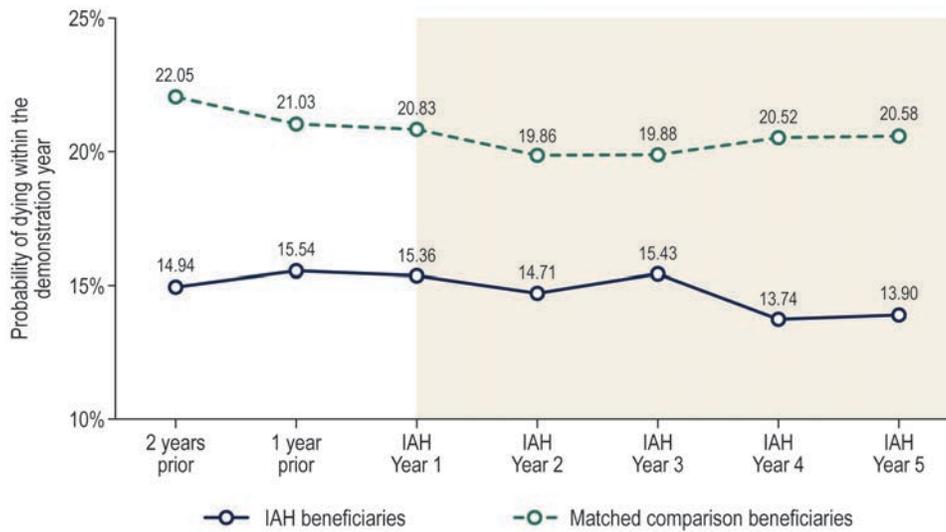
D. Effects of the payment incentive on unintended consequences

Besides examining the effects of the demonstration on expenditures and hospital and ED use, we examined potential unintended consequences of the demonstration. With any payment incentive designed to reduce expenditures and hospital use, concern about adverse health effects arises; such effects can lead to higher mortality for a frail, elderly population such as IAH beneficiaries. Another concern is that IAH practices might try to reduce Medicare expenditures by referring especially costly patients to institutional long-term care facilities because beneficiaries in long-term care are disenrolled from the demonstration and excluded from incentive payment calculations. We therefore examined whether the demonstration was associated with an increased risk of mortality and probability of entering institutional long-term care.

We found no compelling evidence that the demonstration adversely affected the mortality rate across the five demonstration years. In the first three years, there was no effect of IAH on the probability of dying in each year (Exhibit II.10). In Years 4 and 5, mortality rates among IAH beneficiaries fell, whereas rates for the comparison group grew, suggesting that, if anything, the payment incentive may have decreased the mortality rate during these years. However, mortality rates for the IAH group rose significantly relative to the comparison group before the demonstration, which means that the mortality trends in the IAH group and comparison group were not the same before IAH began. Given that the baseline mortality rate changed differently for the two groups, we cannot confidently ascribe any post-demonstration changes in mortality to IAH. Also, none of the qualitative data we collected suggested that changes made by the practices were intended to affect the mortality rate of IAH beneficiaries in Years 4 and 5.

As with mortality, we did not find evidence that the payment incentive was associated with any change in the probability of IAH beneficiaries entering institutional long-term care (Exhibit II.11). Both IAH beneficiaries and their matched comparisons followed similar trends in the probability of entering institutional long-term care, which fell gradually from the pre-demonstration years throughout the demonstration period. This falling trend was consistent with the national trend of shifting from institutional to community-based care for patients who need long-term supports and services (Eiken et al. 2018).

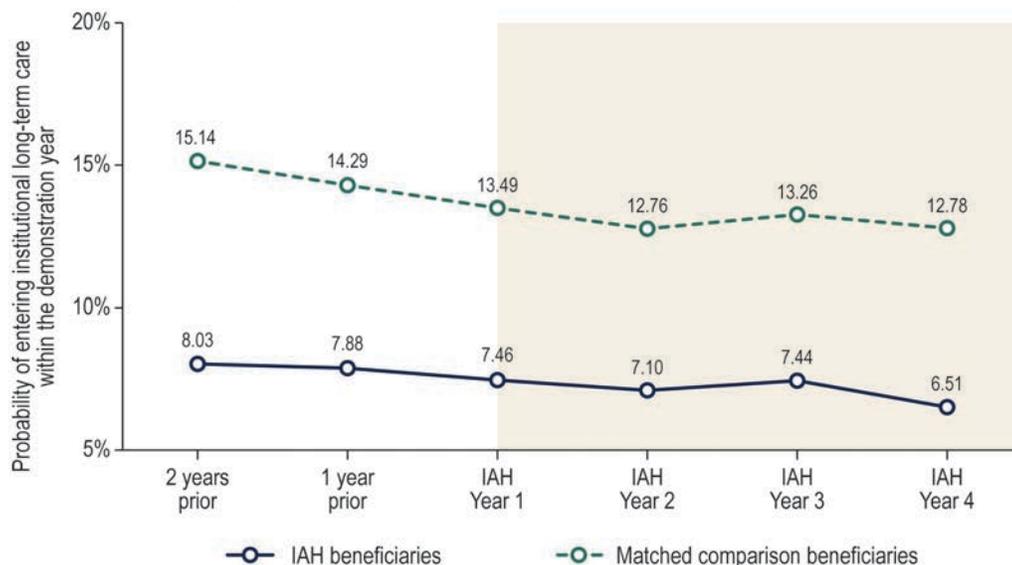
Exhibit II.10. Regression-adjusted probability of dying in each year for IAH and comparison beneficiaries



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2009–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH and matched comparison group beneficiaries in all IAH practices that participated in Year 5.

Notes: The exhibit shows regression-adjusted means obtained by applying the estimated regression coefficients to the covariates of IAH beneficiaries in Year 5. The total unweighted number of observations across all years was 295,292.

Exhibit II.11. Regression-adjusted probability of entering institutional long-term care in each year for IAH and comparison beneficiaries



Source: Mathematica’s analysis of data from the Independence at Home (IAH) implementation contractor and 2009–2017 Medicare claims and enrollment data from the Chronic Conditions Warehouse for IAH and matched comparison group beneficiaries in all IAH practices that participated in Year 5.

Notes: The exhibit shows regression-adjusted means obtained by applying the estimated regression coefficients to the covariates of IAH beneficiaries in Year 5. The total unweighted number of observations across all years was 243,947.

E. How did beneficiaries view their care?

Regardless of the introduction of the payment incentive, beneficiaries and caregivers were pleased with the care they received from IAH practices in the early years of the demonstration. About 93 percent of beneficiaries and caregivers said that they were either satisfied or very satisfied with the overall quality of care they had received from their IAH practice in the past six months.⁴ A large majority of beneficiaries preferred receiving primary care in their home much more than in an office or clinic, and a similarly large share of caregivers preferred that the beneficiary receive primary care at home.

⁴ For more information about beneficiary and caregiver perspectives on the demonstration and survey methods, see Kimmey et al. (2019).

III. CONCLUSION

Congress created the IAH demonstration to test a combined payment incentive and service delivery model for Medicare beneficiaries who have multiple chronic conditions and functional limitations. This report presents our evaluation of the effects of the demonstration payment incentive through Year 5.

Our most recent findings suggest that the IAH demonstration incentive may have reduced expenditures and use of some types of hospital care, but these results were strongly influenced by a single practice that withdrew from the demonstration after Year 5 and no longer provides home-based primary care. When interpreting the estimated effects of the IAH payment incentive on expenditures and hospital use, we considered changes reported by IAH practices, the consistency of the direction (increase or decrease) of the estimated effects, and the possibility that the effects grew during the five-year period. In addition, because of the small sample size of the demonstration, there was little chance that we would detect a reduction in expenditures of \$200 PBPM—the five-year average annual effect of IAH on expenditures—as statistically significant. Taken together, these considerations suggest that the payment incentive could have decreased expenditures and hospital use, particularly in the later years of the demonstration. Yet, the possible effects on expenditures and use of some types of hospital care were driven by one practice. Because this practice discontinued participation in the demonstration after Year 5 and no longer provides home-based primary care, it may not be representative of the other practices in the demonstration and so the estimated Year 5 effect that includes that practice may be of limited interest for understanding the cost and utilization implications of the demonstration.

We examined only the practices that took part in the demonstration, so the findings may not apply to other practices that deliver home-based primary care. We also did not assess how the payment incentive might affect outcomes for Medicare beneficiaries who were treated by IAH practices but were not eligible for the demonstration. Furthermore, there could have been differential changes over time in unobserved characteristics of IAH and comparison beneficiaries, potentially causing bias in the estimated effects of the payment incentive. For example, the greater expenditure reductions estimated in Years 4 and 5 coincided with several IAH practices joining accountable care organizations (ACOs). However, we have not analyzed whether ACO participation may have raised or lowered expenditures in Years 4 and 5.

Beneficiaries served by the IAH practices were quite satisfied with home-based primary care, but several features of the demonstration may have limited its effectiveness to demonstrate any reductions in utilization and spending and improvements in quality. First, the beneficiary eligibility criteria made it challenging to use administrative data to identify IAH patients and comparison beneficiaries who were at the same stage in their disability and chronic illnesses. For example, the IAH criteria identified patients who were temporarily disabled (while recovering from surgery, for instance) as well as those who were permanently disabled. We could not identify the duration of disability in administrative data, making it impossible to identify comparison beneficiaries who were at the same stage in their disability and chronic illnesses—an especially difficult issue because many of the eligible beneficiaries were near death.

Second, although the quality measures used to calculate incentive payments were purportedly important for home-based primary care, most IAH practices did not perform well on the three practice-reported measures or did not value them enough to report for purposes of the demonstration. Eight IAH practices did not meet the performance threshold for follow-up contact and in-home medication reconciliation within 48 hours of hospital or ED use through the fifth year of the demonstration. Most of those eight practices averaged scores of less than 10 percent across the five years, indicating that they were unable to follow up with patients consistently or did not consider the measures important enough to monitor and report. Also, the number of practices meeting the threshold for the third practice-reported quality measure—annual documentation of patient preferences—decreased substantially between the first and fifth years of the demonstration.

Finally, because Congress limited the first five years of the demonstration to 10,000 beneficiaries per year, the number of participating practices was small, and the number of beneficiaries who met the demonstration criteria was a subset of those practices' patients. With such small numbers of participants, site-level payment calculations and evaluation results may be subject to random fluctuations, limiting the evaluation's ability to draw sound conclusions about whether the payment incentive reduced Medicare expenditures for patients who received home-based primary care.

The results of the evaluation may suggest that the IAH incentive structure is not a sufficiently strong intervention for improving care patterns in IAH practices that deliver home-based primary care to chronically ill and functionally limited Medicare beneficiaries. It might be reasonable to see few or no notable results in Year 1 or 2 of the demonstration, as any changes made by IAH practices in response to the payment incentive may not have had time to reduce expenditures. However, after examining data through Year 5, there is little evidence to suggest that the payment incentive in the IAH demonstration decreased Medicare spending.

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