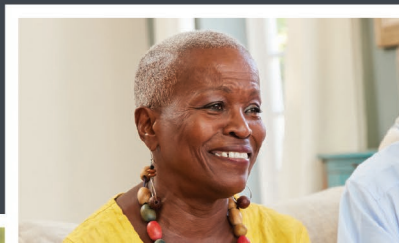


Supporting Aging in Place Through IWISH:



Results from the First Phase of the Supportive Services Demonstration



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Supporting Aging in Place Through IWISH:

Results from the First Phase of the Supportive Services Demonstration

Submitted to
U.S. Department of Housing and Urban Development

Submitted by
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December 22, 2022

About This Document

This report presents the findings of the first phase of the Supportive Services Demonstration for Elderly Households in HUD-Assisted Multifamily Housing. The U.S. Department of Housing and Urban Development (HUD) sponsored the Supportive Services Demonstration to test the impact of housing-based supportive services on the healthcare use and housing stability of low-income adults age 62 and older living in HUD-assisted multifamily properties. This is the third report produced by the evaluation team. The evaluation will continue as the second phase of the evaluation is implemented and additional findings emerge.

Acknowledgments

The authors of this report gratefully acknowledge the efforts of the many individuals who worked on the study and helped produce this report. We owe particular thanks to the study's Contracting Officer's Representatives, Jeffrey Chen and Leah Lozier of HUD's Office of Policy Development & Research (PD&R), for providing support and expert guidance on all aspects of the research design, data collection, and analysis. The authors also thank PD&R's Joseph Downes, Craig Pollack, Elizabeth Rudd, Mark Shroder, Carol Star, and Jennifer Turnham for their thoughtful feedback on report drafts. From HUD's Office of Multifamily Housing, we thank Elizabeth Cochran Fernandez, Belinda Koros, Margaret Poethig, and Katina Washington for their feedback and program knowledge.

This study boasts an outstanding technical expert panel composed of researchers, practitioners, and public policy experts, who provided feedback on this report and on the evaluation design. Members of the expert panel are Mara Blitzer, City and County of San Francisco; Melanie Brown, Centers for Medicare & Medicaid Services (CMS); Bruce Chernof, SCAN Foundation; Partha Deb, Hunter College; Tim Engelhardt, CMS; Kosuke Imai, Harvard University; Cindy Mann, Manatt Health; Sandy Markwood, National Association of Area Agencies on Aging; J. Michael McWilliams, Harvard Medical School; Michelle Missler and Janice C. Monks, American Association of Service Coordinators; Alexandra Nassau-Brown, Stewards of Affordable Housing for the Future; Lori Simon-Rusinowitz, University of Maryland; and Emily Rosenoff, Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services.

Many people at Abt Associates—in addition to the named authors—contributed to this report. Jill Khadduri and Sara Galantowicz provided expert guidance and feedback. Kimberly Groover, Derek Hoodin, Kim Altunkaynak, Valerie Aschenbach, and Peiyi Zhang contributed to the analysis. Caroline Logan and Ian Caughlan helped the study team obtain Medicaid and Medicare claims data. Elizabeth Giardino, Tresa Kappil, Anna Robinson, and Cayla Roby contributed to the qualitative data collection and analysis. Abt's Bry Pollack provided technical editing of the draft report. Katheleen Linton and Erin Miles helped design the graphics.

Most important, we thank the residents, staff, and leadership of the properties in the demonstration who participated in interviews with the study team and provided data and information on their programs.

Foreword

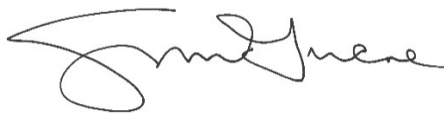
HUD’s Supportive Services Demonstration rigorously tests the housing-based Integrated Wellness in Supportive Housing (IWISH) model of service coordination that HUD launched in 2017. The IWISH model leverages coordinated service delivery to address the interdependent health and service needs of elderly persons, who are also referred to in this document as older residents or older adults, in HUD-assisted properties. The demonstration examines whether structured health and wellness supports provided at project sites can help reduce avoidable healthcare costs, such as the unnecessary use of emergency care, and help low-income older adults who live in affordable housing successfully age in place.

The demonstration funds a full-time Resident Wellness Director and part-time Wellness Nurse to work at 40 HUD-assisted housing developments that predominately or exclusively serve households headed by older adults. The Resident Wellness Director and Wellness Nurse proactively engage residents and implement a formal strategy for coordinating services and supporting resident wellness. The evaluation is among the first rigorous, randomized-controlled trials to assess the housing and healthcare outcomes of a housing-based, supportive services coordination model.

This report is the third in a series. The first report, *Supporting Aging in Place Through IWISH: First Interim Report from the Supportive Services Demonstration*, provided an overview of resident characteristics and described the first 18 months of implementation. The second report, *Supporting Aging in Place Through IWISH: Second Interim Report from the Evaluation of the Supportive Services Demonstration*, described the first 36 months of implementation.

This report provides a quantitative analysis of the impact of the IWISH model on healthcare utilization, housing tenure, and transitions to long-term care facilities from October 2017 to September 2020. The third year of the demonstration coincided with the onset of the COVID-19 pandemic, which temporarily disrupted demonstration activities and fundamentally affected healthcare delivery and demand nationwide. The quantitative analysis did not detect a statistically significant impact on the main outcomes being tested, but some indications exist—consistent with the earlier qualitative findings—that the model can affect measures of resident wellness when fully implemented. Furthermore, the success of the IWISH model depends on the availability of adequate social and health services in the community to which older adults can be connected. Findings from supplementary analysis imply that the IWISH model may be effective at reducing rates of emergency care utilization for subgroups with greater healthcare needs, as well as the positive value of the existing HUD Multifamily Service Coordinator program.

Originally funded to end in September 2020, Congress has extended the Supportive Services Demonstration until 2023. This extension will permit the examination of outcomes over a longer period (2017–23) as the country moves out of the most acute phase of the pandemic. This longer window of observation will also permit additional data collection and analysis, including further analysis of healthcare utilization by incorporating Medicare Advantage data not available for this report’s analysis.



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Executive Summary

The U.S. Department of Housing and Urban Development (HUD) sponsored the Supportive Services Demonstration to learn whether structured health and wellness support can help older adults living in privately owned HUD-assisted housing developments remain in that housing longer, or “age in place.” The model tested through the demonstration is called Integrated Wellness in Supportive Housing (IWISH). The IWISH model funds two onsite health and wellness staff positions in HUD-assisted multifamily properties to better address the health, housing, and social service needs of adults aged 62 and older: a Resident Wellness Director and a Wellness Nurse. Through a rigorous, cluster-randomized controlled trial evaluation of IWISH in housing developments in seven states, the demonstration tests whether IWISH affects (1) the length of stay in housing by reducing transitions to long-term care facilities, (2) unplanned hospitalizations and the use of other types of acute health care, and (3) the use of primary and nonacute care.

This report presents the evaluation findings of the initial 3-year period of the demonstration, which Congress funded from October 2017 through September 2020; in 2021, Congress funded the extension of the demonstration for another 2 years. A final report on the implementation and impacts of the IWISH model over the entire 6-year period¹ is planned for 2026.

Background of the Supportive Services Demonstration

HUD provides affordable rental housing to nearly 1.8 million elderly households, defined as households with one or more persons at least one of whom is 62 years of age or older at the time of initial occupancy. Approximately 40 percent of those households live in HUD-assisted housing developments for older adults, housing that is made affordable for the residents through HUD rental assistance contracts with private owners. The proportion of HUD-assisted households that include individuals aged 62 and older has been increasing in recent decades, and most Americans prefer to continue to live independently for as long as possible. Therefore, HUD is examining how its assisted housing programs can best help older adults stay in an independent housing setting as they age.

Overall, approximately one-half of privately owned HUD-assisted housing developments for older adults have an onsite Service Coordinator, funded through HUD’s Multifamily Service Coordinator program, who refers residents to community services and helps them access public benefits. The IWISH demonstration funds onsite services staff beyond the resources usually available to HUD-assisted properties: a full-time (40 hours a week) Resident Wellness Director and a part-time (20 hours a week) nonclinical Wellness Nurse for every 100 to 115 residents living at a property. The Resident Wellness Director is an enhanced Service Coordinator who, in addition to helping connect residents to social services, also focuses on residents’ health and wellness. The Wellness Nurse provides health education and health monitoring for residents. Both positions work together at the property to identify residents’ individual health and supportive services needs and to coordinate services and programming for residents.

IWISH properties with existing Service Coordinator programs received supplemental funding for the Service Coordinator to assume the greater responsibilities of the Resident Wellness Director role and for supporting the new Wellness Nurse position. The demonstration also provides supplemental funding for health and wellness programming.

¹ A 1-year gap occurred between the initial period and the extension period, during which program activities were conducted at some sites.

Integrated Wellness in Supportive Housing (IWISH) Model

The goal of IWISH is to promote aging in place for residents of HUD-assisted properties, especially by delaying transfers to a long-term care institution. Longer tenure rates and lower exit rates are desirable outcomes for multifamily housing owners and managers because of the substantial costs associated with turning units over and, for residents, because most prefer to age in place.

Primary responsibility for implementing the IWISH model lies with the two resident wellness staff positions that are funded through the Supportive Services Demonstration grant.

The core components of the model are as follows:

- **Proactive engagement by the two resident wellness staff** to maximize participation and to make sure residents understand what IWISH has to offer.
- **Standardized resident health and wellness assessments** at enrollment and annually thereafter so that Resident Wellness Directors and Wellness Nurses understand resident needs and priorities more comprehensively.
- **Individual and community plans for healthy aging** to help residents identify and meet wellness goals.
- **A web-based case management data platform** to record information about IWISH participants, assessment data, healthy aging plans, and use of programming and service coordination.
- **Partnerships with healthcare and social service providers** to coordinate services and to enhance opportunities and resources for residents.
- **Evidence-based health and wellness programming** to address the needs of residents. Each IWISH property received \$15 per unit per month to help meet IWISH participants' health and wellness needs and to support IWISH goals.

The Resident Wellness Director and Wellness Nurse work together to implement the six core components. In addition, they help residents individually as their needs dictate and as residents agree to be helped. This individual assistance includes helping residents self-manage their medication, interacting with their healthcare providers and caretakers on residents' behalf, and helping residents successfully transition back into their home from a hospital or nursing home stay. For the first 3 years of the demonstration, HUD funded an implementation team (separate from the evaluation team) to provide support to the Resident Wellness Directors and Wellness Nurses in implementing the IWISH model.

Evaluation of the IWISH Model Impacts and Implementation

To ensure a rigorous analysis of the IWISH model's impacts, the Supportive Services Demonstration was designed as a cluster-randomized controlled trial. In 2016, HUD randomly assigned 124 properties that predominantly serve older adults in seven states either to the IWISH group (40 properties that would implement IWISH) or to a control group (84 properties that would not receive the funding to implement IWISH). The 40 IWISH properties were initially funded to implement the IWISH model for a 3-year period from October 2017 through September 2020.

Most IWISH and control properties in a state are in the same metropolitan area, and many are in the same neighborhood. The demonstration properties are in one of two HUD multifamily rental assistance programs: the Section 202 Project Rental Assistance Contract (PRAC) program or the Section 8 Rental Assistance program. Both IWISH and control properties predominantly serve older adults. Before the

demonstration, approximately two-thirds of IWISH and control properties had a Service Coordinator, and none of them had housing-based nurses or other healthcare providers. According to HUD administrative data, 4,274 residents were living at the IWISH properties and 9,970 were living at the control properties at the start of the demonstration. The residents of IWISH properties were similar in age, sex, race, ethnicity, and household size to the residents of the control properties.

HUD contracted with the study team of Abt Associates and its partner L&M Policy Research to evaluate how the IWISH model was implemented at the 40 properties (implementation study) and to assess whether IWISH had an effect on residents' tenure or use of healthcare services (impact study). The evaluation's impact study linked individual resident data from HUD with Medicare fee-for-service (FFS) and state Medicaid data and compared healthcare utilization and tenure for residents living in the IWISH properties with those outcomes for residents living in the control properties.

For the implementation study, the study team analyzed IWISH program data and interviewed staff at IWISH and control properties. Using information from the analysis of program and interview data, the team developed a rating system to measure the extent to which IWISH properties implemented the core components of the model over the 3-year demonstration period. The study team also documented how residents, services staff, and property management perceived the IWISH model and its benefits for residents.

Impacts of the IWISH Model at Year 3

The evaluation of the Supportive Services Demonstration looked for evidence of the IWISH model's impact on a range of outcomes during the first 3 years of the demonstration, from October 2017 through September 2020.

In consultation with HUD and an expert panel of policymakers, practitioners, and academics, the study team identified four main **research questions** at the outset of the demonstration to frame IWISH's impacts on residents. The team selected four **confirmatory outcomes** to answer the research questions and determine whether the goals of IWISH were met. **Secondary outcomes** are additional indicators tied to the logic of how the IWISH model was expected to influence outcomes related to each of the four research questions.²

Exhibit ES-1 presents the impact study's research questions and the full set of outcome measures that were analyzed for each research question.

² Randomized controlled trials designate some outcome measures as secondary (or exploratory) to overcome the "multiple comparisons problem." When impact analysis measures many outcomes, some apparently significant outcomes might instead represent random chance. A demonstration or other program is considered to have produced secondary impacts only when those impacts show a consistent pattern.

Exhibit ES-1. Demonstration Research Questions and Confirmatory and Secondary Outcomes

Research Question and Confirmatory Outcome	Secondary Outcome
1. What is the impact of IWISH on housing exits and resident tenure?	
Residency ended, for any reason	Residency ended due to death
2. What is the impact of IWISH on transitions to long-term institutional care?	
Residency ended, transition to long-term care	Days in a long-term care institution
3. What is the impact of IWISH on utilization of Medicare and Medicaid covered primary care and other nonacute healthcare services?	
Number of days with a primary care (evaluation and management) visit	New use of specialty care services: cardiology, rheumatology, endocrinology, ophthalmology
3. What is the impact of IWISH on utilization of Medicare and Medicaid covered unplanned hospitalizations and other acute care?	
Total days of unplanned hospitalization	Unplanned hospital admissions
	Unplanned 30-day hospital readmissions
	All-cause emergency department visits not resulting in hospitalization
	Ambulance events
Cross-Cutting Measures	
	Days in the community, per quarter
	Total Medicare fee-for-service spending, dollars per quarter

Limits of the Impact Analysis for the First 3 Years

During the first 3 years of the demonstration, the study did not find evidence that IWISH prolonged resident tenure, reduced transitions to long-term care, increased primary care, reduced unplanned hospitalizations, or affected other types of healthcare use. The key findings are shown in the text box on the next page and followed by a discussion of the findings by outcome.

The interpretation of the impact findings of this Phase 1 evaluation is limited by several factors. First, the statistical power of the analyses of IWISH impact on healthcare use was diminished because the study team was unable to access Medicare data for about one-half of the residents in the demonstration sample, those who were enrolled in managed-care plans under Medicare Part C. Reduced statistical power limited the team’s ability to detect small but potentially significant differences between IWISH and control group residents.

Second, the impact findings are limited to the first 3 years of implementation of the IWISH model, which was curtailed by a 6-month delayed start of resident enrollment and which coincided with the onset of the COVID-19 public health emergency that had a fundamental impact on healthcare delivery and use.

Third, the information collected on model implementation showed that not all properties implemented all components of the IWISH model or implemented them fully and that several properties had vacancies in one or both IWISH positions for several months during the demonstration period. For example, four properties enrolled less than 60 percent of their residents in IWISH, and only 28 properties completed Individual Healthy Aging Plans with at least one-half of enrolled residents.

Finally, many of the same health and wellness services offered by IWISH were also available via service coordination and wellness programming at the control properties. Therefore, residents at the control properties may have experienced some benefits similar to those at the IWISH properties.

Key Findings During the Initial 3-Year Demonstration Period

Primary Impact Analysis (IWISH vs. control properties)

- Residents of IWISH properties and non-IWISH properties were equally likely to end their residency, regardless of the reason and specifically to transition to long-term care.
- IWISH had no statistically significant effect on rates of unplanned hospitalizations, emergency department visits, or use of ambulance services.
- IWISH had no statistically significant effect on rates of primary care or specialist physician visits.

Subgroup Analysis of Impacts (IWISH vs. control properties)

- IWISH reduced the rates at which residents aged 62–64 and 85 or older used acute or emergency care services. IWISH had no impact on this outcome for residents aged 65–84.

Analysis of Outcomes by IWISH Implementation Ratings (among IWISH properties)

- Residents at IWISH properties that were rated as having higher levels of working individually with residents on meeting their health and wellness goals tended to spend more days in the community (i.e., residing at their property, not admitted to a hospital or long-term care institution, and not visiting an emergency department) than did residents living in IWISH properties with lower levels of working on individual resident goals.
- Residents at IWISH properties that were rated as having higher levels of providing transitional care to residents returning home from a hospital or long-term care stay tended to have fewer unplanned hospitalizations, fewer outpatient emergency department visits and ambulance events, and more primary care visits than residents of lower-rated IWISH properties.

Analysis of Outcomes by Property and Neighborhood Characteristics (among IWISH properties)

- Residents at IWISH properties without a Service Coordinator before IWISH had fewer unplanned hospital admissions, spent fewer days hospitalized, and had more primary care visits than did residents living in IWISH properties with a Service Coordinator before IWISH.
- IWISH residents living in communities that Resident Wellness Directors described as “isolated” or “lacking access to nutritious food” had higher rates of outpatient emergency department visits and ambulance use, had fewer primary care visits, spent more days in a long-term care facility, and spent fewer days in the community than did residents of other IWISH properties.

IWISH Impact on Residents’ Tenure

Over the longer term, the IWISH model is hypothesized to increase housing tenure and delay transitions to long-term care settings. The study team used survival analysis to measure how often residents of IWISH properties exited their units compared with residents of control properties. The analysis found that **residents of IWISH properties and control properties were equally likely to end their residency during the first 3 years of the demonstration, regardless of the reason.** On average, 27 percent of residents in both groups exited their property during those 3 years, including about 10 percent of residents of both IWISH and control properties who died during the 3-year period, 2 percent of residents in both groups who exited to long-term care, and 15 percent of residents who moved out for other reasons (e.g., eviction, moved in with family, moved to a different HUD-assisted property, moved to another housing type).

During each calendar year of the first 3 years of the demonstration, residents of both IWISH and control properties spent an average of 304 days in the community. “Days in the community” measures the number of days residents were residing at their property, were not admitted to a long-term care institution, were not admitted to a hospital for an inpatient or outpatient observation stay, and did not visit an emergency department.

The difference in days in the community for IWISH and control group residents grew somewhat in the demonstration's second and third years such that the difference during the third year (6.8 days per year) was statistically significant. However, the study team cannot confidently conclude that the significant difference indicates that IWISH had an impact on the number of days residents spend in the community. The third year of the demonstration coincided with the onset of the COVID-19 pandemic, which fundamentally affected healthcare delivery and health behaviors.

IWISH Impact on Residents' Healthcare Use

The IWISH staff are expected to help address residents' unmet healthcare needs and connect them to appropriate services, such as primary or specialty health care, and the model was hypothesized to increase the use of those planned services. Unplanned hospital admissions and transfers to an emergency department for emergency care can adversely affect the health and well-being of elderly residents. In addition, unplanned or preventable hospitalizations and emergency department visits are key drivers of the cost burden to Medicare and Medicaid.

IWISH Impact on Primary and Specialty Health Care

The study team found that IWISH had no statistically significant impact on the number of primary care visits or new use of specialty care services. On average, during the first 3 years of the demonstration, residents of both IWISH and control properties had about six primary care visits per year. IWISH residents also had rates similar to the control group members of new visits with cardiologists, rheumatologists, endocrinologists, or ophthalmologists.

Although the team did not find evidence in the Medicaid and Medicare data that IWISH residents increased the use of primary care, on average, interviews with staff at IWISH properties and focus groups with residents suggested that some IWISH residents' use of primary care increased during the demonstration. IWISH residents were encouraged to make followup appointments with their primary care physicians for regular preventive care. IWISH staff would also help "triage" residents, sometimes referring them away from emergency care to more appropriate, nonacute sources of care. The efforts of the wellness staff may have increased the propensity of some IWISH residents to visit their primary care physician, whereas other residents substituted services provided by the Wellness Nurses for visits with a primary care physician.

IWISH Impact on Unplanned Hospitalizations and Other Acute Care Use

The study team found that IWISH had no statistically significant impact on unplanned hospitalizations during the initial 3 years of the demonstration. On average, control group residents spent about 2 days per year in a hospital, and the difference for IWISH residents was not statistically significant. The analysis also found that IWISH had no statistically significant impact on any of the secondary outcomes for this research question during the initial demonstration period, including the number of unplanned hospital admissions or 30-day hospital readmissions, emergency department visits not resulting in hospitalization ("outpatient emergency department visits"), and medical transportation use ("ambulance events").

However, from interviews with residents, Resident Wellness Directors, Wellness Nurses, and property management, the study team learned that preventive actions by the wellness staff might have affected whether some residents had an ambulance event or emergency department visit. Resident Wellness Directors and Wellness Nurses at 38 of the 40 IWISH properties (95 percent) reported helping residents during healthcare emergencies, including providing support during or after emergency events that occurred at the property. They also reported educating residents on how to prevent future emergency

events, including earlier identification of health conditions that might lead to such events if untreated. Staff from one-third of IWISH properties gave examples of when they believed preventive measures by the Wellness Nurse specifically helped avert the unnecessary use of emergency services.

IWISH Impact on Total Medicare FFS Spending

The study team measured IWISH’s impact on total Medicare fee-for-service (FFS) spending to capture changes in planned and unplanned healthcare use that are not included in the study’s other outcome measures. The team found no clear evidence that IWISH decreased Medicare-covered healthcare spending among IWISH residents enrolled in Medicare Parts A and B. Average Medicare FFS spending over the initial 3-year demonstration period was similar (\$5,286 per calendar quarter for IWISH residents and \$5,625 for control group residents), and the difference was not statistically significant.

Additional Analysis of IWISH Impacts and Outcomes

The study team conducted additional analyses to further understand the impact of the IWISH model on certain subgroups of residents and how outcomes might vary according to the degree to which properties implemented the core components of the IWISH model or by specific property or neighborhood characteristics of IWISH properties.

IWISH Reduced Use of Emergency Services Among the Youngest and Oldest Residents of IWISH Properties

The evaluation of the demonstration was not designed to test statistically for IWISH’s impacts on small subgroups of IWISH residents. However, subgroup analysis based on age categories found consistent evidence that IWISH was effective at reducing the rates of emergency services for the IWISH residents aged 62 through 64 (for the purpose of this evaluation, referred to as “younger” IWISH residents) and 85 and older (“older” IWISH residents) but not for IWISH residents aged 65 through 84.³ On average, the youngest and oldest residents had fewer days of unplanned hospitalization, unplanned hospital admissions, unplanned hospital readmissions, outpatient emergency department visits, and ambulance events during the demonstration period than did control group residents of the same ages. Those findings suggest that IWISH tends to benefit those with greater healthcare needs. HUD-assisted residents aged 85 or older on average have more chronic or potentially disabling conditions than do younger residents. Those younger than 65 and living in HUD-assisted properties often are eligible for Medicaid or Medicare because of disabilities and have more healthcare needs than residents 65 and older who do not qualify for disability benefits.

Properties with More Formal Transitional Care and Higher Percentages of Residents with Healthy Aging Plans Were Associated with More Positive Outcomes for Healthcare Use

Using the fidelity ratings developed for the implementation study, the team conducted an additional set of nonexperimental analyses to assess whether IWISH residents’ outcomes are correlated with how certain aspects of the IWISH model were implemented at their properties during the first 3 years of the demonstration. The results of the analysis found no difference in impacts for properties that had higher ratings of implementation fidelity overall but did find relationships between greater impacts of IWISH and two specific aspects of the IWISH model. IWISH residents tended to have more primary care visits and fewer unplanned hospitalizations, outpatient emergency department visits, and ambulance events at properties where Resident Wellness Directors and Wellness Nurses provided more coordinated care for

³ The distinction between “younger” and “older” residents is made for the purposes of this evaluation.

residents returning home from a hospital or nursing home stay. In addition, IWISH properties with higher rates of enrolled residents with recorded goals in Individual Healthy Aging Plans were correlated with lower rates of acute care use, more primary care visits, and more days in the community.

Properties without Service Coordinators Before IWISH Are Associated with Fewer Unplanned Hospitalizations, Fewer Days Hospitalized, and More Primary Care Visits During the Demonstration

Comparisons of outcomes among the IWISH properties found that residents at the seven IWISH properties (18 percent of IWISH properties) *without* a Service Coordinator before IWISH had better outcomes (fewer unplanned hospital admissions, fewer days hospitalized, and more primary care visits) than did residents living in IWISH properties *with* a Service Coordinator before IWISH. That properties with existing service coordination showed fewer changes in healthcare use suggests the positive value of HUD's standard Multifamily Service Coordinator program in supporting residents' well-being. For example, Service Coordinators often help residents obtain public benefits or access transportation services or food assistance, and those small actions could have lasting results on a resident's well-being. Residents with access to service coordination may have had more of their healthcare needs met before the demonstration.

Properties in Isolated Communities Are Associated with Fewer Improvements in Healthcare Use

Resident Wellness Directors at eight IWISH properties (20 percent) reported that the property where they worked was in an isolated community, affecting residents' ability to access the services and supports that residents needed to age in place. Comparisons of outcomes among the IWISH properties found that IWISH residents living in those isolated communities or who lacked access to nutritious food had higher rates of outpatient emergency department visits and ambulance use compared with IWISH residents in other communities. IWISH residents in isolated communities also had fewer primary care visits, spent more days in a long-term care facility, and spent fewer days in the community. Those correlations suggest that challenges for residents in accessing nutritious food or needed healthcare services because of the location of the property could limit the potential impact of IWISH on residents' healthcare use and tenure.

Conclusions and Next Steps for the Evaluation

The cluster-randomized controlled trial design and well-matched IWISH and control populations of the Supportive Services Demonstration offered an opportunity to conduct a rigorous evaluation of the initial impact of the IWISH model. Although the evaluation of the first 3 years of the demonstration did not find statistically significant evidence that IWISH affected residents' healthcare use or caused residents to remain in their homes longer, there are reasons to be optimistic about the potential long-term impact of the IWISH model.

IWISH Model's Potential for Future Impacts

The study's subgroup analyses show that residents aged 62 through 64 and those 85 and older tended to benefit from IWISH. The study also found that two specific aspects of the IWISH model seemed to improve outcomes: working individually with residents on meeting their health and wellness goals and providing transitional care to residents returning home from a hospital or long-term care stay.

The correlation between properties without a Service Coordinator before the start of the demonstration and more positive improvements in healthcare use might also help explain why the study did not find evidence of IWISH impacts during the first 3 years of the demonstration. The incremental benefits of the

Wellness Nurse and formalized assessments and programming might not have been great enough to show statistically significant impacts in the short term.

Residents who participated in the model and IWISH and property management staff reported numerous benefits from implementing the IWISH model at their properties, including examples of preventive actions by IWISH staff that helped residents avoid unnecessary emergency care. At some properties, property managers attributed a reduction in tenant turnover to the services provided under IWISH.

In addition, residents at IWISH properties reported an increased feeling of safety and security, better awareness of their medical diagnoses and the medication they were prescribed, and a greater understanding of their own health. Residents attributed those positive changes to wellness staff and programming. They appreciated having a medical professional and designated point of contact for health and wellness on site, and they described how programming provides an opportunity for social interaction and education.

The findings suggest that the IWISH model could have benefits to residents that cannot be seen in the administrative data or that might become significant over a longer period. The preliminary evaluation findings of the demonstration's effectiveness after the initial 3 years, given the context of the implementation of the IWISH model across the 40 properties, suggest that housing-based wellness staff helping to coordinate resident health care could be a promising strategy for helping residents age in place.

Continued Evaluation of the Supportive Services Demonstration

The extension of the demonstration for an additional 2 years provides an opportunity for the evaluation to examine the effect of IWISH on healthcare use and tenure over a longer period. By 2026, the study team also will be able to obtain Medicare Advantage (managed care) data for the second evaluation period, which will expand the analysis sample for healthcare use to most of the residents living in the IWISH and control properties. The addition of the managed care data will allow the team to analyze healthcare use for the full demonstration sample for both the initial 3-year demonstration period, from 2017 to 2020, and the full 6-year demonstration period,⁴ through 2023.

Findings from the initial period of the Supportive Services Demonstration will inform the evaluation for the extended demonstration period from 2021 to 2023. The study team will conduct qualitative interviews with residents and wellness staff in the extension period to better understand more nuanced characteristics that could affect a resident's participation in IWISH and to explore which elements of the model are most beneficial. Interviews with residents will also help the study team better understand changes in resident behaviors and attitudes that could lead to positive changes in their health, well-being, and quality of life.

⁴ A 1-year gap occurred between the initial period and the extension period, during which program activities were conducted at some sites.

1. Introduction

The Supportive Services Demonstration for Elderly Households in HUD-Assisted Multifamily Housing tests the effect of the Integrated Wellness in Supportive Housing, or IWISH model on residents' tenure and healthcare use. The overall goal of the IWISH model is to help residents remain in their homes longer.

The demonstration's cluster-randomized controlled trial design provides an opportunity for the U.S. Department of Housing and Urban Development (HUD) to rigorously measure the impact of a housing-based enhanced service coordination and wellness model in HUD-assisted multifamily properties serving older adults. Forty properties agreed to implement IWISH with HUD funding that permitted them to hire two housing-based wellness positions and to make evidence-based health and wellness programming available to residents. The demonstration tests the impacts of the IWISH model on residents' tenure and healthcare use beginning in October 2017.

The demonstration is being evaluated over two phases between 2017 and 2026. This report presents the findings on the implementation and impacts of the IWISH model from the first phase (2017 through 2020). This introductory chapter provides context for the Supportive Services Demonstration, describes its goals and the IWISH model, and describes the organization of this report.

1.1 Demonstration Context

As part of the housing assistance it provides to older adults with low incomes, HUD and its affordable housing partners must address how best to support residents in an independent living setting as they age. With aging often come impairments that can affect residents' ability to live independently. For example, new or increasing physical or cognitive impairments often mean that people need assistance with activities of daily living (ADLs), such as bathing and dressing, or instrumental activities of daily living (IADLs) such as managing medications, doing housework, and buying groceries. The prevalence of disabilities related to ADLs and IADLs increases with age, particularly after age 75 (JCHSHU, 2018). At the same time, most Americans prefer to live independently in their own homes or communities for as long as possible (Binette and Vasold, 2018).

More than one-third of the approximately 5 million households that live in HUD-assisted housing include someone aged 62 and older. Most of those households live in an independent housing setting. Some HUD-funded, privately owned multifamily properties for older adults employ onsite Service Coordinators who help connect residents to community-based social services and public benefits.

The Supportive Services Demonstration expands that function by funding an enhanced service coordinator role—the **Resident Wellness Director**, who focuses on residents' health and wellness through a structured, person-centered approach, and by funding a new housing-based role—the **Wellness Nurse**, who helps monitor residents' health and provides health education. Those two housing-based wellness staff work together to help residents meet their needs for health and social services and to help residents successfully age in place. For most residents, aging in

Americans Strongly Prefer to Age in Place

- Nearly 80 percent of adults aged 50 and older say they want to remain in their communities and homes as they age.
- Nearly one-half of adults aged 50 and older say they will never move.

Source: Binette and Vasold, 2018

place means remaining in their homes as they get older and deferring moves to nursing homes, assisted living facilities, or other higher levels of care as long as they can.

HUD Housing Assistance for Older Adults

Older adults (aged 62 and older) make up a substantial proportion of the people for whom HUD provides housing assistance, and that proportion has been increasing in recent decades. In 2021, HUD provided housing assistance to 4.6 million households in the form of public housing, tenant-based housing vouchers, and various privately owned project-based housing programs. Overall, 39 percent of those households—or nearly 1.8 million households—had a household head, co-head, or spouse who was an older adult in 2021, compared with 32 percent in 2010.⁵

Exhibit 1-1 shows the main HUD programs that provide housing assistance to older adults. Assistance is provided in an independent setting, although some programs and properties offer supportive services to help residents live independently.

Exhibit 1-1. HUD Programs with Households Headed by Older Adults, 2021

Program Category	Program Name	Number of Households Overall	Number of Households Headed by Older Adults	Percentage of Households Headed by Older Adults
PHA-Administered Housing Assistance (HUD enters into contracts with PHAs)	Housing Choice Vouchers	2,327,707	698,312	30
	Public Housing	843,749	295,312	35
	Moderate Rehabilitation	20,336	6,711	33
	Subtotal PHA-Administered	3,191,792	1,000,335	31
Multifamily Assisted Housing (HUD enters into contracts with private owners)	Section 8 Rental Assistance	1,217,108	620,725	51
	Section 202 PRAC	121,562	121,562	100
	Section 811 PRAC	31,325	8,458	27
	Other Multifamily Programs	4,080	1,754	43
	Subtotal Multifamily	1,374,075	752,499	55
	Total	4,565,867	1,752,834	39

PHA = public housing agency. PRAC = Project Rental Assistance Contract.

Note: A “household headed by older adult” is defined as a household in which the older of the household head, co-head, or spouse is aged 62 or older.

Source: “HUD Assisted Housing: National and Local,” Picture of Subsidized Households Database, 2021, <https://www.huduser.gov/portal/datasets/asshsg.html>

The Section 202 Project Rental Assistance Contract (PRAC) program primarily serves elderly persons. The other HUD programs serve a greater mix of older adult households and families, with the percentage of households headed by older adults in those programs ranging from 27 percent (in the Section 811 program) to 51 percent (in the Section 8 rental assistance program). Older adults might live in elderly-only or elderly-designated buildings, or they might live in households headed by younger adults or in buildings with households headed by younger adults.

⁵ “HUD Assisted Housing: National and Local.” Picture of Subsidized Households Database. 2021. <https://www.huduser.gov/portal/datasets/asshsg.html>.

The properties in the Supportive Services Demonstration are funded through either the Section 202 PRAC program or the Section 8 rental assistance program:

- The **Section 202 PRAC program** provides capital advances and project rental assistance contracts to private nonprofit organizations to expand the supply of affordable housing with voluntary supportive services for older adults (aged 62 and older) with very low incomes. Recipients of Section 202 capital advances use the funds to finance the development of housing through new construction, rehabilitation, or acquisition. Repayment of the capital advances is not required if occupancy of the housing remains restricted to very low-income older adults for at least 40 years. HUD provides project rental assistance funds to Section 202 properties for operating costs not covered by tenant rent contributions, which are set at 30 percent of adjusted income. Owners also may use the rental assistance funds to offer supportive services to residents of the property and to hire a Service Coordinator to help residents age in place and live independently.
- The **Section 8 rental assistance program** provides rental assistance funding to owners of multifamily rental housing to cover the difference between the households' rent contributions (typically 30 percent of adjusted income) and the total amount of rent needed to retire debt and operate the property. Section 8 properties are not restricted to households headed by older adults, but the developer may choose to restrict the property to older adults, and many Section 8 properties have such restrictions. Those age-restricted Section 8 properties are the focus of the Supportive Services Demonstration. The private owners that have Section 8 contracts with HUD may be nonprofit, cooperative, or for-profit organizations.

Service Coordination in HUD-Assisted Housing Developments for Older Adults

With some exceptions, HUD does not provide or pay for supportive services for residents of properties that are privately owned but HUD assisted. *Supportive services* include a broad array of services and programs that low-income, older adults might need to continue to live independently as they age. The services can include case management, assistance with enrollment in public benefits programs, transportation assistance, fitness and wellness programs, housekeeping assistance, meal services, and health services.

Some properties—for example, those funded through the Section 202 or 811 programs that primarily house elderly persons or people with disabilities—are required to develop supportive services plans that outline how owners will make services available to tenants. Other multifamily properties can choose to make supportive services and service coordination available to residents. Supportive services are typically provided by community-based organizations and not funded by HUD.

Congress has funded Service Coordinators in HUD-assisted multifamily housing since the 1990s through its Multifamily Service Coordinator Program. *Service Coordinators* help residents gain access to the supportive services they might need. A Service Coordinator in HUD's multifamily housing programs is a person hired by the property owner to coordinate community resources and services for residents and develop programs to help residents remain healthy and independent. Service Coordinators are not permitted to provide direct services. The use of service coordination or supportive services by residents is entirely voluntary.

HUD funds owners to provide Service Coordinators in two ways: through the property's operating budget or other eligible project resources or by grant funding awarded through Notices of Funding Availability issued by HUD. The HUD grant funding for its multifamily Service Coordinators is limited and subject to

funding appropriations. HUD makes Service Coordinator grants for an initial 3-year term but typically extends those grants if funding is available to ensure continuity of services. Grant applicants must show that they have no other funds available to pay for a Service Coordinator. Service Coordinators and other supportive services available to residents can also be paid through other owner funds or grants.

The IWISH model expands on and supplements the role of those typical HUD-funded Service Coordinators in HUD-assisted multifamily properties for older adults.

Building on Previous Research on Housing-Based Wellness Supports for Older Adults

The Supportive Services Demonstration builds on what has been learned from earlier programs and studies on the benefits of housing-based wellness services for healthcare use and housing stability; those studies are briefly described below. The study's [*First Interim Report*](#) describes the previous research in greater detail.

Studies Have Shown Benefits of Service Coordination in Assisted Housing for Older Adults

In the 1990s, HUD's evaluation of the Congregate Housing Services Program (CHSP) found that the program helped residents continue living as independently as possible in their own homes. CHSP provided resident service coordination to frail elderly adults and nonelderly people with disabilities in assisted housing.⁶ The study found that most participants were satisfied with the services they received and that both grantees and residents reported that the program helped residents continue living as independently as possible in their own homes. In addition to connecting participants to services, CHSP Service Coordinators helped give residents a sense of security and greater social integration (Griffith et al., 1996).

In 2008, a HUD survey of 363 property managers found that Service Coordinators funded by HUD's Multifamily Service Coordinator Program enabled HUD-assisted multifamily residents to access the services they needed and improved residents' quality of life (Levine and Johns, 2008). Property managers also noted that having an onsite Service Coordinator gave them more time to focus on property management, rather than on residents' health and social service needs, and helped them maintain occupancy and manage transfers to settings with more intensive supports when needed. Analysis of tenure data showed that people who lived in properties with Service Coordinators stayed in those properties an average of 6 months longer than people who lived in similar properties without Service Coordinators.

Data Matching Has Shown the Effects of Service Coordinators on Healthcare Use

More recent studies have used administrative data matching—HUD and other housing data matched to medical records data—to assess the impact of onsite service coordination and service provision on healthcare use and costs.

In 2015, LeadingAge and The Lewin Group published the results of a pilot study that examined housing data and medical records data for residents in HUD-assisted housing developments for older adults. The study found that residents living in housing with onsite Service Coordinators had significantly lower hospitalization rates than did residents without Service Coordinators (Sanders et al., 2015).

A 2016 study compared self-reported health outcomes and healthcare use data for older adults living in HUD-assisted highrise buildings, some of which had implemented the Staying at Home program. Similar to the IWISH model, Staying at Home consisted of an onsite social worker and an onsite registered nurse

⁶ HUD no longer awards new CHSP grants, but Congress has continued to provide funds to extend expiring grants.

who offered all residents of the building care coordination, advance care planning, medication management, and a healthcare diary. Among other positive outcomes, Staying at Home properties had substantially lower rates of transfers to nursing homes and lower rates of emergency room use, inpatient admissions, and unscheduled hospital stays (Castle and Resnick, 2016).⁷

A 2018 report of a study using data matching looked at hospitalization rates for older adults living in affordable housing properties offering the Selfhelp Active Services for Aging Model (SHASAM). At properties with SHASAM, residents had access to onsite social workers who provide health and wellness assessments, counseling, wellness and physical activity programs, and assistance with accessing public benefits. Residents of the SHASAM buildings had lower rates of hospital discharges overall (indicating less hospital use), lower rates of discharges for ambulatory conditions,⁸ and shorter lengths of stay in the hospital (Gusmano, Rodwin, and Weisz, 2018).

The IWISH Model Was Based on Vermont’s Support and Services at Home (SASH) Program

The basic structure of the IWISH model was developed, based in part on the Support and Services at Home (SASH) program that operated in Vermont between 2011 and 2016, mainly in Burlington. The SASH program consisted of a full-time Service Coordinator and a quarter-time Wellness Nurse assigned to each of 54 panels of approximately 100 older adults, most of whom were living in affordable housing developments. An evaluation of the SASH model compared healthcare use and spending across the different panels and compared the outcomes of SASH to outcomes for groups of older adults without access to the SASH program.

The 2019 *SASH Evaluation Findings* report documents several successes of the program in supporting successful aging in place. First, interviews with SASH staff and property managers suggest that those involved in implementing SASH valued the program for its role in helping participants remain functional in their homes as they aged and helped them avoid eviction. Further, SASH participants reported less difficulty managing their medications and higher overall functional status than did Medicare beneficiaries not in the program. Some of the SASH panels—notably, those overseen by the model’s developer—experienced significantly slower growth (per beneficiary, per month) in total Medicare expenditures, in acute hospital care expenditures, in emergency room expenditures, and in specialist physician expenditures than did a comparison group of Medicare beneficiaries in non-SASH HUD-assisted housing (Kandilov et al., 2019).

1.2 Integrated Wellness in Supportive Housing (IWISH) Model

The Supportive Services Demonstration builds on the Service Coordinator role in HUD’s Multifamily Service Coordinator Program and applies the lessons learned in previous studies. In the IWISH model, the Resident Wellness Director is intended to be different from a typical Service Coordinator by providing ***enhanced service coordination*** that goes beyond the refer-and-link model of traditional service

⁷ The areas of positive impact were self-reported use of health services, health improvements, use of noninstitutional health services, engagement in self-care, and satisfaction with services; likelihood of institutionalization; and emergency room visits and unplanned hospitalizations. Staying at Home had no impact on receipt of preventive services, likelihood of having considered an advance directive, or quality of life, all self-reported.

⁸ *Ambulatory conditions* include a variety of health conditions with the common characteristic of responding well to interventions deliverable in community-based healthcare settings. In other words, if managed well in a community-based setting, ambulatory conditions should not require hospitalization. Researchers use ambulatory conditions to help measure potentially preventable hospital admissions.

coordination. Although many Service Coordinator programs have been expanding beyond the traditional referral model to a more proactive approach to working with residents, service coordination is enhanced in the IWISH model in two ways: by specifically focusing on residents' health and wellness and through a proactive, *person-centered approach* for engaging with residents.

The IWISH model's Wellness Nurse is a nonclinical position working with residents directly at the property. The Wellness Nurse is the critical difference between IWISH and other service coordination programs. Although other HUD-assisted multifamily properties also have started shifting to more of a health and wellness focus and a proactive approach to addressing resident needs, it is not typical for those properties to have healthcare professionals employed to work directly at the property.

The two IWISH-funded wellness staff are expected to implement the core components of the model and provide individual assistance to residents as needed and as requested by residents.

Core Components of the IWISH Model

The IWISH model as implemented in the demonstration has six core components:

Core Component 1: Proactive Engagement with Residents to Maximize Participation

Resident Wellness Directors and Wellness Nurses conduct outreach to and build relationships with residents to make sure they understand what the program has to offer and are motivated to participate. Resident Wellness Directors and Wellness Nurses continue to engage residents throughout the duration of the program. Enrollment and participation in IWISH are voluntary for residents.

Core Component 2: Standardized Assessment

All enrolled residents are offered a standardized health and wellness assessment when they first enroll and at least annually until the end of the program. Assessments include person-centered interviews with residents so that Resident Wellness Directors and Wellness Nurses understand their needs and priorities more comprehensively.

The *person-centered interview* is a conversation between the Resident Wellness Director and the resident, guided by a series of predetermined questions. The person-centered interview has four domains of questions:

1. Background and life history.
2. What a typical day is like for the resident.
3. Relationships and social support.
4. Impact of health on function for daily life.

The *health and wellness assessment* is an objective questionnaire that collects and documents information about the residents' physical health, mental health, and functional and social supports. Wellness Nurses generally ask the questions about residents' health and healthcare providers and conduct the functional assessments.

Core Component 3: Individual and Community Healthy Aging Plans

Each enrolled resident is offered the opportunity to work with the IWISH staff to develop an *Individual Healthy Aging Plan (IHAP)* that reflects their needs and priorities. The IHAP identifies actionable goals, barriers to their aging in place, and the service coordination the resident will receive from the wellness staff.

The IWISH staff are also expected to create a *Community Healthy Aging Plan (CHAP)* for the property to help them develop responsive wellness programming based on the most common needs of residents.

Core Component 4: Web-Based Data Platform

All IWISH properties are required to use a web-based data system to track information about enrolled residents, including assessment data, wellness goals, and programming and service coordination usage. The data system allows Resident Wellness Directors and Wellness Nurses to track the needs, priorities, and progress of each enrolled resident. IWISH properties were required to use a centralized data system that was tailored to the IWISH demonstration for the initial 3 years of the demonstration, after which properties could use a data system of their choosing.

Core Component 5: Partnerships with Social Service and Healthcare Providers

Resident Wellness Directors and Wellness Nurses are expected to form partnerships with healthcare and social service organizations to enhance opportunities and resources for their properties' residents. Those organizations include healthcare facilities, primary care providers, local agencies serving seniors, and community agencies. The goal is for those IWISH partnerships related to health and wellness to add to the resource and referral partnerships typical of traditional service coordination.

Core Component 6: Evidence-Based Health and Wellness Programming

As part of the Supportive Services Demonstration grant, IWISH properties received supplemental funding of \$15 per unit per month to support evidence-based health and wellness programming and other related activities. With technical assistance from HUD's implementation team described below, the Resident Wellness Director and the Wellness Nurse are expected to identify one or more evidence-based interventions that address the needs identified in resident assessments and to use the supplemental funding as needed to deliver that programming to residents. *Evidence-based* means that rigorous evaluation has found the programs to be effective in improving health.⁹ Most evidence-based programs require participants to complete a pre- and post-test or survey.

The IWISH Operations Manual (2019) suggests the following areas for programming: health education, vital sign clinics, fitness, fall risk, medication self-management, nutrition support, cognitive health, and support groups. Examples of specific evidence-based programs for older adults recommended by the model include *A Matter of Balance* for falls prevention, Stanford University's *Chronic Disease Self-Management Program*; and the *Diabetes Empowerment Education Program (DEEP™)* for diabetes management.

Housing-Based Resident Wellness Director and Wellness Nurse

The demonstration funds the two housing-based wellness positions to implement the IWISH model:

- The **Resident Wellness Director** proactively engages with residents to conduct health and wellness needs assessments and individual goal setting and coordinates health and wellness programming for residents individually and for the property. The Resident Wellness Director also takes the lead in building partnerships with healthcare and social services partners in the community. At IWISH properties with an existing Service Coordinator, the Resident Wellness

⁹ National Council on Aging. 2022. "About Evidence-Based Programs." <https://www.ncoa.org/center-for-healthy-aging/basics-of-evidence-based-programs/about-evidence-based-programs/>.

Director role replaced that position, and the person who was the onsite Service Coordinator before the start of IWISH transitioned into the Resident Wellness Director.

- The **Wellness Nurse** provides health education and coaching to residents; offers basic health and vital signs monitoring (such as taking blood pressure and helping residents self-manage their medications); helps residents work effectively with their healthcare providers; and assists with residents returning from hospitals, nursing homes, or rehabilitation centers. HUD required IWISH properties to contract for the Wellness Nurse through a certified provider. Those certified providers included assisted-living residences, hospitals, home health agencies, and Federally Qualified Health Centers.

The two IWISH staff are intended to work together to support residents in achieving their health and wellness goals. Exhibit 1-2 is an overview of the IWISH staff responsibilities.

Exhibit 1-2. Overview of IWISH Staff Responsibilities

Resident Wellness Director Primary Responsibilities	Shared Responsibilities	Wellness Nurse Primary Responsibilities
<ul style="list-style-type: none"> • Coordinate outreach and education efforts with residents about IWISH, with input and involvement from the Wellness Nurse and property management staff. • Enroll residents and schedule person-centered interviews and resident health and wellness assessments. • Conduct person-centered interviews. • Oversee completion of resident needs assessments, with the Wellness Nurse completing specified parts. • Ensure development of Individual and Community Healthy Aging Plans (IHAPs, CHAPs), with input from the Wellness Nurse and the residents. • Oversee a followup with residents returning from a hospital or nursing facility, collaborating with the Wellness Nurse as appropriate. • Oversee development and coordination of onsite programming. • Communicate with technical assistance providers. 	<ul style="list-style-type: none"> • Assist residents with implementing and following through on activities and goals identified in IHAPs. • Support residents with addressing ongoing and new health and wellness needs. • Assist residents with addressing any transitional care needs. • Develop partnerships and collaborate with community partners and service providers • Input and maintain information about residents' health status, wellness goals, and service encounters in web-based data system. 	<ul style="list-style-type: none"> • Educate and coach residents on understanding and managing their chronic health conditions. • If authorized by the resident, communicate with residents' healthcare providers to assist residents with relaying health information to their providers and coordinating health-related services. • Monitor vital signs as necessary or as requested. • Assist residents with self-management of medications. • Host health and wellness group activities, such as blood pressure clinics and health education sessions. • Provide nursing expertise when residents return from a hospital or nursing facility to promote a safe transition and minimize readmissions.

Most IWISH properties received funding for at least one full-time (40 hours per week) Resident Wellness Director and at least one part-time (20 hours per week) Wellness Nurse, with larger properties funded for additional positions. Most IWISH properties received funding for just one full-time Resident Wellness Director and one part-time Wellness Nurse (exhibit 1-3).

Exhibit 1-3. Number of Resident Wellness Director and Wellness Nurse Positions, in Full-Time Equivalents

Number of Units per Property	Resident Wellness Director FTEs	Wellness Nurse FTEs	Number of Properties
Up to 115	1.0	0.5	30
116 to 215	2.0	1.0	7
216 to 315	3.0	1.5	2
More than 315	4.0	2.0	1

FTE = full-time equivalent.

Source: Abt Associates adaptation from the *IWISH Operations Manual* (February 6, 2019)

The specifics of the demonstration funding arrangement vary by property and whether a property already had a traditional HUD Service Coordinator grant at the time of applying for the demonstration. Properties with existing Service Coordinator programs received supplemental funding to help the Service Coordinator transition to the greater responsibilities of the Resident Wellness Director role and to support the new Wellness Nurse position.

Person-Centered Approach to Engaging Residents

A hallmark of IWISH is its *person-centered approach* that emphasizes resident engagement and individual choice in all components of the model, including whether or not a resident chooses to enroll in IWISH.

Enrolling in IWISH and participating in any IWISH activity are completely voluntary for residents. Residents must formally enroll in IWISH and sign IWISH’s informed consent form to work directly with the Wellness Nurse. Exhibit 1-4 summarizes the forms of support and assistance available to residents of IWISH properties who enroll in IWISH and to those who do not. A key distinction is that residents who do not enroll in IWISH cannot access the annual health and wellness assessment, individualized goal setting through the IHAP, and one-on-one assistance from the Wellness Nurse. Residents of properties that had Service Coordinators before the demonstration were entitled to receive the same level of service coordination during the demonstration without having to enroll in IWISH.

Exhibit 1-4. Assistance Available to Residents Enrolled in IWISH and to Other Residents

Residents Enrolled in IWISH Have Access to...	Residents Not Enrolled in IWISH Have Access to...
<ul style="list-style-type: none"> • Annual health and wellness assessment. • Individual Healthy Aging Plan, developed with the resident, to address goals and priorities. • Assistance with identifying, accessing, and coordinating services and resources to address goals and ongoing or new needs. • One-on-one assistance from the Wellness Nurse. • Individualized health and wellness education and coaching. • Monitoring following return home from a hospital or nursing home stay. • Group wellness programs and activities. 	<ul style="list-style-type: none"> • The same level of service coordination they previously received if the property had a Service Coordinator. • General information, referral, and assistance from the Resident Wellness Director. • Group wellness programs and activities.

The person-centered approach means that every resident will have a different experience in the IWISH model. Although the core components are available to all enrolled residents, the Resident Wellness

Director and the Wellness Nurse are expected to tailor service coordination and referrals to each resident’s individual needs and preferences.

As described in the IWISH Operations Manual (2019):

A person-centered approach ensures an individual is fully engaged in identifying and making decisions about goals and priorities that relate to their life. It also plans and delivers services and supports in a way that respects the person’s preferences, values, and needs. A person-centered approach considers both “what is important for” and “what is important to” the individual to live a meaningful, healthy, and safe life.
(IWISH Operations Manual, 2019)

Training and Support for IWISH Staff

To support the Resident Wellness Director and the Wellness Nurse in implementing IWISH core components for the initial 3 years of the demonstration, HUD contracted with an implementation team consisting of The Lewin Group and its partners LeadingAge and the National Well Home Network. The implementation team further developed and refined the IWISH model and provided ongoing training and technical assistance to ensure that IWISH staff understand how to implement the IWISH model and have the skills to work as a team and work effectively with residents.

During a demonstration ramp-up phase before official enrollment in March 2018, the team provided formal in-person and virtual training to staff on IWISH procedures and policies. The team also provided ongoing training and support throughout the demonstration period. Formal training covered special topics relevant to working with older adults, such as memory conditions, bullying, and trauma-informed care.

The team provided day-to-day support through dedicated site liaisons assigned to each property and convened in-person and virtual opportunities for the Resident Wellness Directors and Wellness Nurses to learn from one another. The implementation team also monitored and supported the progress of IWISH staff in enrolling residents and assisted the IWISH staff with identifying evidenced-based programming.

1.3 Report Objectives and Organization

This report is the third in a series and provides quantitative analysis of IWISH impacts on residents’ healthcare use and housing stability. The report examines whether IWISH had an effect on participants’ healthcare use and costs or their ability to remain in their homes. The study team used HUD administrative data and Medicaid and Medicare claims data to compare outcomes for housing tenure and healthcare use for residents of the IWISH properties with resident outcomes in the control properties.

The report also contextualizes the impact findings with information learned from IWISH program data, interviews with IWISH staff and property representatives, and focus groups with residents. Additional analysis examines the association of outcomes for residents of IWISH properties with the extent to which IWISH properties implemented core components of the IWISH model and with the characteristics of the IWISH properties and their neighborhoods.

2. Evaluation of the Supportive Services Demonstration

To understand the IWISH model's impact, the evaluation compares healthcare use and housing tenure outcomes for residents living in 40 treatment group properties where IWISH was implemented with outcomes for residents living in 84 control properties where it was not. The outcomes are based on HUD administrative data and on Medicare fee-for-service (FFS) and state Medicaid data.

HUD contracted with a study team led by Abt Associates to evaluate the implementation and the impacts of the demonstration.

The evaluation consists of two phases:

- The **Phase 1 evaluation (2017 through 2022)** presented in this report measured the impacts of IWISH on residents' housing stability and healthcare use and documented how the treatment properties implemented the IWISH model in its initial demonstration period from October 2017 through September 2020. The Phase 1 evaluation took place between 2017 and 2022.

For federal fiscal year 2021, Congress funded the demonstration for an additional 2 years, from October 2021 through September 2023.

- The **Phase 2 evaluation (2021 through 2026)** will assess changes in IWISH implementation since the end of the initial demonstration period and measure impacts of the IWISH model on residents' healthcare use, tenure, and mortality for the 2-year extension period. Although the official extension period did not begin until October 2021, properties could have continued implementing the IWISH model after the initial period ended in September 2020. The Phase 2 evaluation will include additional Medicare (managed care encounter) data not available for the Phase 1 evaluation. The Phase 2 evaluation takes place between 2021 and 2026 and covers the full 6-year demonstration period from 2017 through 2023.

This report presents findings on the impacts and implementation of the IWISH model from the first phase of the demonstration. The results of the Phase 2 evaluation will be presented in a final report, expected in 2026.¹⁰

The basic structure of IWISH is modeled after the SASH program; however, the evaluation is quite different from the SASH evaluation. The SASH evaluation was designed as a quasi-experimental study with cohorts of individuals in different housing settings, including a large percentage of people younger than 62 years old. The SASH evaluation compared healthcare use for Medicare FFS beneficiaries who were living in properties that hosted the SASH program and were assisted by HUD or through the Low-Income Housing Tax Credit program to a comparison group of individuals living in similar properties without SASH. The comparison group was identified through administrative data. The study used a difference-in-differences (DID) model to compare differences in Medicare expenditures between the two groups in 2006, before the SASH program started, through 2016, the end of the SASH enrollment period.

¹⁰ The Centers for Medicare and Medicaid Services releases the final version of Medicare managed care encounter data for each calendar year to researchers approximately 21 months after calendar year ends. The final version of the files includes 12 months of updates to the encounters. Final 2023 data are expected to be available by September 2025, providing sufficient time for the study team to analyze the data and report the findings by 2026.

Unlike randomized controlled trials, quasi-experimental studies do not randomly assign study members to either be offered the intervention (“treatment group”) or not receive it (“control group”). Although quasi-experimental studies can evaluate interventions, they do not have the same rigor as studies that use randomization and often do not allow for causal inference.

The Supportive Services Demonstration was designed as a cluster-randomized controlled trial and is being conducted only in HUD-assisted, privately owned multifamily properties that either exclusively or predominately serve older adults. That properties in the demonstration are randomized to implement IWISH (treatment group) or not (control group) allows evaluators to determine with a high degree of confidence whether changes in tenure and healthcare use are caused by the intervention of the IWISH model rather than by other factors. In addition, the SASH program was implemented in a single state, Vermont, whereas the Social Service Demonstration is being implemented in seven other states, so its findings may be more broadly applicable.

2.1 Cluster-Randomized Controlled Trial

Randomized controlled trials measure the effect of an intervention (the treatment) by randomly assigning individuals into either the group that receives the treatment or the one that does not and then comparing the average outcomes of the two groups. Randomization reduces bias due to unobservable factors that might otherwise be systematically related to both selection for treatment and the outcome of interest. Thus, randomization provides a rigorous way to examine the cause-and-effect relationship between the treatment and the outcomes.

A “clustered” trial randomizes groups of study members (in this instance, by property) rather than randomizing individual study members (residents of a property). A cluster-randomized controlled trial can provide an unbiased estimate of an intervention’s impact on individual-level outcomes when individual-level randomization within groups would be impractical, unethical, or even impossible. Moreover, cluster-randomized controlled trials are more valid than traditional randomized controlled trials when preventing certain group members from being exposed to the intervention is impossible, and hence members of a group are likely to exhibit similar outcomes. In the case of IWISH, residents who do not enroll in the program may still benefit from the enhanced service coordination, the presence of a nurse on the property, and the programming focused on wellness.

In the IWISH evaluation, random assignment occurs at the property level, but impacts are estimated at the resident level by comparing residents at the treatment properties to residents at the control properties. The bigger the difference between the level of support offered to residents of the IWISH properties and the level of support offered to residents of the control properties, the larger the expected impact.

Random Assignment of 124 Demonstration Properties

In January 2016, HUD issued a Notice of Funding Availability (NOFA)¹¹ that invited owners of multifamily properties serving older adults to apply for demonstration grant funding.

To be eligible for the demonstration, properties had to meet the following criteria:

- Have at least 50 HUD-assisted housing units, with no more than 10 percent of units available for residents younger than age 62.
- Pass the most recent physical inspection by HUD.

¹¹ The NOFA can be found here: <https://www.hud.gov/sites/documents/2015SSDEMO-NOFA.pdf>.

- Receive satisfactory Management and Occupancy Review ratings from HUD.
- Could have an onsite Service Coordinator at the time of application but could not have an onsite Wellness Nurse.

HUD received more than 700 applications from multifamily properties throughout the country. From that pool, HUD identified 131 properties across seven states (California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina) as eligible for the demonstration. Seven properties elected not to participate in the demonstration, leaving 124 properties. In 2017, HUD randomly assigned 40 of the 124 properties to the treatment group of properties that would receive grant funds to implement IWISH. The remaining 84 properties were assigned to a control group.

To select properties for each group, HUD assigned weights to each property on the basis of the rate of Medicare fee-for-service participation in its county and the property's budget request in its funding application. HUD used those weights to order the properties for random assignment. HUD also considered the location of the properties so that within each state, treatment and control properties were located close to one another.

Three Demonstration Groups to Detect IWISH Impacts

Three demonstration groups were used in the impact analysis:

- **IWISH Group.** The 40 treatment group properties were asked to implement the model fully for a 3-year demonstration period. They received funding to support Resident Wellness Director and Wellness Nurse positions for 3 years plus supplemental funding to support health and wellness programming for residents and training and technical assistance for staff.

The 84 properties randomly assigned to a control group did not implement the IWISH model; they form the control group for the impact analysis. For the implementation study, the control properties were divided in two:

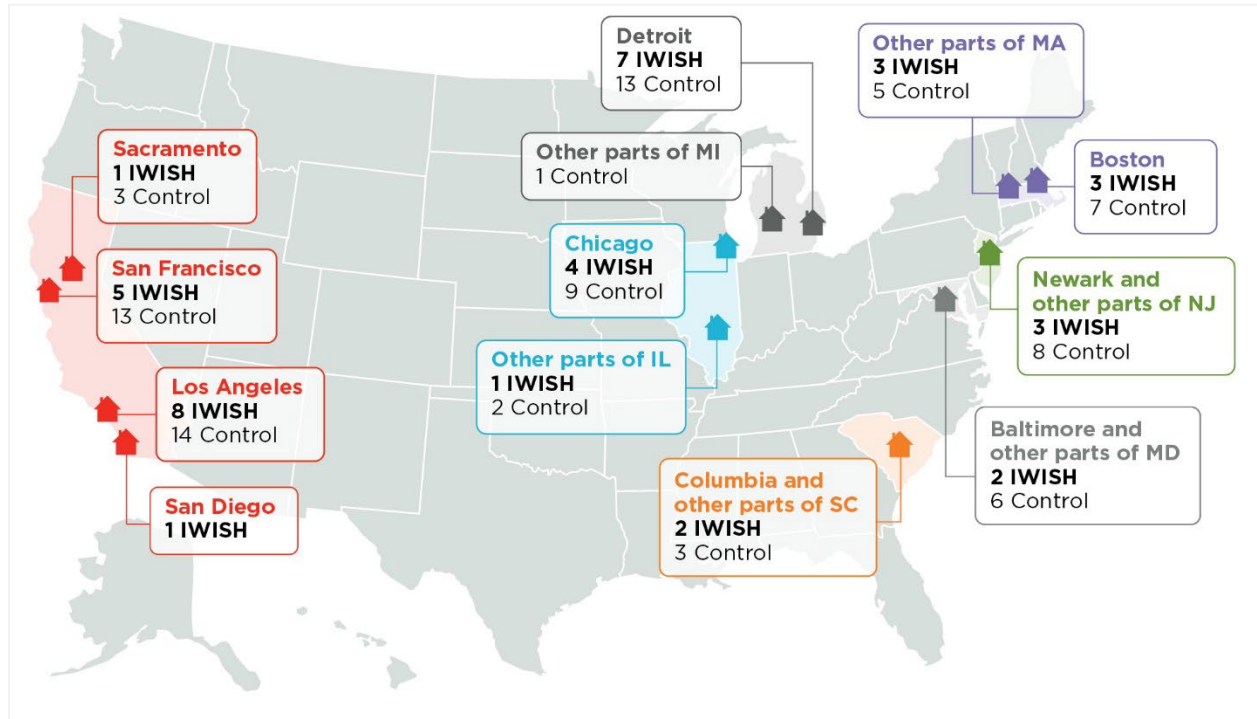
- **Active Control Group.** These 40 properties received a nominal fee for their property management and service coordination staff to participate in telephone and in-person interviews with the study team as part of the implementation study.
- **Passive Control Group.** Staff from these 44 properties were not interviewed as part of the implementation study.

The main purpose of the control properties is to compare the outcomes of residents at the IWISH properties to outcomes of residents at HUD-assisted properties that do not have access to the additional resources offered by the IWISH model.

The only difference between the active and passive control groups is that property management and Service Coordinators in the active control properties participated in interviews with the study team for the evaluation, and those in the passive control properties did not. Information gained from the interviews allowed the study team to compare the supportive services available at the active control properties with services at the IWISH properties. Although that information represents only one-half of the full control group, it sheds light on what services might be available at HUD multifamily properties without IWISH.

Exhibit 2-1 shows the demonstration's 124 properties by state and their approximate locations.

Exhibit 2-1. Map of Demonstration Properties



The 124 properties in the demonstration are all buildings that are restricted to or designated for older adults. About 40 percent of the properties participating in the demonstration are funded through the Section 202 PRAC program; the other 60 percent of the properties are funded through the Project-Based Section 8 rental assistance program but have a resident population restricted to older adults.

2.2 Phase 1 Implementation Study

The Phase 1 implementation study examined to what degree the 40 IWISH properties implemented the demonstration with fidelity to the IWISH model from October 2017 through September 2020 and how implementation varied across properties.

Implementation Study Research Questions and Data Sources

The implementation study's research questions address IWISH implementation across the 40 treatment properties, the experiences of staff and residents, and how the resident supports provided at the IWISH properties differed from supports provided at the active control properties. The study assessed how IWISH staff worked together to implement the IWISH model; which aspects of the model IWISH staff, property management staff, and residents found the most beneficial; and which ones they found the most challenging. The study team also examined how the IWISH model—as implemented during the first phase of the demonstration—differed from service coordination in the 40 active control properties.

The implementation study is based primarily on qualitative research at the IWISH and active control properties. Between 2018 and 2020, the study team conducted site visits and interviews with IWISH Resident Wellness Directors and Wellness Nurses; Service Coordinators at active control properties; and property managers and owners of IWISH and control properties. The study team also led focus groups

with residents at six active control properties and analyzed IWISH program and resident assessment data collected through the case management data system used by IWISH staff.

Exhibit 2-2 presents the Phase 1 Implementation research questions and the data sources used to answer them.

Exhibit 2-2. Implementation Analysis Research Questions and Data Sources, IWISH and Active Control Properties

Research Question	Interviews with Property and IWISH Staff	Focus Groups with Residents	IWISH Program Data
What are the experiences of residents, wellness staff, and property management staff with implementing the IWISH model?	✓		
What are the perceived benefits, strengths, and weaknesses of the IWISH model?	✓	✓	
Within the treatment group, did residents' perceptions of their health, well-being, and satisfaction with housing and services change?	✓	✓	
Across the IWISH properties, was the demonstration implemented with fidelity to the IWISH model?	✓		✓
What factors explain or contribute to the observed variation in fidelity to the IWISH model across the treatment properties?	✓	✓	✓
How does the service coordination and health and wellness programming provided at the IWISH properties differ from that provided at active control properties?	✓	✓	

Rating System to Assess How Properties Implemented the IWISH Model

As part of the implementation study, the study team developed a fidelity rating system to identify the differences in implementation across the treatment properties and the extent to which services differed between IWISH and active control properties. The rating measures were developed in consultation with the study's expert panel and based on IWISH program data and interviews with wellness and property staff.

The study team assessed to what extent the 40 treatment properties implemented the IWISH model with fidelity in three areas: implementation of the six core components, staffing of the Resident Wellness Director and Wellness Nurse throughout the 36-month demonstration, and the extent to which staff provided enhanced service coordination services to residents. The rating system assigned fidelity levels of high, medium, and low implementation.

For the IWISH properties, the study team analyzed interview responses and IWISH program data. For the active control properties, the study team relied on responses from a telephone survey conducted with staff in 2018 and interviews in 2019 and 2020. For the ratings based solely on interview data, the study team sorted and analyzed relevant interview responses by individual property and assigned ratings based on the responses.

Exhibit 2-3 shows the data sources for each category of ratings. (For a description of the rating system and results, see appendix A of the *Second Interim Report*.)

Exhibit 2-3. Data Sources for Fidelity Ratings by Category

Category	IWISH Properties	Active Control Properties
Onsite Services Staffing		
Resident Wellness Director Staffing	Implementation reports, staff interviews	Staff interviews
Wellness Nurse Staffing	Implementation reports, staff interviews	Staff interviews
IWISH Core Components		
Resident engagement in services	IWISH program data	Staff interviews
One-on-one health and wellness assessments	IWISH program data	Staff interviews
Individual and Community Healthy Aging Plans	IWISH program data, staff interviews	Staff interviews
Evidence-based programming based on resident needs	Program reports, staff interviews	Staff interviews
Healthcare partnerships	Staff interviews	Staff interviews
Web-based data system	Program reports, staff interviews	Staff interviews
Enhanced Service Coordination		
Standardized transitional care coordination	Staff interviews	Staff interviews
Medication self-management assistance	Staff interviews	Staff interviews
Family and caregiver interaction	Staff interviews	Staff interviews

Previous Reports from the Phase 1 Implementation Study

Detailed results from the Phase 1 Implementation study are reported in the study’s *First* and *Second Interim Reports* (see Giardino et al., 2021; Turnham et al., 2020).

The *First Interim Report* describes the baseline characteristics of residents living at IWISH properties, drawing on HUD administrative data, Medicare claims data, and public use data sources. It describes the first 18 months of IWISH implementation (October 2017 through March 2019). The report focuses on the process of hiring and retaining IWISH staff and implementing key startup IWISH activities, such as enrolling residents in the program and initially assessing their health and wellness needs. The first report can be found here: https://www.huduser.gov/portal/publications/IWISH_FirstInterimReport.html.

The *Second Interim Report* describes the experiences of IWISH staff and residents with implementing IWISH during the initial 3 years of the demonstration (October 2017 through September 2020). The report assesses to what extent the 40 treatment properties implemented the core components of the IWISH model. It also describes the differences in experiences and contexts across the IWISH properties and the extent to which services differed between treatment and control properties. The second report can be found here: https://www.huduser.gov/portal/publications/IWISH_SecondInterimReport.html.

2.3 Phase 1 Impact Study

The Phase 1 Impact Study measures the impact of the first 3 years of the IWISH model on healthcare use and spending, housing tenure, and transfers to long-term care facilities as residents age.

Impact Study Research Questions and Outcome Measures

In consultation with HUD and the expert panel for the evaluation, the study team identified primary research questions to guide the IWISH impact study:

1. **What is the impact of IWISH on housing exits and resident tenure?**
2. **What is the impact of IWISH on transitions to long-term institutional care?**

3. **What is the impact of IWISH on the utilization of Medicare and Medicaid covered unplanned hospitalizations and other acute or emergency care services?**
4. **What is the impact of IWISH on the utilization of Medicare and Medicaid covered primary care and other nonemergency healthcare services?**

To answer the four research questions, the impact study uses HUD administrative data linked with Medicare and Medicaid claims data and publicly available data on community characteristics.

Each research question is evaluated using multiple outcome measures. The study team prespecified one key outcome measure for each research question as “**confirmatory**” when drawing conclusions about IWISH’s impact. Randomized controlled trials use a limited number of confirmatory outcomes to establish whether a program has met its goals to avoid the problem that occurs when impacts are measured for many different outcomes: some impacts may appear as statistically significant when the apparent significance is due to random chance.

1. **Residency ended, for any reason.**
2. **Residency ended due to transition to long-term care.**
3. **Total days of unplanned hospitalization.**
4. **Number of days with a primary care visit.**

Those four outcomes were deemed confirmatory in that they were most important for answering the four research questions and for determining whether the goals of IWISH were met. That is, if the study were to find an impact on any of the confirmatory measures, one would be able to provide a definitive answer to the relevant research question.

In addition to the confirmatory outcomes, each research question also has a set of “**secondary**” **outcomes**. Secondary outcomes are additional indicators tied to the logic of how the IWISH model is expected to influence outcomes related to each of the four research questions. If the study were to not find an impact on the confirmatory outcome but did find an impact on one or more of its secondary outcomes, one would be able to draw inferences about the potential of IWISH to achieve impacts, but one would be less confident about IWISH’s overall impact on housing exits and healthcare use.

In addition to secondary outcome measures for each research question, the study team also analyzed some secondary outcome measures that span multiple research questions:

- **Days in the community** is defined as the number of days that residents were alive, not residing in an institution for long-term care, were not admitted to a facility for acute inpatient care, and did not have an outpatient emergency department visit or observation stay. An increase in the number of days in the community means that there was a decrease in the number of days that residents needed acute care or the rate at which residents used or transitioned to a long-term care facility.
- **Total Medicare fee-for-service spending** could reflect changes in overall healthcare use. A short-term increase in the use of nonacute healthcare services and a longer-term decrease in the use of acute care services likely will be associated with a short-term increase and longer-term decrease in total spending.

Exhibit 2-4 shows the full set of confirmatory and secondary outcome measures the research design planned to analyze for each research question, with the main data sources used to create each measure. Appendix H, exhibit H-1 categorizes and describes the types of data collected and their purpose in the impact study.

Exhibit 2-4. Impact Study Outcome Measures and Main Data Sources, by Research Question

Outcome Measure ^a	Medicare Fee-for-Service				Medicaid			Other			
	Medicare Inpatient	Medicare Outpatient	Medicare Carrier	Other Medicare Files ^b	Inpatient Hospital	Other Services	Long-Term Care	Demographic & Eligibility	Medicare Summary File	Minimum Dataset ^c	HUD TRACS Data
1. What is the impact of IWISH on housing exits and resident tenure?											
●Residency ended, for any reason				✓			✓	✓	✓	✓	✓
Residency ended due to death				✓			✓	✓	✓	✓	✓
2. What is the impact of IWISH on transitions to long-term institutional care?											
●Residency ended, transition to long-term care				✓			✓	✓	✓	✓	✓
Days in a long-term care institution				✓			✓			✓	
3. What is the impact of IWISH on the utilization of Medicare and Medicaid covered unplanned hospitalizations and other acute care?											
●Total days of unplanned hospitalization	✓				✓						
Unplanned hospital admissions	✓				✓						
Unplanned hospital readmissions within 30 days of previous hospital discharge	✓				✓						
All-cause emergency department visits not resulting in hospital admission	✓	✓			✓	✓					
Ambulance events		✓	✓			✓					
4. What is the impact of IWISH on the utilization of Medicare and Medicaid covered primary care and other nonacute healthcare services?											
●Number of days with a primary care (evaluation and management) visit			✓			✓					
New use of specialty care services			✓			✓					
Cross-Cutting Measures											
Days in the community	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total Medicare fee-for-service spending	✓	✓	✓	✓							

● = confirmatory outcome. TRACS = Tenant Rental Assistance Certification System.

^a Healthcare use measures (such as days of unplanned admissions and hospital readmissions) are specified as the number of days or events per resident per 1,000 resident months to accommodate longitudinal analysis, and because the study stops following residents' healthcare use when they exit the property or switch to Medicare managed care coverage.

^b Other Medicare Files include Home Health, Hospice, Skilled Nursing Facility, Durable Medical Equipment, and Part D event data.

^c Minimum Dataset is a database of clinical or functional assessments of patients residing in a nursing or skilled nursing facility.

Impact Analysis

The impact study is designed to detect statistical differences in rates of housing exits and healthcare use between all residents who were residing at IWISH properties and all residents who were residing at control properties at the time the demonstration started.

Primary Analysis Estimates Impact of Offering IWISH

The study's primary impact analysis used the cluster-randomized controlled trial design of the IWISH demonstration to estimate the impact of offering a housing-based wellness program to HUD-assisted residents of IWISH properties. The impact of *offering* a program is often referred to as the impact of the "intent-to-treat" (ITT). The study pooled active control and passive control property residents into one control group and estimated IWISH's impact as the difference between the average outcomes among residents of 40 IWISH properties and the average outcomes among residents of 84 control properties.

The study also estimated the impact of the "treatment on the treated" (TOT), which reveals the impact of the IWISH model on residents who *chose to enroll* in the program. The TOT estimate is essentially the ITT estimate weighted by the proportion of IWISH residents who ever enrolled in IWISH and is based on the notion that IWISH's estimated effect on outcomes among all HUD-assisted residents at IWISH properties is driven by those who participated to any extent in the model. Appendix C, exhibit C-2 presents the TOT estimates.

Analysis of IWISH's Impact on Housing Tenure and Healthcare Use by Subgroups of Residents

Although the total number of IWISH residents limits the study team's ability to detect statistically significant differences among small subsets of residents, the team was able to estimate how the effects of IWISH on the confirmatory and secondary outcome measures varied across some of the larger subgroups of residents on the basis of race and ethnicity, age, household size, how long the resident had lived in the property, and high versus low use of healthcare before the demonstration started.

Additional Analysis of Outcomes

The study team conducted additional analyses of outcomes to explore the effect of IWISH by specific implementation, property, or neighborhood factors.

Nonexperimental Analysis of How Outcomes Are Related to Implementation of IWISH Core Components

Using the fidelity ratings developed for the implementation study, the study team conducted analyses to assess whether the outcomes for IWISH residents were correlated with how certain aspects of the IWISH model were implemented at their properties during the first 3 years of the demonstration.

Nonexperimental Analysis on How Outcomes Are Related to Property and Neighborhood Characteristics

The study conducted analyses of how outcomes among IWISH properties are related to property and neighborhood characteristics that may influence the expected outcomes of the model, including whether the property had a Service Coordinator before the start of the demonstration and whether properties were in neighborhoods with access to transportation and community services.

Research Design and Analysis Plan

Additional details for the impact study can be found in the *Research Design and Analysis Plan for the Impact Study* at <https://www.huduser.gov/portal/sites/default/files/pdf/Impact-Study-Research-Design.pdf>.

3. Demonstration Residents and Properties

This chapter presents the resident, property, and community characteristics of the Supportive Services Demonstration at baseline, the starting point of the demonstration. The baseline period for this study is the period immediately preceding the official start of the demonstration on October 1, 2017. The residents included in the evaluation are all residents living at the 40 properties implementing the Integrated Wellness in Supportive Housing model and at the 84 control properties as of September 30, 2017, and those who moved to the properties by September 30, 2018, after the demonstration started.

The purpose of randomly assigning the properties in the demonstration to treatment and control groups is to ensure that any differences in the characteristics of the treatment and control group members are due to chance. Although some differences are to be expected and can be controlled for in analysis through multivariate regression, successful randomization of properties should result in similar distributions of observable and unobservable characteristics across the treatment and control properties and their residents.

The study team identified some statistically significant differences between the characteristics of IWISH residents and control group residents. The study used generalized least squares regression to control for observable differences between the two groups when estimating the IWISH model's impact on housing exits and healthcare use.¹² Therefore, the team is confident that estimated differences in the housing exits and healthcare use rates during the demonstration are not influenced by differences in average resident characteristics between the two groups.

Section 3.1 summarizes information presented in the *First Interim Report*, which describes the baseline characteristics of residents living at IWISH and control properties. Section 3.2 describes the smaller sample of study members used to estimate the impact of IWISH on healthcare use and how that sample was developed. Section 3.3 provides information on the characteristics of the IWISH properties and neighborhoods.

3.1 Baseline Characteristics of All IWISH and Control Group Residents

The study team analyzed the demographic and housing characteristics of residents living in the IWISH and control properties as of September 2017 using data from HUD's Tenant Rental Assistance Certification System (TRACS).

Baseline Characteristics of All HUD-Assisted Residents in IWISH Properties

The study team identified 4,274 HUD-assisted residents living at IWISH properties before the start of the demonstration in September 2017. The IWISH resident population is diverse.

As of September 2017, according to TRACS data—

- Most residents of IWISH properties (82 percent) lived in single-person households; another 18 percent were in two-person households. Fewer than 1 percent were in households of three or more people.

¹² The models risk-adjust for any differences in individual characteristics presented in exhibits 2-1 and 2-2 that were statistically significant at the 10-percent level.

- The average resident was about 76 years old and had lived in the property for about 7½ years, meaning that they moved in when they were in their late 60s. Overall, 96 percent of the residents of IWISH properties were aged 62 or older, including 53 percent aged 75 or older and 17 percent aged 85 or older.
- About 69 percent of residents of IWISH properties were women. Nationally, 56 percent of people aged 65 and older are women (2013–2017 American Community Survey (ACS) 5-year estimates).
- One-fourth of residents were Black or African-American (26 percent), almost one-fifth (18 percent) were Asian or Pacific Islander, and 49 percent were White. Thirteen (13) percent of residents identified their ethnicity as Hispanic.

IWISH Resident Characteristics Vary at the Property Level

Although IWISH residents overall displayed some common characteristics, specific IWISH properties varied highly in the characteristics of their resident populations. For example, some properties had lengths of stay before the start of the demonstration averaging 5 years; in others, residents’ average stay was 12 years. In some properties, almost all residents identify as White, including properties with sizable European immigrant populations. In other properties, almost all residents identify as African-American/Black or as Asian/Pacific Islander. Some properties are racially mixed. At some properties, a sizable share of residents is aged 85 or older, whereas at other properties the percentage of residents aged 85 or older is quite small.

Although there is wide property-level variation in resident characteristics, the impact study groups together residents of properties and analyzes average differences in rates of housing exits and healthcare use between all residents in IWISH properties and all residents in control properties.

Comparison of IWISH and Control Group Baseline Characteristics

The study team identified 9,970 residents of the 84 control properties as of September 2017. Exhibit 3-1 presents baseline demographic, socioeconomic, and housing characteristics of residents living in IWISH and control properties and identifies differences that are statistically significant at the 5- or 10-percent level.

Exhibit 3-1. Baseline Characteristics of IWISH and Control Group Residents as of September 2017

Variable	Treatment Group (n = 4,274)		Control Group (n = 9,970)		Difference	p-Value ^b
	Percentage / Mean	Standard Deviation ^a	Percentage / Mean	Standard Deviation		
Residents by Age Category ^c						
Younger than 62	4.0		4.4		-0.4	.691
Aged 62–64	4.1		4.2		-0.1	.875
Aged 65–74	38.7		33.9		4.8	.049**
Aged 75–84	36.4		36.4		0.0	.980
Aged 85+	16.8		21.2		-4.4	.019**
Aged, years	75.9	9.6	77.0	9.8	-1.1	.129
Age at move-in, years	68.5	8.9	69.1	9.2	-0.6	.254
Residents by Sex						
Women	69.3		69.1		0.2	.919

Variable	Treatment Group (n = 4,274)		Control Group (n = 9,970)		Difference	p-Value ^b
	Percentage / Mean	Standard Deviation ^a	Percentage / Mean	Standard Deviation		
Men	30.7		30.9		-0.2	.828
Residents by Race						
African-American or Black	25.9		22.0		3.9	.540
Asian	17.6		20.8		-3.2	.611
White	49.4		50.4		-1.0	.884
Other race	3.2		3.9		-0.7	.497
Unknown race	4.5		3.7		0.8	.463
Residents by Ethnicity						
Hispanic	13.4		12.1		1.3	.772
Non-Hispanic	86.6		87.9		-1.3	.772
Residents by Household Size						
One-person households	81.9		77.1		4.8	.116
Two-person households	17.9		22.7		-4.9	.114
Three- or more person households	0.2		0.2		0.0	.840
Residents by Household Characteristics						
Length of stay, years ^d	7.4	6.2	7.9	6.5	-0.5	.366
Annual household income, dollars	13,972	5,732	14,591	6,832	619	.228
Rent burden, percentage ^e	27.7	4.5	27.3	5.5	0.4	.418

^a Standard deviations are shown for continuous variables only.

^b p-Values were calculated using estimates from regression of each variable on a treatment or control group indicator using individual-level data and cluster-robust standard errors.

^c Age at baseline calculated as of October 1, 2017, if residents moved in before the demonstration began, and as of the resident's move-in date if they moved in after the demonstration began but before October 1, 2018.

^d Duration of stay from move-in date until October 1, 2017.

^e Rent burden is calculated as tenant rent as a percentage of adjusted income and capped at 100 percent.

** p-value <.05.

Source: HUD TRACS data, September 2017

The Analysis Controls for One Observable Difference Between IWISH and Control Group Residents

The study team conducted detailed comparative analysis of the two groups and found that the treatment and control groups are well matched in all but one observable resident characteristic. Residents of IWISH properties were somewhat younger than the control group residents as of the start of the demonstration. About 5 percent more residents of IWISH properties were between 65 and 74, and 4 percent fewer residents were aged 85 or older. The analyses to estimate the impact of the IWISH model on housing tenure and healthcare use risk-adjust for age differences between IWISH and control group residents to ensure unbiased comparisons.

3.2 Baseline Characteristics of the Healthcare Sample

The study was able to analyze healthcare use for only about one-half of all residents living at the IWISH and control properties at baseline and then measure impacts. This group is known as the “Healthcare Sample” and consists of IWISH residents (“IWISH Healthcare Sample”) and control group residents (“Control Healthcare Sample”).

The study initially identified 4,003 individuals age 62 and older who resided at the IWISH properties on October 1, 2017, or moved into a property before October 1, 2018.¹³ The IWISH Healthcare Sample consists of 2,031 individuals, which is only half of the full treatment group. This 2,031 number reflects several adjustments the study team made to account for available data, as detailed in appendix A, exhibit A-1, and summarized below.

To arrive at the IWISH Healthcare Sample, the study team linked IWISH residents to Medicare and Medicaid enrollment data from October 1, 2015, through September 30, 2020. The team then restricted that sample of IWISH residents to be able to measure all healthcare use completely and accurately across every individual in the sample. Because the team did not have access to Medicare managed care encounter data for the entire demonstration period,¹⁴ the sample was restricted to individuals continuously enrolled in a Medicare fee-for-service plan, or any Medicaid plan with full coverage, for at least 6 consecutive months after baseline. The study team also required that Medicare beneficiaries be continuously enrolled in *both* Medicare Part A (hospital insurance) and Part B (medical insurance).

The Control Healthcare Sample also was about one-half of the full control group and reflects similar adjustments.

Comparison of IWISH Healthcare Sample to All IWISH Residents

The demographic characteristics of the IWISH Healthcare Sample differ somewhat from the full group of IWISH residents. Residents in the IWISH Healthcare Sample had lived at their properties about 7 months longer, on average, than the full group of IWISH residents. Residents in the IWISH Healthcare Sample were somewhat more likely to be women, identify as White and non-Hispanic, and be younger than age 65 or age 85 and older. They were less likely to identify as Hispanic or as non-Hispanic African-American/Black. Those differences are relatively small in magnitude but potentially limit the generalizability of the estimated impact of the IWISH model on healthcare use to the broader universe of HUD-assisted multifamily properties implementing the IWISH model.¹⁵

The analysis of differences of individual characteristics of all HUD-assisted residents in the IWISH Healthcare Sample compared with all residents of the IWISH group are presented as appendix A, exhibit A-2.

¹³ The study team refined the IWISH sample after the first interim report with additional TRACS extracts, Medicare enrollment data, nursing home assessment data, and long-term care Medicaid claims. Out of the initial 4,274 IWISH residents, 364 residents were dropped due to potentially erroneous data from the initial TRACS extract. Of the remaining 3,910 residents at IWISH properties on October 1, 2017, 166 were younger than 62, 16 residents died on or near the start of the demonstration (October 1, 2017), and 20 residents appeared to reside in long-term care at the start of the demonstration. The final IWISH sample included an additional 295 residents aged 62 or older who moved into an IWISH property by September 30, 2018. The team applied the same standards and restrictions to the control group.

¹⁴ Preliminary 2019 Medicare Advantage data were released after the study team received the final extract of Medicare administrative data for the impact study. The next phase of the evaluation will include Medicare Advantage data through 2023.

¹⁵ The next phase of the evaluation will include Medicare Advantage data through 2023, and the impact of IWISH on healthcare use during the first 3 years of the demonstration will be updated to reflect the full demonstration sample.

Comparison of IWISH and Control Group Residents Within the Healthcare Sample

The Control Healthcare Sample for the healthcare use analyses was also about one-half of control property residents. The study identified 9,354 individuals aged 62 or older who resided at the control properties on October 1, 2017, or moved into the property before October 1, 2018. The team excluded 4,578 residents of control properties from the analysis of healthcare use who were not continuously enrolled in Medicaid (with full coverage) or Medicare Parts A and B (and not managed care) for at least 6 consecutive months after baseline, leaving 4,776 (51 percent) individuals in the Control Healthcare Sample.

Significant Differences in Demographic Characteristics of IWISH and Control Healthcare Samples

Exhibit 3-2 compares the demographic characteristics of IWISH and control group residents in the IWISH and Control Healthcare Samples at baseline.

The IWISH Healthcare Sample was somewhat younger than the Control Healthcare Sample, with a greater proportion of residents aged 65 through 74 and a smaller proportion of residents aged 85 or older. Slightly larger proportions of IWISH residents identified as non-Hispanic African-American/Black and identified as Hispanic, and a smaller proportion of residents identified as Asian and non-Hispanic. IWISH residents were also more likely to live alone, and they lived at the property, on average, for about 4 fewer months (0.3 years) at baseline. Because of those differences, the analysis of healthcare use presented in chapter 6 risk-adjusts comparisons of IWISH and control group residents’ outcomes by age group, race and ethnicity, whether the resident lived alone, length of residency, as well as for certain chronic or potentially disabling conditions, which are discussed below.

Exhibit 3-2. Characteristics of Residents of IWISH and Control Properties in the Healthcare Sample

Variable	IWISH Healthcare Sample (n = 2,031)		Control Healthcare Sample (n = 4,776)		Difference	p-Value ^b
	Percentage / Mean	Standard Deviation ^a	Percentage/ Mean	Standard Deviation		
Residents by Age Category						
Age 62–64	6.5		7.3		– 0.8	.255
Age 65–74	37.7		33.5		4.1	.001***
Age 75–84	38.2		36.7		1.5	.248
Age 85+	17.6		22.5		– 4.9	<.001***
Residents by Sex						
Women	70.3		71.1		– 0.9	.474
Residents by Race and Ethnicity ^c						
African-American or Black	22.8		20.1		2.7	.013**
Asian	18.0		21.3		– 3.3	.001***
White	45.3		47.0		– 1.7	.198
Hispanic	9.4		7.6		1.8	.014**
Other race	1.7		1.7		0.0	.985
Unknown race	2.7		2.3		0.4	.287
Residents by Household Characteristics						
Lives alone	83.7		79.5		4.3	<.001***
Resident tenure, years	7.4	6.4	7.7	6.8	– 0.3	.064*

Variable	IWISH Healthcare Sample (n = 2,031)		Control Healthcare Sample (n = 4,776)		Difference	p-Value ^b
	Percentage / Mean	Standard Deviation ^a	Percentage/ Mean	Standard Deviation		
Resident Duration of Healthcare Coverage						
Months continuously enrolled in Medicaid (with full coverage) or Medicare Parts A and B and not Medicare managed care during the demonstration	31.0	8.6	31.3	8.2	- 0.2	.289

* p-value <0.10. ** p-value <.05. *** p-value <.01.

^a Standard deviations are shown for continuous variables only.

^b p-Values were calculated using estimates from regression of each variable on an indicator for treatment or control using individual-level data and robust standard errors.

^c Information on race and ethnicity from the Medicare administrative data supplemented race and ethnicity data in TRACS. To align the two data sets, the study distinguishes racial and ethnic groups as Hispanic and any race or non-Hispanic and Black/African-American, Asian, White, other race, or unknown race.

Note: Residents in the IWISH and Control Healthcare Samples were aged 62 or older at baseline, enrolled in Medicare Parts A and B or Medicaid with full coverage at baseline, and covered during their first 6 months in the demonstration.

Sources: Centers for Medicare & Medicaid Services, Medicare enrollment records, October 2017–March 2019; HUD TRACS data, September 2017–2018; Medicaid enrollment records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–March 2019

IWISH and Control Group Residents Were Enrolled in Medicare and Medicaid for the Same Amount of Time

The IWISH and Control Healthcare Samples could have up to 36 consecutive months of healthcare use during the demonstration period. The study team was able to follow the healthcare use of IWISH and control group residents for nearly the same length of time. On average, the residents in both Healthcare Samples were continuously enrolled in Medicaid (with full coverage) or Medicare Parts A and B (and not managed care) for 31 consecutive months after baseline. More than half of the IWISH and Control Healthcare Samples had a full 36 months of utilization data; three-fourths had at least 28 months of continuous Medicaid or Medicare fee-for-service coverage; and 90 percent had at least 15 months of continuous coverage.

IWISH and Control Healthcare Samples Show Similarly High Rates of Chronic or Potentially Disabling Conditions

The study used the Medicare Beneficiary Summary Files for 2017–2018 and Medicaid administrative data for 2015–2018 to examine the prevalence of 27 chronic conditions common to the overall Medicare population. The study found that, in general, IWISH residents were in worse health compared with the overall Medicare fee-for-service population. For example, the following chronic conditions were 9 to 17 percentage points more prevalent in the IWISH Medicare fee-for-service sample: hypertension, hyperlipidemia (high cholesterol), rheumatoid arthritis or osteoarthritis, diabetes, ischemic heart disease, anemia, chronic kidney disease, and benign prostatic hyperplasia (enlarged prostate). Only one condition was lower in the IWISH Medicare fee-for-service sample than in the overall Medicare fee-for-service population: cataracts.

An overwhelming majority of residents in both the IWISH (88 percent) and Control (89 percent) Healthcare Samples were diagnosed with one or more chronic conditions. Nearly one-half of the IWISH and Control residents had five or more conditions: 49 percent in both cases.

The prevalence of those chronic conditions in the IWISH Healthcare Sample was largely similar to the Control Healthcare Sample. More than one-half of residents in the IWISH and Control Healthcare Samples were diagnosed with high cholesterol (52 percent of the IWISH sample and 55 percent of the Control sample) or high blood pressure (70 percent and 72 percent). More than one-third of the IWISH and Control Healthcare Samples were diagnosed with diabetes (37 percent in both cases) or rheumatoid/osteoarthritis (43 percent and 41 percent). More than one-tenth of residents in the IWISH (12 percent) and Control (13 percent) Healthcare Samples were diagnosed with Alzheimer’s disease, related disorders, or senile dementia. Nine (9) percent of the IWISH and Control Healthcare Samples had been diagnosed with either lung, colorectal, prostate, breast, or endometrial cancer at baseline.

Because about three-fourths of residents in the IWISH Healthcare Sample were dually eligible for Medicare and Medicaid, the study also examined the prevalence of 35 other chronic or potentially disabling conditions more common among the dual-eligible population, including mental health and substance abuse conditions, developmental disorder and disability-related conditions, and other chronic physical and behavioral health conditions. Nearly two-thirds of the IWISH Healthcare Sample had at least one of those other conditions. Among those conditions, the most prevalent were fibromyalgia, chronic pain or fatigue (25 percent and 23 percent), pulmonary vascular disease (23 percent and 23 percent), and obesity (21 percent and 20 percent).

The Study Controls for Differences in Chronic or Potentially Disabling Conditions Between IWISH and Control Healthcare Samples

The study found statistically significant differences at either the 5- or 10-percent level between the IWISH and Control Healthcare Samples in nine chronic or potentially disabling conditions that were examined: hyperlipidemia, depression, chronic obstructive pulmonary disease, congestive heart failure, cataracts, stroke/transient ischemic attack, Alzheimer’s disease, epilepsy, and traumatic brain injury (which includes nonpsychotic mental disorders due to brain damage). The analysis risk-adjusts for those nine chronic or potentially disabling conditions to estimate the unbiased impact of the IWISH model on healthcare use.

3.3 Characteristics of Demonstration Properties and Neighborhoods

Characteristics of the neighborhoods where residents of IWISH and control properties live, as well as characteristics of the properties themselves, could affect the intended impacts of the IWISH model. The impact analysis compares average outcomes for IWISH residents (treatment group) with outcomes for residents in the control group. Looking at averages across residents in the two groups, however, masks property-level or community-level characteristics that could affect how IWISH is implemented and how well it works. In fact, the 40 IWISH properties and the communities in which they are located are highly varied.

The study team analyzed data from the American Community Survey (ACS) and the AARP Livability Index to understand the characteristics of the neighborhoods where demonstration properties are located. The study team also surveyed IWISH and property staff about property and community characteristics that could pose challenges to residents continuing to live independently.

The study team did not find any substantial differences in property size, type, or features between the treatment and control properties. Likewise, the study did not find any substantial differences in the community characteristics between IWISH and control groups. Most treatment and control properties in a

state are in the same metropolitan area, and many are in the same neighborhood. The remainder of this section describes the property and neighborhood characteristics of only the IWISH group.

Physical Characteristics of IWISH Properties

The study team analyzed characteristics of the IWISH properties, drawing on household data from TRACS, property inspection data compiled by the Real Estate Assessment Center (REAC), and information collected through surveys and interviews with property management and services staff.

IWISH Properties Range in Property Type and Size

The 40 IWISH properties range in size from 51 to 420 units, with an average size of 108 units. About one-half (21 of 40) are low-rise buildings (one to three floors); the other half are highrise (four or more floors). The mix of building types varies somewhat by state: California and New Jersey have a higher share of low-rise buildings; Illinois, where three of the five IWISH properties are in Chicago, has a greater share of highrise buildings.

Most IWISH Properties Are in Good or Average Physical Condition, but Almost One-Half Had Severe Health and Safety Deficiencies

IWISH properties did not vary substantially in physical condition based on HUD inspection data. Most of the IWISH properties were in good or average physical condition based on the scores from their most recent inspection from HUD as of 2019. Ninety-five (95) percent of the IWISH properties (38 of 40) scored in the top two inspection categories versus 81 percent of all HUD multifamily properties.¹⁶

Despite being in good physical condition overall, almost one-half (45 percent) of IWISH properties had at least one life-threatening deficiency on the last inspection. *Life-threatening* deficiencies include electrical hazards, inadequate ventilation of heating or cooling equipment, blocked exit doors or fire escapes, or missing or inoperable fire extinguishers.

IWISH Staff Reported Property Features that Could Present Challenges to Aging in Place

To provide another perspective on property conditions, the study team asked Resident Wellness Directors, as part of the telephone survey fielded in the fall of 2018, about property features or conditions (related to the units, building, or grounds) that could present a challenge to residents aging in place.

Resident Wellness Directors at 28 of the 40 IWISH properties (70 percent) identified at least one property feature as a challenge to aging in place, but no clear patterns emerged. The most common issues were the lack of peepholes or closed-circuit video (nine properties), followed by the lack or inadequacy of elevators (eight properties) and accessibility issues in the bathroom in the resident's unit (seven properties). Several Resident Wellness Directors mentioned inadequate parking as a problem that could result in challenges to residents aging in place. Concerns about adequate parking included the overall size of the parking lot, the number of handicapped spots, and the distance of parking from the property. Staff noted that limited parking meant that family and friends were less likely to visit residents.

Neighborhood Population Characteristics

Neighborhood characteristics are not something IWISH was designed to address, but they can affect residents' length of stay in the property, their access to services they want and need in the community as they age, and their overall quality of life. Neighborhood quality issues are also something that can affect

¹⁶ Scoring in the top two categories was not a criterion for eligibility for the demonstration. To be eligible, a property had to have passed its most recent inspection (that is, scored 60 or above).

staffing at the properties—for example, if people are reluctant to work at a property because of neighborhood conditions.

Exhibit 3-3 presents select ACS data for the census tracts in which the IWISH properties are located and for all census tracts in the United States as a whole. (Census tracts approximate the neighborhoods where IWISH properties are located.)

Exhibit 3-3. Neighborhood (Census-Tract) Characteristics of IWISH Properties, 2017

	Tracts Containing IWISH Properties				All U.S. Tracts
	Minimum	Maximum	Median	Mean	Mean
Percentage of population below 100 percent of poverty level	4%	53%	19%	21%	15%
Median income of residents in 2017 dollars	\$11,846	\$91,250	\$24,630	\$29,659	\$28,776
Percentage of population age 25 and older with a bachelor's degree or higher	8%	83%	28%	34%	31%
Percentage of population White and non-Hispanic	1%	99%	44%	45%	62%
Percentage of population age 5 and older speaking English "less than very well"	0%	66%	10%	14%	8.5%

Source: Table S0601, "Selected Characteristics of the Total and Native Population in the United States," 2013–2017 American Community Survey 5-year estimates (accessed from American Fact Finder, July 2019)

IWISH Properties Are in Highly Diverse Neighborhoods

IWISH properties are in highly diverse neighborhoods. The percentage of residents living below the poverty level in IWISH neighborhoods ranges from 4 to 53 percent, with an average of 21 percent. The national average poverty rate is 15 percent. Of the 40 IWISH properties, 19 are in neighborhoods with poverty rates of 20 percent or higher; 3 are in neighborhoods with poverty rates above 40 percent. Other measures shown in exhibit 3-3, such as median income and educational attainment, are often correlated with poverty.

The neighborhoods where IWISH properties are located range in racial and ethnic composition. Of the 40 IWISH neighborhoods, 16 have a higher share of White and non-Hispanic residents than the national average of 62 percent. The other 24 neighborhoods are more diverse, including 9 where less than 10 percent of the population identifies as White and non-Hispanic.

Many IWISH Staff Report Lack of Access to Public Transportation and Nutritious Food

The 2018 telephone survey with Resident Wellness Directors identified challenges to aging in place in 30 of the 40 communities (75 percent), the most common being access to public transportation and access to nutritious food. The Resident Wellness Directors at 13 IWISH properties (33 percent) reported a lack of access to nutritious food in their neighborhoods. Resident Wellness Directors at eight IWISH properties (20 percent) reported that their properties were located in isolated communities, which affected residents' ability to access services and supports needed to age in place.

4. First 3 Years of IWISH Model Implementation

The impact study findings presented in chapters 5 and 6 should be understood in the context of how the Integrated Wellness in Supportive Housing model was implemented at the 40 IWISH (treatment) properties. The full potential impact of the model could have been diminished by how those 40 properties were staffed and how they implemented the model in the first phase of the Supportive Services Demonstration. This chapter presents a summary of how the IWISH properties implemented the model during the initial demonstration period, October 1, 2017 through September 30, 2020. The *Second Interim Report* includes the full fidelity rating methodology and results and describes the experiences of staff and residents with implementing the IWISH model.

The following research questions addressed implementation of the IWISH model in the initial demonstration period:

- What are the experiences of residents, wellness staff, and property management staff with implementing the IWISH model?
- What are the perceived benefits, strengths, and weaknesses of the IWISH model?
- Within the treatment group, did residents' perceptions of their health, well-being, and satisfaction with housing and services change?
- Across the IWISH properties, was the demonstration implemented with fidelity to the IWISH model?
- What factors explain or contribute to the observed variation in fidelity to the IWISH model across the treatment properties?
- How does the service coordination and health and wellness programming provided at the IWISH properties differ from that provided at active control properties?

Section 4.1 discusses factors that affected the implementation schedule for the first 3 years of the demonstration. Section 4.2 presents information on staffing of the two IWISH wellness positions. Section 4.3 describes resident enrollment and engagement in IWISH, and Section 4.4 presents a summary of the extent to which the 40 IWISH properties implemented the core components of the IWISH model as HUD intended. Section 4.5 discusses how services in the 40 active control properties compare with services implemented at the IWISH properties.

4.1 Supportive Services Demonstration Implementation Schedule

Several factors affected the implementation of the demonstration between 2017 and 2020. Of note, the 36-month period included both 6 months of properties ramping up staffing and procedures before IWISH enrollment began and the onset of the COVID-19 public health emergency in the final 6 months of the demonstration, in early 2020. Because of those constraints to the implementation schedule, the full IWISH model was not implemented as intended for the entire 36-month demonstration period. Exhibit 4-1 presents key dates for the demonstration and evaluation, followed by a discussion of factors that affected implementation during the first 3 years of the demonstration.

Exhibit 4-1. Key Dates for the Supportive Services Demonstration and Evaluation



IWISH Properties Spent the First 6 Months of the Demonstration Hiring Staff and Ramping up for Enrollment

The demonstration formally launched on October 1, 2017. The period of October 2017 through March 2018 period was a ramp-up phase, during which the IWISH properties worked on setting up equipment and workspaces; educating residents, property staff, and local stakeholders about IWISH; reviewing IWISH policies and procedures and developing local adaptations as needed; participating in training; building relationships with residents; and providing routine service coordination and wellness work.

Although the implementation team had always planned for a ramp-up period, the duration was longer than expected due to delays in obtaining final government approval for the data collection associated with the demonstration. Approval was granted March 19, 2018.

The Subsequent 12 Months of the Demonstration Period Focused on Enrolling Residents

On March 19, 2018, Resident Wellness Directors and Wellness Nurses began enrolling residents in IWISH and conducting core components of the IWISH model. Some properties began enrolling residents rapidly and others more slowly. One year later and halfway through the initial 3-year demonstration period, the 40 IWISH properties had enrolled 2,960 residents, a 71-percent enrollment rate overall and the highest average enrollment rate reached during the demonstration. Other than new residents moving into the property later in the demonstration, most residents enrolled during the first year of enrollment or chose not to enroll at all.

COVID-19 Public Health Emergency Had Effect on IWISH Implementation

The onset of the COVID-19 public health emergency in early 2020 affected how the IWISH model was implemented at the demonstration properties. At the end of the observation period for this report, in the fall of 2020, the study team conducted follow-up interviews with IWISH properties to learn how they had fared and adapted the program in response to the pandemic. Resident Wellness Directors and Wellness Nurses reported altering the way they implemented health and wellness activities and how they engaged with residents, changing to mostly telephone rather than in-person interactions.

The COVID-19 pandemic fundamentally affected healthcare delivery, including the demand for healthcare services and healthcare facility capabilities, in all communities during the third year of the demonstration. Hospitals, emergency departments, long-term care facilities, and policymakers took unprecedented actions to deal with the consequences of the public health emergency. The timing and extent of those actions largely were decided at the local level, depending on the degree to which COVID-19 had spread through communities.

4.2 IWISH Wellness Staffing During the First 3 Years of the Demonstration

The study team assessed the extent to which each IWISH property’s staff positions were fully or partially staffed throughout the 3-year initial demonstration period and used that information to rate the level of IWISH staffing for each of the IWISH properties (exhibit 4-2).

Exhibit 4-2. Staffing Fidelity Measures for the 40 IWISH Properties

IWISH Component	Fidelity Rating Definition	Ratings of High, Medium, and Low Implementation	IWISH Properties Rated High (N)	IWISH Properties Rated Medium (N)	IWISH Properties Rated Low (N)
Resident Wellness Director (RWD) Staffing	Presence of onsite RWD during 36-month demonstration period	High: At least one RWD for all 36 months Medium: No RWD for 1–5 months Low: No RWD for 6 months or longer	28 (70%)	9 (23%)	3 (8%)
Wellness Nurse (WN) Staffing	Presence of onsite WN during 36-month demonstration period	High: At least one WN for all 36 months Medium: No WN for 1–5 months Low: No WN for 6 months or longer	3 (8%)	30 (75%)	7 (18%)

Notes: *Month* refers to a 30-day period during the time of the demonstration. Total percentages may not add to 100 percent due to rounding.

Sources: Abt Associates analysis of IWISH program data in Population Health Logistics; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020

IWISH Staff Positions Were At Least Partially Filled at Most IWISH Properties for the Demonstration Period

The Resident Wellness Director position was staffed at most properties for most of the initial 3-year demonstration period. More than two-thirds of properties had at least one Resident Wellness Director for all 36 months of the demonstration and were rated as having high fidelity for this component. Nine properties (23 percent) had no Resident Wellness Director on staff for between 1 and 5 months and were rated as having medium fidelity. Three properties had no Resident Wellness Director for 6 months or longer and were rated as having low fidelity.

On average, across all IWISH properties, only three properties were rated as having high fidelity to Wellness Nurse staffing, with at least one position filled the entire 3 years. Seven properties were rated as having low fidelity, less than full staffing for 6 months or longer. The remaining 30 properties were rated as having medium fidelity, without any Wellness Nurse for between 1 and 5 months during the 36-month period.

Staffing Vacancies Resulted from Delays in Initial Hiring and Challenges Replacing Staff upon Turnover

As with the Resident Wellness Directors, understaffing among Wellness Nurses resulted both from delays in initial hiring and delays in replacing subsequent vacancies. Hiring and retaining Wellness Nurses was more challenging than hiring and retaining Resident Wellness Directors, however. Delays in hiring the Wellness Nurses at the start of the demonstration played a large part in nurse staffing shortages overall. Properties did not have experience having a nurse as part of their staffing model and faced a steep learning curve with this aspect of IWISH. IWISH properties contracted for the Wellness Nurse through

certified nursing providers, and those providers did not always act quickly to fill the roles. In addition, the Wellness Nurse is a part-time position, which could have been less desirable to applicants.

Staffing the two positions is integral to the implementation of the IWISH model; the model cannot be implemented without staff filling these important roles. At properties with Resident Wellness Director or Wellness Nurse vacancies or both, residents reported that the vacancies affected resident enrollment and engagement and eroded the trust that had been built in the program. However, interviews with IWISH and property staff suggest that the presence of at least one Wellness Nurse enabled what they saw as the most important IWISH activities to continue in large part. IWISH staff reported that the implementation of the core components was not substantially affected by vacancies in the Resident Wellness Director position.

4.3 Resident Enrollment and Engagement in IWISH

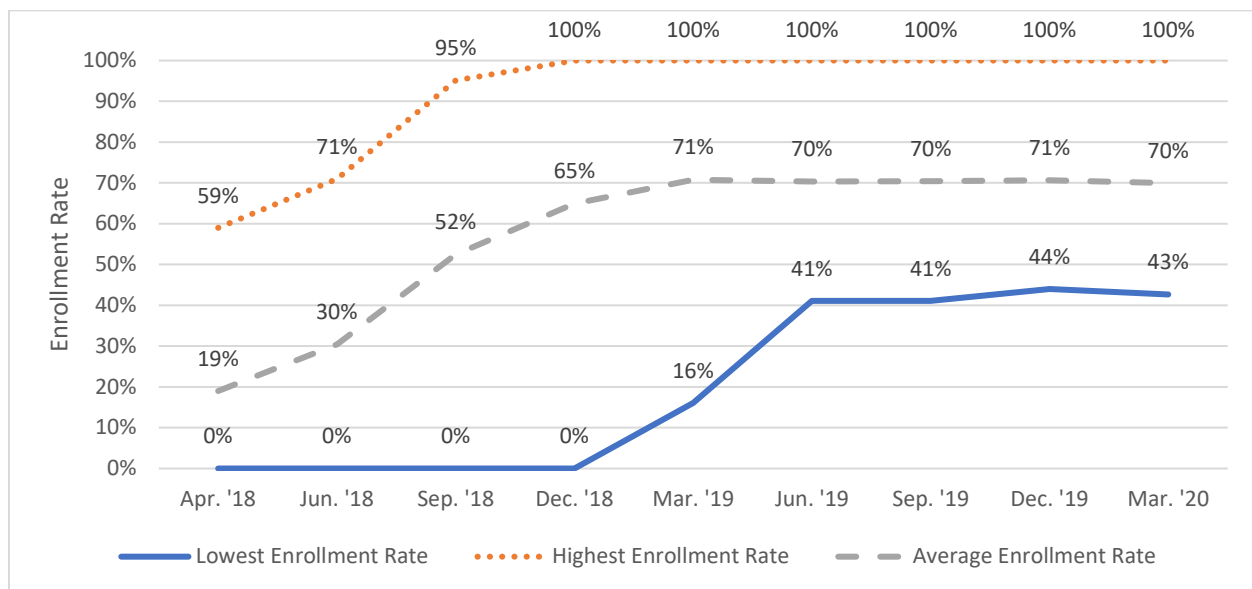
After enrollment, participation in IWISH programs and visits with IWISH staff varied within and across IWISH properties, reflecting the person-centered approach to engaging residents in the model.

The Average Enrollment Rate Was Satisfactory, but Engagement Varied Across Properties

The IWISH implementation team encouraged IWISH staff to aim for an 80-percent enrollment rate, considered to be the highest likely enrollment rate. A few properties succeeded in enrolling a majority of their residents in the first few months following the launch of enrollment. Resident enrollment officially launched on March 19, 2018. Most properties started more slowly, in some cases encountering challenges with staffing or engaging residents. Across all IWISH properties, 71 percent of eligible residents had enrolled in IWISH as of March 2020. Most residents chose to enroll during the first year of IWISH or not at all. Once enrolled, very few residents chose to drop out of IWISH.

Exhibit 4-3 presents resident enrollment rates by month from April 2018 through March 2020. Given changing and increased responsibilities of IWISH staff due to the COVID-19 public health emergency, the study team conducted analysis of IWISH program data only through March 2020.

Exhibit 4-3. IWISH Enrollment Rates by Month, April 2018–March 2020



Notes: N = 40 IWISH properties. Enrollment at some properties exceeded 100 percent because the number of residents exceeded the number of units, but the enrollment rate is capped at 100 percent for the purposes of this chart.
Source: Abt Associates analysis of IWISH implementation team program reports

Forty Percent of IWISH Properties Enrolled At Least 80 Percent of Residents

Forty percent of the IWISH properties met the 80-percent enrollment goal set by the implementation team, including three properties that enrolled 100 percent of residents. The study team rated those 16 IWISH properties as having high fidelity to enrollment goals. Another 14 properties (35 percent) enrolled from 60 to 79 percent of their residents and were rated as having medium fidelity to enrollment goals. The remaining 10 properties (25 percent) had low enrollment rates of less than 60 percent, including four properties (10 percent) that enrolled less than 50 percent of the property’s residents. Exhibit 4-4 presents the IWISH enrollment fidelity ratings for the 40 treatment properties.

Exhibit 4-4. IWISH Enrollment Fidelity Ratings for the 40 IWISH Properties

IWISH Component	Fidelity Rating Definition	Ratings of High, Medium, and Low Implementation	IWISH Properties Rated High	IWISH Properties Rated Medium	IWISH Properties Rated Low
Resident Enrollment	Percentage of residents at property that enrolled and consented to participate in IWISH	High: ≥80% of residents enrolled in IWISH Medium: 60-79% enrolled in IWISH Low: <60% enrolled in IWISH	16 (40%)	14 (35%)	10 (25%)

Source: Abt Associates analysis of IWISH program data in Population Health Logistics, IWISH staffing data from implementation team monthly reports, and responses of interviews with IWISH staff in 2019 and 2020, and analysis of monthly implementation team reports.

Resident Engagement in the Model Varied Across Properties

Once enrolled, resident participation in IWISH activities varied widely among properties. Only about one-fourth of residents met with IWISH staff at least every 3 months while enrolled, and approximately 10 percent of participants did not meet with IWISH staff at all after the first month of enrollment. Staff and residents reported that speaking a different primary language from IWISH staff, a desire for privacy, and vacancies and turnover in IWISH staffing were factors that limited resident enrollment and engagement.

A resident’s individual health needs may be a factor contributing to the decision to enroll in IWISH. IWISH staff provided two conflicting observations regarding the link between residents’ likelihood of enrolling and health needs. Some staff reported that residents with serious medical conditions, low literacy levels, or lack of family support were more likely to enroll in IWISH than those with fewer or less critical needs. Those staff believed that residents who had the most immediate need for IWISH services tended to enroll. Other IWISH staff believed that “younger, more active” residents were more health conscious and more likely to enroll and participate.

Some Demographic Groups Met with IWISH Staff Less Frequently

Residents enrolled in IWISH were largely similar in age, race, and ethnicity to the overall resident population at their property, but the study team found small, but statistically significant, differences in the reported frequency of meetings with IWISH staff based on race and ethnicity, age, marital status, and primary language. Based on analysis of IWISH case management data, the study team found the following:

- Hispanic residents, American Indian/Alaska Native, and White residents had higher rates of visits with IWISH staff than did non-Hispanic African-American/Black or non-Hispanic Asian residents.
- Divorced and widowed residents met more frequently with IWISH staff than married and other non-married residents.
- Residents younger than 60 had far fewer visits than all other residents. Residents aged 60 to 64 and 85 or older met with IWISH staff slightly more often than those aged 65 to 84.
- Residents whose primary language is English met more frequently with staff than those whose primary language is not English.

4.4 Implementation of IWISH Core Components

There was substantial variation in how properties implemented the core components of the IWISH model, and not all properties fully implemented the core components during the first 3 years of the demonstration. Across all IWISH properties, 33 of 40 properties were rated as having high or medium implementation fidelity for all core IWISH components. This section describes the variation in how properties implemented the model's core components.

Resident Participation in Wellness Assessments and Setting Wellness Goals

After residents enrolled, they were asked to participate in the two-part health and wellness assessment consisting of a person-centered interview and structured health and wellness questionnaire and functional assessment. The interviews and assessments help staff identify resident needs and to determine where to target supportive services.

In the IWISH model, Wellness Nurses and Resident Wellness Directors are expected use the interview and assessment data to help residents set personal health and wellness goals that are important to them and to help residents develop Individual Healthy Aging Plans (IHAPs) for achieving those goals. In IWISH, this plan typically follows (and builds on) the person-centered interview and health and wellness assessment. The model also intended IWISH staff to use assessment information to develop programs and partnerships that promote well-being among all residents who live at the property.

HUD's implementation team strongly encouraged IWISH staff to complete person-centered interviews, health and wellness assessments, and IHAPs with all residents enrolled in IWISH. The implementation team provided training and technical assistance to staff in those areas. As with all aspects of IWISH, however, participation was optional for enrolled residents. Residents could refuse to participate in any of the components or skip questions and sections of the assessment or interview.

As shown in exhibit 4-5, most properties had high ratings in conducting person-centered interviews and health and wellness assessments, conducting interviews and assessments with more than 80 percent of enrolled residents. Only one property was rated low in the implementation of interviews, and three properties were rated low in assessments.

Most Enrolled Residents Participated in a Wellness Assessment and a Person-Centered Interview

IWISH staff were very successful in completing the two-part assessment process with most residents who elected to enroll in IWISH. By March 2020, some 96 percent of IWISH participants had participated in a person-centered interview, and 89 percent had completed a health and wellness assessment; that rate varied across properties, however.

The IWISH model also calls for annual reassessments of participants. Based on an analysis of recorded reasons for resident visits with staff, only about one-third (36 percent) of IWISH participants had met with the Resident Wellness Director or the Wellness Nurse for a reassessment as of March 2020. During interviews with the study team, some IWISH staff reported that they only conduct reassessments when the resident experiences a serious health event or a change in health condition.

Exhibit 4-5. IWISH Fidelity Ratings for Resident Assessments, Interviews, and Healthy Aging Plans

IWISH Component	Fidelity Rating Definition	Ratings of High, Medium, and Low Implementation	IWISH Properties Rated High	IWISH Properties Rated Medium	IWISH Properties Rated Low
Health and Wellness Assessments	Percentage of IWISH participants with completed health and wellness assessments	High: ≥80% of IWISH participants completed assessments Medium: 50–79% of IWISH participants completed assessments Low: <50% of IWISH participants completed assessments	31 (78%)	4 (10%)	5 (13%)
Person-Centered Interviews	Percentage of IWISH participants with completed person-centered interviews	High: ≥80% of IWISH participants completed interviews Medium: 50–79% of IWISH participants completed interviews Low: <50% of IWISH participants completed interviews	31 (78%)	8 (20%)	1 (3%)
Development of Individual Healthy Aging Plans (IHAPs)	Development of IHAPs	High: ≥80% of IWISH participants developed IHAPs Medium: 50–79% of IWISH participants developed IHAPs Low: <50% of IWISH participants developed IHAPs	13 (33%)	15 (38%)	12 (30%)

Note: Total percentages may not add to 100 percent due to rounding.

Sources: Abt Associates analysis of program data in Population Health Logistics; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; analysis of monthly implementation team reports

Some Residents Reported Concerns About the Privacy of Their Health Data

For residents who did not elect to participate in the assessment, resident concerns about privacy were cited as the most common reason for their not participating. Although IWISH staff were trained to help residents understand how their data would be used and protected through data system securities and releases of information forms, staff described the reluctance of some residents to share personal information with IWISH staff because of a perceived stigma, embarrassment, or an overall preference for privacy. Others feared that they might lose their housing or other HUD benefits.

Two-Thirds of Enrolled Residents Set Wellness Goals, but the Formal Goal-Setting Process Did Not Appeal to Some Residents

Only one-third of IWISH properties had high ratings in the development of IHAPs. As of March 2020, 61 percent of enrolled residents had one or more health and wellness goals recorded by IWISH staff. Identifying goals typically followed and built on the person-centered interview and the health and wellness assessment. That IWISH staff conducted fewer goal discussions with residents than interviews

or assessments likely reflects that sequencing. IWISH residents typically identified goals that affected their overall health and well-being.

Staff perceived some elements of individual goal setting or planning as beneficial, but IWISH staff at some properties said that formal goal setting in the IWISH model did not suit their needs for assisting the residents nor the desires of residents. Resident concerns about setting formal goals, the structure of the tool, and time limitations kept formal goal setting from being more widely used during the demonstration.

Common Goals Set by IWISH Residents

The most common personal goals set by IWISH participants through the goal-setting process were to—

- Increase levels of activity and exercise.
- Improve nutrition or eat healthier.
- Obtain healthcare services, social services, or public benefits.
- Increase socialization.

IWISH staff described successful strategies for goal setting, including helping residents meet objectives that matter to them, such as getting health insurance or connecting to other benefits. Specifically, staff reported that words such as *goal* and *barrier* did not resonate with residents. Some IWISH staff found a more effective strategy by customizing their approach to the IHAP and weaving goal setting into the conversation naturally rather than just asking the resident to set a goal and completing the IHAP form step by step.

Health and Wellness Programming and Partnerships

In the IWISH model, Resident Wellness Directors and Wellness Nurses are expected to develop health- and wellness-related programming and, specifically, to offer programs that are both evidence based and address resident needs identified through the resident assessment and goal-setting processes. Evidence based means that the program has been found to be effective through rigorous evaluation. Health and wellness programming includes ongoing onsite programs on topics such as fall prevention and chronic disease management and one-time events such as a health fair or an invited speaker.

Exhibit 4-6 presents the study’s fidelity ratings for IWISH programming and partnerships.

Exhibit 4-6. IWISH Fidelity Ratings for Healthcare Programming and Partnerships

IWISH Component	Fidelity Rating Definition	Ratings of High, Medium, and Low Implementation	IWISH Properties Rated High	IWISH Properties Rated Medium	IWISH Properties Rated Low
Community Healthy Aging Plan (CHAP)	Completion of the CHAP based on identified needs of residents	<p>High: Completed a CHAP and reported using it to inform needed programming</p> <p>Medium: Completed a CHAP but did not use it to inform needed programming</p> <p>Low: Did not complete a CHAP</p>	32 (80%)	3 (8%)	5 (13%)

IWISH Component	Fidelity Rating Definition	Ratings of High, Medium, and Low Implementation	IWISH Properties Rated High	IWISH Properties Rated Medium	IWISH Properties Rated Low
Evidence-Based Programming	Availability of evidence-based group programming recommended by the IWISH model and included in the IWISH <i>Evidence-Based Catalog</i>	<p>High: Made available evidence-based programs included in the IWISH catalog and that meet identified resident needs</p> <p>Medium: Made available health and wellness programs that meet identified needs of residents but were not included in the IWISH catalog</p> <p>Low: Did not make available any health and wellness group programming</p>	20 (50%)	20 (50%)	0 (0%)
Healthcare Provider Partnerships	Extent to which site staff developed property-wide partnerships with healthcare providers or interacted with providers on behalf of individual residents.	<p>High: Staff developed propertywide partnership and individual interactions with healthcare providers</p> <p>Medium: No propertywide partnerships, but staff interacted with healthcare providers on behalf of individual residents</p> <p>Low: Staff did not interact with healthcare providers</p>	0 (0%)	40 (100%)	0 (0%)

Note: Total percentages may not add to 100 percent due to rounding.

Sources: Abt Associates analysis of IWISH program data; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; and analysis of monthly implementation team reports

Most IWISH Staff Used Community Healthy Aging Plans to Identify Resident Needs

IWISH staff were expected to use the information on residents’ health and wellness collected through assessments to identify and develop programming that meet the collective residents’ needs. As part of that process, staff were expected to create a Community Healthy Aging Plan (CHAP) for the property that identifies the most common needs of residents and how the needs will be addressed through programs or services. The implementation team helped IWISH staff develop CHAPs for their properties, including developing a standard format and providing staff with aggregated data on their property’s residents from the centralized data system. Although the data system was supposed to allow individual IWISH staff to run their own summary reports, that functionality ended up not being available to staff.

As a result of the assistance provided by the implementation team, most IWISH properties scored either High or Medium in completion of a CHAP for their property. As of August 2019, 32 of the 40 properties had developed a CHAP and reported using it to inform or develop needed programs. Those 32 properties were rated as having High fidelity to this component. Of the remaining properties, three completed a CHAP but did not report using it (Medium fidelity), and five had not yet completed a CHAP (Low fidelity).

Some IWISH Staff Reported Limitations of and Challenges with Developing CHAPs

Several IWISH staff reported limitations in the process for developing the CHAP. During interviews with the study team, some staff reported that they were unfamiliar with the CHAP process, and others reported that they did not receive their property’s community profile as early in the demonstration period as they would have liked. Several IWISH staff said they would have preferred to be able to run aggregate reports

from the data system themselves at the frequencies they chose rather than having to rely on the implementation team to provide the community profiles.

As the format and content were largely developed by the implementation team, the study team did not evaluate the CHAPs for content or whether the programs identified matched the most common needs of residents. The connection between identified resident needs and the programming made available at IWISH properties will be studied in the second phase of the evaluation.

All Properties Offered Programs Focused on Health and Wellness, but Only One-Half of IWISH Properties Implemented Evidence-Based Programs

The demonstration grant provided supplemental funding for evidence-based programming and other activities that help residents perform the instrumental activities of daily living and health, wellness, and preventive care to support their aging in place. In December 2018, the implementation team provided the IWISH properties with a catalog of more than 30 evidence-based programs to help IWISH staff identify programs that meet the needs of their residents. The catalog included guidance to help IWISH staff identify and select programs to offer. The implementation team also provided staff with training and technical assistance on how to develop programming at their property.

IWISH staff at only one-half of the properties reported implementing the specific evidence-based programs that were recommended by the IWISH model. Those properties were rated as having high fidelity to evidence-based programming. Among IWISH staff interviewed, the most common of those evidence-based programs implemented at IWISH properties were the following:

- A Matter of Balance, STEADI (Stopping Elderly Accidents, Deaths and Injuries), and other fall prevention programs.
- Diabetes Self-Management, Diabetes Empowerment Education program.
- Tai Chi for Arthritis, Qigong, Walk with Ease, and other exercise and arthritis interventions.
- Chronic Disease Self-Management (chronic disease intervention).
- Eat Better & Move More (nutrition intervention).
- PACE (Program of All-Inclusive Care for the Elderly).
- Clear Horizons (smoking cessation).

Although one-half of the properties did not implement the recommended evidence-based programs, most properties implemented programs that focused on the same goals as the recommended programs. For example, properties may not have implemented *A Matter of Balance*, the recommended evidence-based program for improving balance, but many properties implemented a similar program that focused on helping residents improve their balance. Staff reported that programming related to exercise, nutrition, balance, and chronic disease management had the most impact on residents' health and well-being.

Participation in Wellness Programming Varied; the Most-Attended Programs Promoted Socialization

The number of health and wellness programs and events offered at IWISH properties varied widely across properties, from a low of about 20 to more than 200 separate events a year. IWISH staff reported offering an average of six health and wellness events each month, including both evidence-based and non-evidence-based programs.

Information reported by services staff indicates that most programs were attended by 10 or fewer residents for each class or event. The activities that had the largest attendance were not focused on health and wellness and included social activities that appeal to a wide audience. Events that drew the largest number of participants often were explicitly social events, such as ice cream socials or birthday celebrations.

Developing Propertywide Healthcare Partnerships Was a Challenge

Developing partnerships with healthcare facilities, primary care providers, local agencies serving seniors, and community agencies is an important part of the IWISH model. The goal is for IWISH partnerships related to health and wellness to add to the resource and referral partnerships typical of traditional service coordination. The IWISH model encouraged properties to enter into formal partnership agreements with those organizations to strategize on how best to serve residents.

No properties were rated as having High fidelity to healthcare and social service provider partnerships. Although properties were successful in building relationships with social service providers on behalf of the properties' residents, no properties were able to develop propertywide partnerships with healthcare providers or facilities to help facilitate transitional care and assist residents. IWISH staff reported that this model component was most challenging to implement.

According to IWISH staff, challenges in developing partnerships with healthcare facilities were largely associated with issues of scale. Establishing relationships with the large number of doctors and hospitals visited by residents at their property was not feasible for IWISH staff, especially at larger properties and in larger metropolitan areas. Overall, hospitals and facilities did not express interest in and did not have the time to develop a partnership with the IWISH property (or any individual property) or identified bureaucratic or legal obstacles to establishing partnerships. Several IWISH staff did not think it was appropriate for them to conduct conversations to facilitate a partnership with an entire healthcare facility or organization or did not feel well equipped to manage that type of conversation.

Although establishing propertywide partnerships with healthcare providers was a challenge, many staff reported developing relationships with individual providers or facilities on behalf of individual residents as needs arose. In addition, several properties reported propertywide partnerships with other types of organizations that focus on health and wellness or serve older adults, such as nursing schools, local Area Agencies on Aging and senior centers, and community health organizations.

Enhanced Service Coordination by IWISH Staff

In conjunction with the six core components and as part of the person-centered approach to assisting residents, IWISH staff are also expected to provide enhanced service coordination services to residents as needed and requested. In the IWISH model, service coordination is "enhanced" because of its distinct focus on resident health and wellness beyond the help in accessing community resources that Service Coordinators may typically provide in HUD-assisted multifamily properties.

The study team rated the extent to which wellness staff engaged in enhanced service coordination activities with residents in the following areas: transitional care, medication self-management, and family and caregiver interaction.

Exhibit 4-7 presents the IWISH fidelity measures and ratings for enhanced service coordination. Ratings were based on program data and self-reported information from Resident Wellness Directors, Wellness Nurses, and property managers at the 40 IWISH properties and the 40 active control properties.

Exhibit 4-7. IWISH Enhanced Service Coordination Fidelity Measures and Ratings

IWISH Component	Fidelity Rating Definition	Ratings of High, Medium, and Low Implementation	IWISH Properties Rated High	IWISH Properties Rated Medium	IWISH Properties Rated Low
Transitional Care	Extent to which onsite services staff provided and coordinated care for residents returning home from a hospital or nursing home stay, as reported by staff	<p>High: Formal process for providing transitional care to residents, and staff report doing so on a regular basis</p> <p>Medium: No formal process, but staff provide these services as requested by residents</p> <p>Low: No formal process for providing transitional care, and staff do not provide any type of transitional care or do so rarely</p>	20 (50%)	17 (43%)	1 (3%)
Medication Self-Management	Extent to which onsite services staff engaged in medication self-management services described in the <i>IWISH Operations Manual*</i>	<p>High: IWISH staff report doing all three activities on a regular basis</p> <p>Medium: IWISH staff report doing one or two of these activities on a regular basis or all three infrequently</p> <p>Low: IWISH staff report doing one of these activities or doing any of the activities infrequently</p>	12 (30%)	16 (40%)	7 (18%)
Family and Caregiver Interaction	Extent to which onsite services staff interacted with IWISH participants' families and caregivers to help residents obtain needed services and support	<p>High: Staff often interacted with residents' families and caregivers</p> <p>Medium: Staff sometimes interacted with residents' families and caregivers</p> <p>Low: Staff rarely or never interacted with residents' families and caregivers</p>	22 (55%)	12 (30%)	5 (13%)

* Educating residents on medications, helping residents reconcile their medications with their prescriptions, and helping residents establish medication reminder systems.

Notes: Due to insufficient or unclear interview data, the transitional care rating was not determined for two properties; the medication self-management rating was not determined for five properties; and the family and caregiver interaction rating was not determined for one property. Total percentages may not add to 100 percent due to rounding.

Sources: Abt Associates analysis of program data in Population Health Logistics; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; and analysis of monthly implementation team reports

Staff at All IWISH Properties Reported Providing Transitional Care to IWISH Residents

The fidelity rating for “Transitional Care” is the extent to which onsite services staff provided and coordinated care for residents returning home from a hospital or nursing home stay. Staff at all IWISH properties reported providing transitional care to their residents. Based on information learned from interviews with staff, the study team rated the level of transitional care provided by onsite staff for all IWISH properties. Almost all properties received a rating of either High (20) or Medium (17) for providing transitional care to residents.

Typical transitional care consisted of the IWISH staff, usually the Wellness Nurse, reviewing a resident’s discharge papers or communicating directly with the resident’s hospital or nursing home case manager, discharge planner, or social worker to discuss the discharge plan. The IWISH staff then helped the resident and sometimes the resident’s family understand the plan, helped set up followup appointments,

reviewed changes in medication with the resident, and recorded the event and discharge details in the resident's record.

Wellness Nurses at Most IWISH Properties Helped IWISH Participants Self-Manage Their Medications

The fidelity rating for “Medication Self-Management” is the extent to which onsite services staff engaged in medication self-management services described in the *IWISH Operations Manual* (educating residents on medications, helping residents reconcile their medications with their prescriptions, and helping residents establish medication reminder systems). Wellness Nurses most commonly assisted residents with their medication by directly communicating with doctors and pharmacists and by educating residents about the purpose of the medication, the appropriate dosage, and potential interactions.

The study team found greater variation in the level of medication self-management support than in the other areas of enhanced service coordination examined. Thirty percent of properties were rated as having High levels of medication self-management assistance, 40 percent as Medium, and 18 percent as Low.

IWISH Staff Reported Benefits of Interacting with Residents' Family and Other Caregivers

The IWISH model is intended to promote direct engagement and collaboration of IWISH staff with a resident's family and other caregivers to address issues related to the resident's health and safety. IWISH staff experiences working with families varied greatly across properties. Some IWISH staff reported that they interacted with family frequently, and others reported that they seldom did so. Most seemed satisfied with their level of interaction with family and other caregivers, but a sizable minority indicated that they would have preferred more interaction. IWISH staff reported that family support was especially important during a resident's transitions from a hospital or other healthcare setting or when a resident was declining in health and might require additional services to live independently.

IWISH staff were asked about the frequency and circumstances of their interactions with family and caregivers and whether staff feel they were interacting with those individuals as much as they should. Based on analysis of their responses, 22 properties were rated as having High levels of family and caregiver interaction, 12 as Medium, and five as Low.

Property Management Involvement in IWISH Implementation

Involvement by management is a contextual factor that could affect how the IWISH model was implemented. To better understand the role of property management in IWISH outcomes, the study team rated each treatment property on the property management's level of involvement in IWISH based on property management staff reports of how much time they typically spent on IWISH and the extent of their involvement in day-to-day implementation decisions.

Property Management Supported IWISH Staff, but Most Property Managers Were Minimally Involved in Day-to-Day IWISH Activities

Although IWISH staff may not share any health and wellness information about individual residents without the resident's permission, property managers and IWISH staff are expected to communicate regularly to help identify and address resident needs. Overall, property managers were minimally involved in implementing the IWISH program, with most spending less than 5 hours a week on IWISH activities. Despite the limited time commitment, IWISH staff reported the relationship with property management staff to be important in helping to identify and meet resident needs. All property managers of IWISH properties interviewed said they were willing to work with the IWISH staff to help solve

resident problems when they arose and to refer residents to the IWISH staff if they saw or learned something concerning about a resident.

The majority of properties, 23 of 40 (58 percent), were rated as having as having Low property management involvement, 6 properties (15 percent) were rated as Medium, and four properties (10 percent) were rated as High. Property management at three properties reported having no involvement in IWISH activities.

4.5 How IWISH Compares with Wellness Services in the Active Control Properties

To assess the extent to which the IWISH model is different from the supportive services available at properties in the control group, the study team assessed service coordination and health and wellness programming in the 40 active control properties during the initial IWISH demonstration period. Information on supportive services at active control properties was limited and based solely on interviews with property management and Service Coordinators. Therefore, the study team was not always able to make direct comparisons of services between IWISH and the active control properties.

Understanding the differences in service coordination and wellness services between the IWISH and control groups is important for interpreting the analysis of the IWISH model impacts on housing tenure and healthcare use. The more similar the services in the active control group are to those in IWISH, the less one would expect to see differences in impacts for IWISH and control property residents.

Comparison of Service Coordinators in IWISH and Active Control Properties

Although most of the active control properties had Service Coordinators at some point during the initial demonstration period, the study team identified several differences between the roles of Resident Wellness Directors in IWISH properties and Service Coordinators in the active control properties.

Most Active Control Properties Had Service Coordinators During the Initial Demonstration Period

Most active control properties had a Service Coordinator before the start of the demonstration in October 2017, and some properties added Service Coordinators during the demonstration period. Of the 40 active control properties, 27 had an onsite Service Coordinator when the demonstration period started in October 2017. Several of those properties had recently begun a Service Coordinator program. Several of the active control properties also added Service Coordinator positions during the demonstration period. By August 2019, all but two active control properties had Service Coordinators on site.

Active Control Properties Had More Staffing Vacancies During the Demonstration Period than Did IWISH Properties

Properties in both IWISH and active control groups experienced staffing vacancies during the demonstration period, but more active control properties than IWISH properties had staffing vacancies in the Service Coordinator position than IWISH properties had in the Resident Wellness Director position. At least 40 percent of active control properties had vacancies in the Service Coordinator position between when the demonstration started in October 2017 and when the study team conducted site visits in August 2019. The average length of vacancy was just shy of 5 months during that period. By contrast, only 20 percent of IWISH properties experienced a vacancy in the Resident Wellness Director position during the entire demonstration period (October 2017 through September 2020), and the average length of the vacancy was 1 month.

The Level of Property Management Involvement in Service Coordination Was No Different Between IWISH and Control Properties

The level of support and involvement that the property manager and owner provide may affect the implementation and effectiveness of supportive services. Therefore, the study team also compared the level of involvement of property management in onsite services between the IWISH and active control properties. The study did not find any substantial differences between property managers' and owners' involvement at IWISH properties and control properties. The study team characterized most IWISH and active control properties as having either no (2 IWISH and 4 active control) or low (25 IWISH and 20 active control) involvement of the property manager in onsite services.

Comparison of Assessments and Service Plans in the Active Control Properties

The study team identified some similarities and a few differences between IWISH and active control properties in health and wellness assessments and goal setting.

Resident Participation in Wellness Assessments at Active Control Properties Varied Widely

Service Coordinators at three-fourths of active control properties conducted some type of health and wellness assessment with residents, compared with all IWISH properties. One additional active control property was in the process of starting to conduct resident assessments when the study team interviewed staff in 2019. For the properties that conducted assessments, resident participation in those assessments varied greatly. Although service coordinators who reported conducting resident assessments noted that their goal was to conduct assessments with all residents, the reported participation rates among residents ranged from a low of 30 percent at one control property to a high of 100 percent at another. Both groups reported updating wellness assessments at similar frequencies.

Factors that seemed to affect whether assessments were conducted at the active control properties were whether assessments were required or encouraged by the owner organization and whether staff had access to case management software that included assessment questions and screening tools.

IWISH Assessment Tools Were More Structured Than in the Active Control Properties

The data collected by Service Coordinators at active control properties included much of the same resident demographic and health and wellness information that was collected through the IWISH assessment tool. However, the IWISH assessment tool may have been more comprehensive, structured, and more proactive than other tools commonly used by the active control properties. For instance, the IWISH assessment tool encouraged staff to proactively assess needs related to mental health, food insecurity, and social isolation. Service coordinators at non-IWISH properties may have gathered that information but rarely as systematically or proactively as in IWISH.

Formal Setting of Wellness Goals Was Not as Common in the Active Control Properties as in IWISH

Although some Service Coordinators reported working with residents on their personal health and wellness goals, it was typically not through a formal process as is intended in IWISH. Service Coordinators reported helping residents develop goals at slightly more than one-half of active control properties. Active control Service Coordinators were also not as likely to work with residents to formally identify health and wellness or to establish a written plan for meeting those goals.

Like IWISH, Most Active Control Properties Used a Case Management System to Track Resident Data

Similar to IWISH staff, staff at most active control properties used a secure, web-based case management system to store resident information and service data. Service coordinators at active control properties

reported updating information in the system at relatively the same frequencies and for the same reasons as the IWISH properties: to keep track of resident interactions and service provisions and to update assessment data annually or after sentinel events.

Service Coordinators at Active Control Properties Did Not Report Providing as Much Enhanced Service Coordination as IWISH Staff

Based on interviews with both IWISH staff and Service Coordinators at active control properties, the study found that Service Coordinators do not provide as many enhanced service coordination services as in IWISH. In contrast to IWISH, most Service Coordinators in the active control properties had little involvement in helping residents self-manage their medication. IWISH staff also reported greater interaction with families and caregivers on behalf of residents than did Service Coordinators in the active control group.

Comparison of Wellness Staffing and Programming in the Active Control Properties

The study team compared wellness staffing and programming in the active control properties to IWISH and identified several differences.

No Active Control Properties Had an Onsite Nurse; Similar to IWISH, Some Had Visiting Healthcare Providers

None of the active control properties had an onsite nurse during the initial 3-year demonstration period. In addition, none of the IWISH properties had a regular onsite nurse before their participation in the demonstration.

A proportion of properties in both groups had regular visiting healthcare providers, such as nurses, podiatrists, elder care specialists, dentists, and physical therapists; however, those services were not typically similar to those provided by the onsite Wellness Nurse. The frequency of the providers' visits varied from once a week to once a year, compared with the ongoing presence of the Wellness Nurse, who was at the property for several days each week. In addition, most of the services provided by the visiting healthcare providers were specialty clinical services—not the more general nonclinical care that the Wellness Nurse provides.

Active Control Properties Made Fewer Evidence-Based Wellness Programs Available to Residents

IWISH properties implemented more evidence-based programs, although active control properties were increasingly making those programs available. Interviews with representatives of owner organizations of properties in both the IWISH and the active control groups revealed that some organizations had been making health and wellness programming available in all of their properties for older adults in recent years. In addition, although programs offered in active control programs may not have been the specific ones recommended in the IWISH model, many of them focused on the same health and wellness goals.

Most Service Coordinators at Active Control Properties Did Not Develop Formal Community Aging Plans

Service Coordinators at two-thirds of the active control properties reported that they did not develop any propertywide service plans for their residents, in contrast to the three-fourths of the IWISH properties that developed a CHAP. Staff at the remaining one-third of active control properties reported that they had not developed propertywide services plans or were in the planning stages of developing such plans at the time the evaluation team interviewed them in the fall of 2019. Although few Service Coordinators reported using a formal process to do so, almost all reported that, to help determine what programming to offer at

the property, they used some type of resident data, such as those collected through annual resident surveys.

Service Coordinators Did Not Engage with Healthcare Providers to the Extent that IWISH Staff Did

Service Coordinators at one-half of the active control properties said that they engaged with local healthcare providers in some way, most commonly through the development of onsite services or through interactions on behalf of individual residents. At about one-third of properties, Service Coordinators said that they interacted with healthcare providers on behalf of residents only on an as-needed basis, when specifically requested by residents. Service Coordinators at seven properties said they had never had interactions with healthcare providers for any reason. By comparison, IWISH staff at all properties reported that they tried to engage with healthcare providers even if they were not always successful in their efforts.

5. Impact of IWISH on Housing Tenure and Transition to Long-Term Care

The goal of the IWISH model is to promote aging in place for residents of HUD-assisted properties, especially by delaying transfers to a nursing home or other long-term care facility. Long-term care is costly, and transfers to acute care settings such as hospitals can have negative consequences for the well-being of an older adult. Nationally, less than 5 percent of older adults live in a nursing home or other long-term care facility, although the percentage increases with age, ranging from 1 percent for people age 65 through 74 to 2 percent for people age 75 through 84 and 8 percent for people older than 85 (Administration for Community Living, 2021).

Two of the evaluation’s research questions addressed the impact of IWISH on housing tenure:

- What is the impact of IWISH on housing exits and resident tenure?
- What is the impact of IWISH on transitions to long-term institutional care?

For those research questions, the study team, in consultation with HUD and the Expert Panel, selected two confirmatory outcomes for the impact analysis to measure:

- Residency ended, for any reason.
- Residency ended at transition to long-term care.

To look for evidence that residency in the IWISH or control properties ended for any reason, the study used household-level HUD administrative data. To look for evidence that the IWISH model specifically reduced residents’ likelihood of moving to a long-term care facility, the study linked the HUD data to patient assessment data for Medicaid- or Medicare-covered nursing home residents and Medicaid claims and encounters for long-term care.

This chapter presents the study’s analysis of IWISH impacts on residents’ housing tenure and transition to long-term care. Section 5.1. provides an overview of housing tenure in HUD-assisted housing for older adults. Section 5.2 describes how the study team examined the impact of the IWISH on housing exits and transitions to long-term care before presenting the results of the impact analysis. Section 5.3 describes the results of additional analyses conducted to further explore the impacts of IWISH on housing tenure by subgroups of residents and by property and neighborhood characteristics.

Key Findings on the Impact of IWISH on Housing Tenure

Analysis of the impact of IWISH on housing tenure found that during the 3-year demonstration—

- More than a quarter (27 percent) of both IWISH and control group residents exited housing, including approximately 10 percent who died and 2 percent who transitioned to long-term care. The remainder moved out for other reasons.
- Residents of IWISH properties and control properties were equally likely to end their residency regardless of the reason.
- Residents of IWISH properties and control properties were equally likely to end their residency specifically to transition to long-term care.
- Mortality rates during the 3-year demonstration were similar between IWISH and control properties.

5.1 Housing Tenure in HUD-Assisted Housing for Older Adults

Because IWISH seeks to extend tenure in HUD’s multifamily properties as residents age in place, how and why they exit HUD-assisted housing is an important consideration for the demonstration.

According to 2021 data from HUD's Picture of Subsidized Households database,¹⁷ 10 percent of households in all HUD housing programs moved in the past year. In the Section 202 and Section 8 housing assistance programs, the two programs that fund all 124 demonstration properties, 12 percent of households moved in the past year.

As of 2021, the average length of time households in all HUD-assisted housing programs had received housing assistance was almost 10 years, somewhat longer than the average 8-year tenure in the Section 202 and Section 8 housing assistance programs.

The reasons why people move from HUD-assisted housing, as with all housing, are numerous and complex. Household needs and preferences for unit size, location, and amenities change over time. Many households move from one assisted housing development to another or within developments as their housing needs or preferences change and as units with the characteristics they need become available. For example, a household might need to move to a first floor unit or to a property with an elevator if one of the residents were having difficulty climbing stairs.

The property managers of IWISH and control properties who were interviewed for the study indicated that evictions in HUD-assisted housing for older adults are rare occurrences. Property staff typically try to help residents meet tenancy requirements, only initiating eviction proceedings when other avenues have been exhausted. In addition, residents who fall behind on their rent or have other lease violations typically move out before being formally evicted.

According to interviews conducted with staff at IWISH and active control properties,¹⁸ some level of tenancy supports typically is made available to residents in both groups of properties. Service Coordinators in HUD-assisted properties can provide some services to support residents to live independently, such as connecting them to home health aides and supporting reasonable accommodation requests. When property managers had issues with residents violating the terms of their lease, they turned to the Service Coordinator or Resident Wellness Director to help residents obtain resources to address those lease violations. In active control properties without Service Coordinators, property managers might provide or help coordinate some of the tenancy supports that Service Coordinators would typically provide. Both the IWISH staff and Service Coordinators at active control properties interviewed associate their efforts with reduced rates of turnover at their properties.

5.2 Impact of IWISH on Housing Exits and Transitions to Long-Term Care

The study used housing exit data reported by property owners to HUD's Tenant Rental Assistance Certification System (TRACS) to identify IWISH and control group residents who exited the properties for any reason during the initial 3-year demonstration period. The team also examined Medicaid, Medicare, and patient assessment data from nursing homes to determine the proportion of residents who moved to long-term care facilities during those 3 years. Residents' dates of death were available in both the HUD and Medicare administrative data.

HUD administrative data on housing exits have limitations. The study team found that the data on termination dates were not always populated when compared with TRACS extracts over subsequent years or to dates of death and long-term care in the Medicare and Medicaid data.

¹⁷ The database can be found here: <https://www.huduser.gov/portal/datasets/assthsg.html>.

¹⁸ Residents in passive control properties were not interviewed, but they were included in impact analyses.

**CHAPTER 5. IMPACT OF IWISH ON HOUSING TENURE AND
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When the termination or move-out data were missing or not credible when compared with data on dates of death or long-term care from the Medicare and Medicaid databases, the study team used a “record truncation” method to impute when the resident exited the property. Using the data that were not missing, the team found that the median number of days between when the TRACS data indicated a resident exited the property and their previous household record was 284 days. The team added 284 days to the date of the resident’s last household record to impute a missing exit date. If a resident’s recorded or imputed move-out date was after their date of death recorded in the Medicare database, their date of death served as their move-out date. In most cases, dates of death in the TRACS data and the Medicare data agreed.

Data on the reasons why people exit housing were also incomplete. Although owners of HUD-assisted multifamily properties are required to report the household’s reason for exiting housing assistance, owners might not always know the reason.¹⁹

Impact of IWISH on Likelihood to End Residency During the Demonstration

Whether a resident left the property during the demonstration period was defined as one of the confirmatory outcomes of the impact analysis. At the end of the initial 3-year demonstration period, 27 percent of IWISH residents were no longer residing at their property, including about 10 percent who died and 2 percent who moved to long-term care. The reasons why the remaining 15 percent of IWISH residents exited their properties during the 3-year period are not known.

Exhibit 5-1 presents the numbers of IWISH and control group residents who moved out, transitioned to long-term care, or died while still residing at their property within 1, 2, or 3 years of their baseline date (that is, October 1, 2020, if the resident moved to the property by September 2017, or the date the resident moved to the property if they entered between October 1, 2017, and September 20, 2018). The difference in the percentage of IWISH residents and residents of the control properties who exited by the end of the initial 3-year demonstration period was not statistically significant. A slightly higher percentage (14.4 percent compared with 12.7 percent) of IWISH residents moved out before they died or transitioned to long-term care, and that difference was statistically significant at the 5-percent level.

Exhibit 5-1. Number of IWISH and Control Group Residents Who Exited Their Property During the Demonstration

Type of Exit from the Property	IWISH Residents (N=4,003)	Control Residents (N=9,354)	Difference (%)	p-Value
Moved Out	577 (14.4%)	1,191 (12.7%)	1.7%	.010***
Died While a Resident	406 (10.1%)	1,046 (11.2%)	- 1.1%	.072*
Transitioned to Long-Term Care	97 (2.4%)	252 (2.7%)	- 0.3%	.359
Total Exits	1,080 (27.0%)	2,489 (26.6%)	0.4%	.658

* p-value <.10. ** p-value <0.05. *** p-value <0.01.

Notes: The IWISH Demonstration was implemented from Q4 2017 through Q3 2020. p-Values were calculated using estimates from regression of each variable on a treatment or control group indicator using individual-level data and cluster-robust standard errors.

¹⁹ When multifamily property owners process a move-out, they are supposed to complete form HUD-50059-A and enter a code that best describes the reason for the move-out. Two of the codes refer to owner-initiated move-outs (i.e., evictions). Discussions with HUD suggest that those data may not be reliable—not all properties have well-populated data in this field, and evictions may be undercounted in the data because tenants frequently move out before facing formal eviction.

Sources: HUD TRACS data, 2017–2020; Centers for Medicare & Medicaid Services, Medicare Minimum Data Set 3.0, 2017–2019; Medicare enrollment data, 2017–2020; Medicaid long-term claims and encounters, 2017–2020

More Than One-Quarter of IWISH and Control Group Residents Exited Their Properties in the First 3 Years of the Demonstration

Between October 1, 2017, and September 30, 2020, 1,080 (27.0 percent) of the 4,003 IWISH residents and 2,489 (26.6 percent) of the 9,354 control group residents exited their property for any reason. The difference was not statistically significant. IWISH and control group residents who moved from their properties before they died were of similar age and had resided at their property for similar lengths of time when they moved. On average, IWISH and control group residents were 78 years old when they moved from their property, and both groups had resided at their property for 7 years before they moved.

Nearly 80 percent of IWISH residents who moved from their property had lived there for 2 or more years, 60 percent for 4 or more years, 35 percent for 8 or more years, and 22 percent had lived at their property for 12 or more years.

14 Percent of IWISH and Control Group Residents Died During the 3-Year Demonstration Period

According to dates of death from TRACS and Medicare data, 406 (10.1 percent) of IWISH residents and 1,046 (11.2 percent) of control group residents died while residing at their property. The difference for this secondary outcome is not statistically significant at the 5-percent level.

IWISH residents who had died while residing at their property were only slightly younger than control residents who died while residing at their property. On average, IWISH residents who died were 79 years old, whereas control group residents who died were 80 years old (a statistically significant difference),²⁰ and both groups had resided at their property for 10 years.

Impact of IWISH on Transitions to Long-Term Care

Whether a resident transitioned to long-term care during the demonstration period is another outcome that was identified as confirmatory for the impact analysis. *Long-term care* is an ambiguous term in healthcare services research. Many services that typically are categorized in Medicaid databases as long-term care—including services provided by nursing or skilled nursing facilities, intermediate care facilities, inpatient psychological hospitals, or any other type of residential care facility—might provide care to patients for weeks, months, or years. The most prevalent form of institutional long-term care is nursing homes, which serve approximately 1.3 million residents annually (CDC National Center for Health Statistics, n.d.). The risk of needing and receiving any type of long-term care, frequently referred to as long-term services and supports, increases with age.

The majority of long-term services and supports are provided informally by family and other unpaid caregivers. Medicaid is the single-largest payer for long-term care. The proportion of care provided in an institution versus in the community varies considerably across the United States, in part because of differences in state Medicaid policies and investments. For example, the percentage of state and Medicaid funding for community-based long-term services and supports (compared with institutional long-term care) in Massachusetts was more than twice that in Michigan or Maryland (64.2 percent, 31.5 percent, and 28.5 percent, respectively) (AARP, 2020). Nationwide patterns have been shifting away from institutional long-term services and supports in favor of community-based care.

²⁰ The *p*-value is <0.05. This difference is not risk-adjusted for the difference in IWISH and control group residents' ages at baseline. Exhibit 3-1 shows that IWISH residents were somewhat younger than control group residents.

For this portion of the analysis, the study defined *long-term care transition* as a resident who—

- Exited the property.
- Was admitted to a long-term care facility either before or within 90 days of their reported or imputed exit date.
- Subsequently resided at the long-term care facility for more than 100 cumulative days, without a gap of 30 or more days between a discharge and reentry to the facility.²¹

Using that definition, the study team examined IWISH’s impact on the likelihood that residents transitioned from independent living to institutional long-term care when they exited their property. The analysis found that 97 (2.4 percent) of IWISH residents and 252 (2.7 percent) of control group residents exited their property and transitioned to institutional long-term care. The difference is not statistically significant.

Hazard Models Show IWISH and Control Group Residents Equally Likely to End Residency

To further analyze differences in how long residents resided at IWISH and control properties, the study used risk-adjusted hazard models to compare IWISH and control group residents’ risk of exiting the property at any time during the initial demonstration period.²²

The hazard analysis shows that IWISH and control group residents were equally likely to end their residency for any reason (hazard ratio: 1.01, *p*-value: .388). They also were equally likely to exit to transition to long-term care (hazard ratio: 0.979, *p*-value: .489)²³ or die while residing at the property (hazard ratio: 0.984, *p*-value: .231).

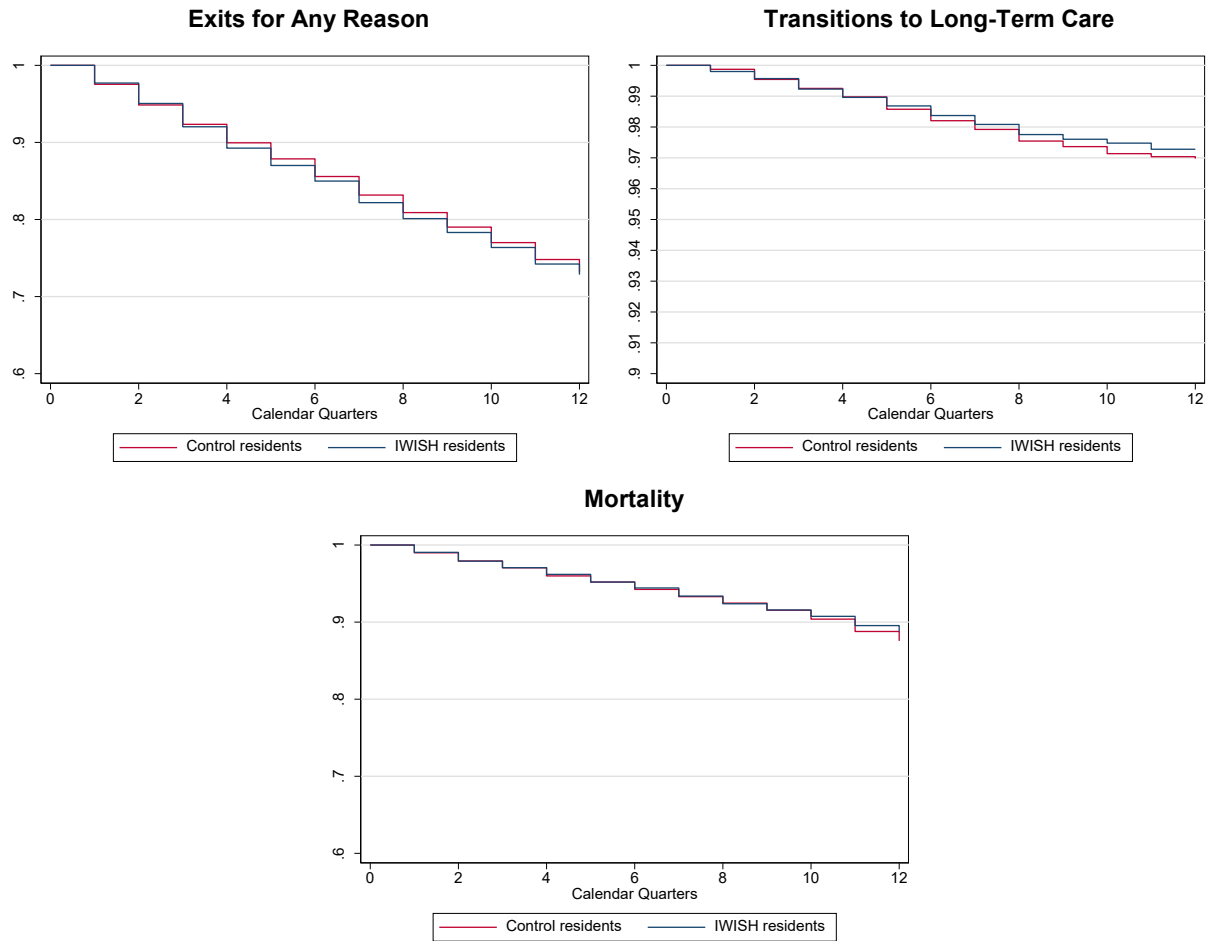
The lines shown in exhibit 5-2 are Kaplan-Meier curves (Jager et al., 2008) that show the proportion of residents who continued residing in their home at the start of each calendar quarter (Q4 2017 through Q3 2020), accounting for the proportion of residents who previously exited the property. Nearly equal proportions of IWISH and control group residents continued to reside in their homes during every calendar quarter of the demonstration, which is indicated by nearly overlapping curves for the two groups.

²¹ The definition of *long-term care facility* does not include assisted living homes or other independent living housing with onsite services, and the definition of *long-term care resident* aligns with the Centers for Medicare & Medicaid Services’ definition of a long-stay resident of a nursing facility.

²² This study used discrete-time hazard models with cluster-robust standard errors to compare IWISH and control group residents’ risk of exiting the property during any quarter of the demonstration, adjusting for whether residents were ages 65 through 74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone, as well as for length of residency.

²³ The study team conducted a sensitivity test of the definition of *transitions to long-term care* and found that IWISH had no statistically significant effect on residents’ likelihood of transitioning to long-term care even when a transition to long-term care is defined using 14 or 30 cumulative days in the facility instead of the more restrictive definition using 100 cumulative days.

Exhibit 5-2. Likelihood of IWISH and Control Residents Exiting Their Home for Any Reason, to Transition to Long-Term Care, or Due to Mortality



Notes: Kaplan-Meier curves represent the proportion of residents (left axis) who continued residing in their home at the start of each calendar quarter (Q4 2017–Q3 2020), adjusting for (or “censoring”) residents who had previously exited the property for competing reasons (note that there were no competing reasons for exiting when the study team calculated the rate of “exits for any reason”). Nearly overlapping Kaplan-Meier curves for the IWISH residents ($n=4,003$) and control group residents ($n=9,354$) indicate that nearly equal proportions of IWISH and control group residents continued to reside in their home during every quarter of the demonstration. The team also found no statistically significant impact of IWISH on housing exits, for any reason, based on population-averaged c-log-log models and cluster-robust standard errors, controlling for residents aged 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone and for length of residency.

Sources: HUD TRACS data, 2017–2020; Centers for Medicare & Medicaid Services, Medicare Minimum Data Set 3.0, 2017–2019; Medicare enrollment data, 2017–2020; Medicaid long-term claims and encounters, 2017–2020

Impact of IWISH on Days Admitted to Long-Term Care Facilities and Days in the Community

The study analyzed residents in the Healthcare Sample to examine whether IWISH had an impact on the total number of days residents were admitted to a long-term care institution while a resident of their property and to estimate the effects of the IWISH model on the number of “days in the community”—that is, the overall number of days that the resident spent in the community while they resided at their property and were not admitted to a long-term care institution, not admitted to a hospital for an inpatient or observation stay, and not in an outpatient emergency department. Those findings were defined as secondary outcomes for the impact analysis.

See appendix C, exhibit C-1, for detailed results of the impact analysis on residents' days in long-term care and days in the community.²⁴

IWISH Did Not Decrease Medicaid or Medicare Covered Days in Long-Term Care Institutions

Over the 3 years, residents in the IWISH Healthcare Sample were admitted to long-term care facilities 5.8 days per year, on average, approximately the same as residents in the Control Healthcare Sample (6.2 days per year, a difference that is not statistically significant). Days admitted to long-term care dropped for both IWISH and control group residents during the first quarter of 2020 as residents of long-term care facilities experienced some of the earliest and most severe ramifications of the spread of the COVID-19 virus.

IWISH Had No Cumulative Impact on the Number of Days That IWISH Residents Were in the Community

“Days in the community” captures IWISH’s effects on residents’ overall experience interacting with institutional healthcare providers while still residing at IWISH properties. By definition, an increase in the number of days in the community is associated with decreases in three of the study’s other outcome measures: days admitted for long-term care, days of unplanned hospitalization, and number of outpatient emergency visits. IWISH had no cumulative impact on the number of days that IWISH residents were in the community during the initial 3-year demonstration period (exhibit 5-3).

The difference in the number of days in the community for IWISH and control group residents grew somewhat in the demonstration’s second year (320.4 days per year and 315.2 days per year) and third year (336.0 days per year and 329.2 days per year), such that the difference during the third year (6.8 days per year) was statistically significant.²⁵ However, in this first phase of the evaluation, the study team cannot confidently conclude that the relatively small but statistically significant difference in IWISH and control group residents’ days in the community by the end of the 3-year period indicates that IWISH had an impact of residents’ housing tenure or healthcare use. The third year of the demonstration coincided with the onset of the COVID-19 pandemic, which fundamentally affected healthcare delivery, health behaviors, and the demand for healthcare services in all communities and could have confounded the study’s impact estimates. The second phase of the evaluation will allow the team to determine whether those differences were the beginning of a trend or an anomaly caused by the pandemic.

²⁴ The study team used generalized linear regression models to estimate the IWISH model’s average cumulative impact on residents’ days admitted to long-term care and days in the community during the 3-year demonstration period, applying statistical adjustments to control for differences in whether the residents were ages 65 through 74, age 85 or older, Black/African-American (non-Hispanic), Hispanic, Asian (non-Hispanic), living alone, as well as their length of residency, and indicators for nine chronic or disabling conditions. Appendix H describes the team’s statistical approach.

²⁵ The third-year difference of 6.8 (95-percent confidence interval: 0.8, 12.8) days in the community was statistically significant at the 5-percent level. The study team also estimated the impact of IWISH on days in the community among IWISH residents who were ever enrolled in the IWISH program (i.e., the impact of the “treatment-on-the-treated”). The results revealed that, during the third year of the demonstration, enrolled IWISH residents spent 10.8 (95-percent confidence interval: 1.2, 20.8) more days per year in the community than control group residents, and that difference was also statistically significant at the 5-percent level.

Exhibit 5-3. Impact of the IWISH Model on Days in the Community per Year Among Residents Age 62 or Older at IWISH and Control Properties

Statistic	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Risk-Adjusted Average ^a	308.0	304.0	310.8	306.8	320.4	315.2	336.0	329.2
Risk-Adjusted Difference	4.0		4.0		5.2		6.8	
p-Value	.290		.326		.127		.030**	

** p-value <0.05

^a Risk-adjusted averages control for whether the residents were aged 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. The data for days in the community exclude South Carolina residents and include 1,931 IWISH residents and 4,705 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data and hence days in the community were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

5.3 Additional Analyses of the Impact of IWISH on Housing Tenure and Transitions to Long-Term Care

To further explore the potential impact of IWISH on residents, the study team conducted additional analyses of housing exits by subgroups of residents and by certain property and neighborhood characteristics.

- **Analysis of Impacts on Housing Exits by Resident Subgroups.** The study team analyzed impacts by subgroups of IWISH and control property residents using resident demographic data to examine whether the effect of IWISH on housing tenure or transitions to long-term care might vary by age group, race or ethnicity, household size, or length of tenure before the start of the demonstration. The analysis found no consistent evidence of systematic variation in housing tenure or long-term care outcomes by age, sex, race, ethnicity, length of tenure in housing, or number of people in the household. (See appendix E for results.)
- **Analyses of the Association of Housing Exits with Property and Neighborhood Characteristics.** Property and neighborhood characteristics varied among IWISH properties in ways that could influence the outcomes of living in an IWISH property (see section 3.3). The study team hypothesized that properties with worse physical conditions or in neighborhoods with less access to services might reduce the model's ability to reduce resident turnover. However, the study found no evidence of differences in housing tenure or long-term care outcomes associated with differences in the physical condition of the IWISH properties (as measured by property inspection

ratings).²⁶ The study also found no differences in housing exits between residents of properties in neighborhoods of higher and lower poverty rates or in properties or neighborhoods that Resident Wellness Directors identified as having one or more barriers to aging in place. The study team also analyzed housing exits by whether the property had a Service Coordinator before the demonstration began and found no difference in rates for residents living in properties with or without an existing Service Coordinator.

- ***Analyses of the Association of Housing Exits with IWISH Implementation Fidelity.*** Within IWISH properties, the study team also analyzed whether rates of housing exits or transitions to long-term care differed on the basis of how fully IWISH properties implemented the IWISH model during the initial 3-year demonstration. The study found no correlation between housing exits in properties that were designated as high implementers (scored a rating of high in at least six of eight rating categories) compared with lower-rated properties. Neither did the study find a correlation between housing exits with high ratings of implementation fidelity for any one specific IWISH component. Further, the study did not find any correlation between rates of housing exits and whether the Resident Wellness Director and Wellness Nurse positions were fully staffed throughout the initial demonstration period.

The findings of those additional analyses reinforce the study's basic finding of the IWISH model having no impact on the housing exits of residents during the first 3 years of the demonstration.

²⁶ This analysis was nonexperimental because it measured and tested only differences among the IWISH properties. Data on control group residents were used in the analysis to risk-adjust the estimates at the resident level, and the estimated differences were expressed as differences relative to all residents in the control group.

6. Impact of IWISH on Planned and Unplanned Healthcare

In the Integrated Wellness in Supportive Housing model, Wellness Nurses and Resident Wellness Directors are expected to help residents address their unmet health and wellness needs and connect them to appropriate health and social services in the community, such as primary or specialty care. Over time, the actions of the housing-based wellness staff and access to evidence-based health and wellness programming are hypothesized to increase the use of such planned care and to reduce unnecessary hospitalizations and the use of emergency department or ambulance services.

Two of the evaluation’s research questions specifically addressed IWISH impact on healthcare use, which could be a factor in residents’ ability to sustain their tenure in HUD housing:

- What is the impact of IWISH on the utilization of Medicare and Medicaid covered primary care and other nonacute healthcare services?
- What is the impact of IWISH on utilization of Medicare and Medicaid covered unplanned hospitalizations and other acute care?

For those research questions, the study team, in consultation with HUD and the Expert Panel, selected two confirmatory outcomes for the impact analysis to measure:

- Total days of unplanned hospitalization.
- Number of days with a primary care visit.

The study team linked HUD administrative data for residents of the IWISH and control properties to Medicare fee-for-service claims from the Centers for Medicare & Medicaid and the Medicaid databases of the seven states in the demonstration to look for evidence of IWISH’s impact on healthcare use.

This chapter presents the study’s analysis of IWISH impacts on residents’ use of nonacute care services, acute care services, and Medicare fee-for-service spending. Key findings are shown in the text box below. Section 6.1 provides an overview of how healthcare coordination and wellness supports differ between IWISH and control properties, and Section 6.2 summarizes the overall findings regarding the impact of IWISH on healthcare use. Section 6.3 describes the results of additional analyses conducted to further explore the impacts of IWISH healthcare use by subgroups of residents and to show the correlations of outcomes for IWISH properties with varying property and neighborhood characteristics.

Key Findings on the Impact of IWISH on Planned and Unplanned Healthcare

- Residents of IWISH and control properties had the same number of primary care visits and similar rates of new visits to physician specialists during the 3-year demonstration.
- IWISH had no statistically significant effect on the number of days of unplanned hospitalizations or other types of unplanned or emergency healthcare services.
- IWISH reduced the rates at which residents aged 62 through 64 and 85 or older used acute or emergency care services but not the rates at which residents aged 65 through 84 used those services.
- Residents at IWISH properties that were rated as having higher levels of working individually with residents on meeting their health and wellness goals tended to spend more days in the community.
- Residents at IWISH properties that were rated as having higher levels of providing transitional care to residents returning home from a hospital or long-term care stay tended to have fewer unplanned hospitalizations, fewer outpatient emergency department visits and ambulance events, and more primary care visits than residents of lower-rated IWISH properties.

- Residents at IWISH properties without a Service Coordinator before IWISH had fewer unplanned hospital admissions, spent fewer days hospitalized, and had more primary care visits than did residents living in IWISH properties with a Service Coordinator before IWISH.
- IWISH residents living in “isolated” communities, or communities that “lacked access to nutritious food” had higher rates of outpatient emergency department visits and ambulance use than other IWISH residents and had fewer primary care visits, spent more days in a long-term care facility, and spent fewer days in the community.

6.1 Healthcare Coordination and Wellness Supports at IWISH and Control Properties

The IWISH model is hypothesized to have positive impacts on the residents’ use of the healthcare system, avoiding unplanned hospitalizations and other less effective uses of the system and encouraging better connections to primary health care. Although the Wellness Nurse has a nonclinical role at the IWISH property and does not provide direct, hands-on healthcare to residents, the Wellness Nurse provides health education and monitoring and can act as a liaison between residents and their healthcare providers. The Resident Wellness Director connects residents to public benefits and to social services such as transportation and meal services that can positively affect residents’ use of healthcare. The provision of evidence-based health and wellness programming is also expected to positively affect the use of healthcare through better education of health conditions and awareness of barriers to aging in place.

From interviews with Wellness Nurses and Resident Wellness Directors, staff reported encouraging IWISH residents to make followup appointments with their primary care physicians for regular preventive care. They reported “triaging” residents, sometimes referring them away from emergency care to more appropriate, nonacute sources of care. IWISH staff were most likely to identify a resident’s need or proactively refer a resident to primary care during “milestone” or “transitional” moments; for instance, after an emergency or after the resident returns home from hospitalization, at a group health event (e.g., flu shots or blood pressure clinics), during an IWISH assessment, or when a resident contacts the Wellness Nurse because they are not feeling well. Interviews with the Resident Wellness Director and Wellness Nurse suggested that IWISH residents’ use of primary care increased during the demonstration.

Wellness Nurses at most of the IWISH properties assisted residents with their medication self-management, and seven Wellness Nurses (at 18 percent of IWISH properties) said that was the service they provided that they felt had the most impact on resident’s health. IWISH staff at most treatment properties, particularly Wellness Nurses, also reported playing a role in resident emergency events—including providing support to residents before, during, and after the event—and IWISH staff at all properties reported providing transitional care to residents after a hospital or long-term care stay.

6.2 The Impact of IWISH on Planned and Unplanned Healthcare During the Initial 3-Year Demonstration

The study team examined 12 healthcare use measures (specified in appendix B) to determine whether the IWISH model had an impact on residents’ healthcare use during the initial 3-year demonstration period. Two measures are confirmatory outcomes that the team used to determine whether IWISH had any impact on the use of primary care services or unplanned hospitalizations. The study team also examined 10 secondary measures to determine whether IWISH had any impact on residents’ general patterns of healthcare use, which might predict a larger cumulative impact of IWISH on healthcare use over a longer period of time.

CHAPTER 6. IMPACT OF IWISH ON PLANNED AND UNPLANNED HEALTHCARE

The study found no clear evidence that the IWISH model had an impact on the use of primary or acute care services by IWISH residents during the first 3 years of the demonstration, as summarized in exhibit 6-1. As shown by the *p*-values in the exhibit, none of the differences in outcomes between residents of the IWISH properties and residents of control properties is statistically significant (none of the *p*-values are less than .05, which would indicate a 5-percent level of significance).

Exhibit 6-1. Impact of IWISH on Healthcare Use at IWISH and Control Properties

Healthcare Use Outcomes ^a	IWISH Average ^b	Control Group Average	Difference (%)	<i>p</i> -Value
Impact of IWISH on the Use of Medicare and Medicaid Covered Primary Care and Other Nonacute Healthcare Services				
● Number of days with a primary care (evaluation and management) visit	5.9	5.9	0.0	.990
New use of specialty care services, cardiology	15.0%	16.4%	- 1.4%	.271
New use of specialty care services, rheumatology	3.5%	2.7%	0.8%	.343
New use of specialty care services, endocrinology	4.4%	3.6%	0.8%	.184
New use of specialty care services, ophthalmology	1.3%	1.3%	0.0%	.975
Impact of IWISH on the Use of Medicare and Medicaid Covered Unplanned Hospitalizations and Other Acute Care				
● Total days of unplanned hospitalization	2.0	1.9	0.1	.487
Unplanned hospital admissions	0.3	0.3	0.0	.331
Unplanned 30-day hospital readmissions	0.1	0.1	0.0	.949
All-cause emergency department visits not resulting in hospital admission	0.7	0.6	0.1	.832
Ambulance events	1.0	1.1	- 0.1	.429
Cross-Cutting Measure				
Total Medicare fee-for-service spending, per quarter	\$5,286	\$5,625	-\$339	.282

● = confirmatory outcome.

^a Healthcare use measures (except for the new use of specialty care services and Medicare fee-for-service spending) are specified as the number of days or events per resident per year. Residents were followed from baseline until they exited the property or switched to a Medicare managed care plan for healthcare coverage.

^b Risk-adjusted averages, controlling for whether the residents were aged 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Impacts of IWISH on Primary Care and Other Planned Healthcare

IWISH aims to connect residents to appropriate health and social services in the community, such as primary or specialty care services. Increased use of those services has the potential to improve the health and well-being of IWISH residents, to prevent some adverse events, and to reduce hospitalizations and the use of emergency care services.

The study used the number of days that a resident visited a physician for primary care as a confirmatory outcome to measure whether IWISH affected residents’ use of primary care services. The study team

defined *primary care* as evaluation and management conducted by specific types of physicians outside a hospital or ambulatory surgery center, including at home or through telehealth.

The study team also examined new visits with four types of physician specialists as secondary measures of IWISH’s potential effect on the use of nonacute care. The team examined new visits with cardiologists, rheumatologists, endocrinologists, and ophthalmologists. Those specialists were chosen because of the prevalence of heart conditions, arthritis, diabetes, cataracts, and glaucoma among IWISH and control group residents in the Healthcare Sample. The team measured *new* visits to a specialist because an increase in the rate of new visits is likely to result from increased access to care because of the IWISH model, whereas an increase in the rate of existing visits could indicate a worsening of the health condition unrelated to IWISH. A specialist visit was defined as a “new” visit if the resident had not visited the same type of specialist during the 12 months preceding the baseline date.²⁷

IWISH and Control Group Residents Had a Similar Number of Primary Care Visits and Similar Rates of Specialist Visits During the Demonstration

The study team found that IWISH had no impact on the number of primary care visits by IWISH residents during the 3-year demonstration period. There was little to no difference between IWISH and control group residents during any of the 3 years, as shown in exhibit 6-2. Averages are adjusted for resident characteristics associated with risks of needing health care, including demographic characteristics and chronic or disabling conditions of the residents at baseline. As shown by the *p*-values, none of which is less than .05, the difference was not statistically significant overall or in any year.

During the initial 3-year demonstration period, residents of both IWISH and control properties had an average of 6 days with a primary care visit per year, which was consistent with utilization patterns before IWISH for this population of older residents of HUD-assisted multifamily properties, who have health care needs higher than is typical for people their age (see the discussion of chronic and disabling conditions in section 3.2). IWISH residents also had rates similar to the rates for control group members of new visits with cardiologists, rheumatologists, endocrinologists, or ophthalmologists during the demonstration period (see appendix C, exhibit C-1, for results).

Exhibit 6-2. Impact of IWISH on Days with a Primary Care Visit Among Residents Age 62 or Older at IWISH and Control Properties

Statistic	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Primary Care Visits per 1,000 Beneficiary Months								
Risk-Adjusted Average^a	5.9	5.9	5.7	5.6	6.0	5.9	5.3	5.4
Risk-Adjusted Difference	– 0.0		0.1		0.1		– 0.1	
<i>p</i>-Value	.990		.785		.850		.884	

²⁷ A resident’s baseline date is October 1, 2017, for residents who moved in beforehand, or the date the resident moved in if it was on or after October 1, 2017, but before October 1, 2018. The sample for estimating the impact of IWISH on new use of specialty services is restricted to residents continuously enrolled in Medicare fee-for-service or Medicaid with full coverage during the 12 preceding months.

^a Risk-adjusted averages, controlling for whether the residents were aged 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions. Unadjusted averages are reported in appendix C.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Impact of IWISH on Residents' Use of Acute or Emergency Care Services

Given that a key driver of costs and other negative consequences of unplanned hospitalizations is the amount of time spent in a hospital or emergency care, the study team considered the total number of days that residents were admitted to a hospital for unplanned acute care services during the demonstration period as a confirmatory measure of whether the IWISH model had any impact on the use of acute care.

The impact study also examined four secondary measures related to the use of acute care services. The first two secondary measures are unplanned hospital admissions and unplanned hospital readmissions within 30 days of previous hospital discharge. Unplanned hospital admissions measure the overall frequency of hospitalizations; 30-day hospital readmissions are an important measure of the overall quality of care for patients discharged from a hospital. Fewer hospital readmissions would reflect improvements in the quality of discharge planning at the hospital and more coordinated care received by the residents at IWISH properties after they were discharged from a hospital.

The third and fourth secondary measures are all-cause emergency department visits not resulting in hospital admission and ambulance events. Reduced numbers of emergency department visits and ambulance trips not only represent less use of unplanned acute care services but also could signal the IWISH model's longer-term potential to limit adverse outcomes among residents and reduce spending on high-cost healthcare services. Not all emergency department visits and ambulance trips warrant inpatient care, and they are likely to occur more frequently than hospital admissions. Therefore, the study team hypothesized that the impact of the IWISH model on those services would be detected before its impact on the use of unplanned inpatient services.

IWISH and Control Group Residents Had Similar Rates of Unplanned Hospitalization Over the 3-Year Demonstration Period

There was no clear evidence that IWISH decreased the number of days that residents spent in a hospital for unplanned acute care services during the demonstration period. IWISH residents' unplanned hospitalization days of 2.0 days per year was not statistically significantly different from the rate for control group residents (1.9 days per year) (exhibit 6-3). The study team also found no statistically significant difference in the number of unplanned hospital admissions or 30-day unplanned hospital readmissions between IWISH and control group residents. (Appendix C, exhibit C-1, presents IWISH's estimated impacts on all outcomes).

Exhibit 6-3. Impact of IWISH on Total Days of Unplanned Hospitalization Among Residents Age 62 or Older at IWISH and Control Properties

Statistic	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Total Days of Unplanned Hospitalization per 1,000 Beneficiary Months								
Risk-Adjusted Average^a	2.0	1.9	1.6	1.5	1.8	2.0	1.8	2.1
Risk-Adjusted Difference	0.1		0.1		– 0.2		– 0.3	
p-Value	.487		.421		.452		.256	

^a Risk-adjusted averages, controlling for whether the residents were age 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions. Unadjusted averages are reported in appendix C, exhibit C-1.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

In the analysis of quarterly trends, the study team found that IWISH and control group residents' number of days hospitalized varied substantially from quarter to quarter. The team reasoned that this volatility could have masked an underlying divergence in rates of unplanned hospitalization between IWISH residents and control group residents. The team therefore reestimated the impact of IWISH on total days of unplanned hospitalization after excluding IWISH and control group residents with exceptionally high rates during the demonstration period, and found the differences remained insignificant.²⁸ (The results of those analyses are presented in appendix C, exhibit C-3, and appendix D, section D.2.)

IWISH and Control Group Residents Had Similar Rates of Outpatient Emergency Department Visits and Ambulance Events

There was no evidence that IWISH decreased rates of Medicaid or Medicare covered outpatient emergency department visits or emergency and nonemergency medical transportation (“ambulance events”) during the initial 3 years of the demonstration. IWISH and control group residents also differed little in the number of outpatient emergency department visits during any of the 3 years. During the initial 3-year demonstration period, residents of both IWISH and control properties had fewer than 1 emergency department visit per year (0.6 for both groups).

The study team also found that IWISH residents used ambulance services at rates similar to control property residents (1 day per year and 1.1 days per year), and the difference was not statistically significant. The lack of a statistically significant difference persisted when the team excluded from the Healthcare Sample residents who were outliers in terms of ambulance events.

²⁸ The study team defined outliers as IWISH or control group residents in the Healthcare Sample whose cumulative number of days of unplanned hospitalization (per quarter, to adjust for residents who exited the demonstration) was 1.5 times greater than the 75th percentile across both groups.

Staff at Most IWISH Properties Reported Playing a Role in Emergency Management

Although no statistical evidence indicated that IWISH made a difference in rates of emergency care use, IWISH staff at most treatment properties—particularly Wellness Nurses—reported playing a role in resident emergency events. That role included providing support to residents during the event, providing support and service coordination after the event, and educating residents on how to prevent future emergency events. Wellness Nurses from one-third of IWISH properties gave examples of when their support averted the unnecessary use of emergency services.

Impact of IWISH on Total Medicare Fee-for-Service Spending

Total Medicare fee-for-service spending captures changes in acute and nonacute healthcare services not included in the confirmatory and secondary healthcare use measures already discussed. Total Medicare fee-for-service spending reflects residents’ combined medical and pharmacy costs for all Medicare beneficiaries who were enrolled in Medicare Parts A and B during the demonstration period (including dual-eligible beneficiaries, for whom Medicare is the primary payer of medical services other than long-term care). Some, but not all, residents with Medicare Parts A and B coverage had prescription drugs covered under Medicare Part D, the costs of which were also included in the total Medicare fee-for-service spending measure. The study team did not adjust for geographic variation in Medicare fee-for-service spending because IWISH and control properties were randomized such that both property types were nearly equally represented the regions of the states involved in the demonstration.

Analysis Found No Clear Evidence That IWISH Reduced Medicare Spending by IWISH Residents Enrolled in Medicare Parts A and B over the Initial 3-Year Period of the Demonstration

IWISH and control group residents enrolled in Medicare Parts A and B had comparable rates of Medicare fee-for-service spending over the 3 years. IWISH residents enrolled in Medicare Parts A and B incurred average costs of \$5,286 per quarter, and control group residents incurred average costs of \$5,625 per quarter—a difference that was not statistically significant (exhibit 6-4).

Exhibit 6-4. Impact of the IWISH Model on Medicare Fee-for-Service Spending per Calendar Quarter Among Residents Age 62 Years or Older at IWISH and Control Properties

Statistic	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Risk-Adjusted Average^a	\$5,286	\$5,625	\$4,524	\$4,726	\$5,424	\$5,886	\$5,237	\$5,743
Risk-Adjusted Difference (95% Confidence Interval)	– \$339 (– 956, 278)		– \$202 (– 830, 426)		– \$462 (– 1,245, 321)		– \$505 (– 1,323, 312)	
p-Value	.282		.528		.248		.226	

^a Risk-adjusted averages, controlling for whether the residents were aged 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions. Unadjusted averages are reported in appendix C.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. The data included 1,940 IWISH residents and 4,564 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Given the quarterly variation in IWISH residents' Medicare spending, especially during the COVID-19 pandemic and public health emergency, the study team reestimated the impact of IWISH on total Medicare fee-for-service spending after excluding IWISH and control group residents with exceptionally high rates of spending.²⁹ After excluding outlier residents from the sample of Medicare fee-for-service beneficiaries, the team found any apparent, relative decreases in the IWISH residents' spending during 2019 and 2020 did not persist.

At the start of the evaluation, HUD and the study team determined that the design of the Supportive Services Demonstration would not have sufficient statistical power to detect statistically significant differences in healthcare spending. The study team therefore chose to assess the effects of IWISH on healthcare spending as part of the analyses of secondary outcomes rather than the main, confirmatory analyses. A short-term increase and longer-term decrease in total spending on medical and pharmacy services by IWISH residents might reflect a short-term increase in the use of nonacute healthcare services and a longer-term decrease in the use of higher-cost acute care services.

Based on those findings, the study team cannot conclude that the lack of statistically significant differences in Medicare fee-for-service spending between the IWISH and control group residents enrolled in Medicare Parts A and B indicate IWISH's potential longer-term impact on overall healthcare use and spending. The team will revisit those findings during the second phase of the evaluation, however, with 2 additional years of data with which to detect IWISH's potential longer-term impacts.

Testing Results of Impact Analyses

In addition to the main analysis of the impact of offering IWISH at HUD-assisted properties, the study also conducted several additional analyses to further understand IWISH's potential impact on residents.

Impact of IWISH on Residents Enrolled in IWISH ("Treatment on the Treated")

Appendix C, exhibit C-2 presents the cumulative and annual "treatment-on-the-treated" (TOT) estimates for each confirmatory and secondary healthcare use measure. TOT estimates are essentially the intent-to-treat (ITT) estimates weighted by the proportion of IWISH residents who ever enrolled in IWISH. They represent the estimated effects of IWISH on outcomes among IWISH residents who formally enrolled in IWISH during the demonstration. TOT estimates are less precise than ITT estimates and do not change the statistical significance of the estimates. As the study found no statistically significant impacts of IWISH on healthcare utilization based on ITT estimates, the study found no statistically significant impacts based on the TOT estimates.

Sensitivity Analyses

The study team conducted sensitivity analyses to test whether the findings differed from the main estimates of IWISH's cumulative effects on healthcare use by doing the following:

- Do *not* risk-adjust the comparisons to control for small imbalances in certain characteristics of the randomized IWISH and control groups.

²⁹ The study team defined outliers as IWISH or control group residents in the Healthcare Sample who were enrolled in Medicare Parts A and B and whose cumulative spending (per quarter, to adjust for residents who exited the demonstration) was 1.5 times greater than the 75th percentile across both groups.

- Weight the treatment and control groups to adjust for potential differences in sample attrition due to mortality.
- Weight the treatment and control groups to adjust for the probability of sample attrition for any reason (including mortality).
- Calculate each resident's healthcare use over the entire demonstration period to follow patterns in their healthcare use regardless of whether they moved out during the demonstration.

Appendix C, exhibit C-4, presents the results of the sensitivity analyses. The estimates of IWISH's cumulative impact remained statistically insignificant across all sensitivity analyses and were of similar magnitude for most of the outcomes.

6.3 Additional Analyses of IWISH Impacts and Outcomes

The differences in engagement with IWISH staff described in section 4.3 may suggest a potential disparity in program engagement or access among certain demographic groups, which may lead to differences in healthcare use. To understand those differences and how the impact of IWISH on residents' healthcare use varied in general, the analysis estimated impacts on healthcare use for subgroups defined by age group, race and ethnicity, household size, length of tenure at the property when the demonstration started, and high use of healthcare services before the start of the demonstration. The cluster-randomized controlled trial design of the demonstration was not explicitly developed to ensure enough statistical power to detect small differences in outcomes within any specific subgroups of residents. However, noticeable, systematic patterns in the impact that IWISH had on healthcare use across subgroups would help in understanding whether some groups of residents benefit from IWISH more than others and whether the impacts of IWISH could help overcome health disparities between groups.

Impact of IWISH on Healthcare Use by Subgroups of Residents

The study team hypothesized that residents with more healthcare needs, whether due to older age or poor functional status, might have benefited more from the IWISH program than other residents. The team also hypothesized that differences in the rates at which certain demographic groups engaged with the Wellness Nurse and Resident Wellness Director at IWISH properties, as implementation study results suggested, could lead to differences in healthcare use among the IWISH residents. For instance, the study team found that residents who identified as Hispanic (of any race) or non-Hispanic American Indian/Alaska Native or White had higher rates of visits with IWISH staff than did non-Hispanic African-American/Black and Asian residents. The team also found that divorced or widowed residents met more frequently with the IWISH staff than married residents did, and residents aged 60 through 64 met with IWISH staff slightly more often than did those aged 65 or older.

The study team used TRACS data from 2017 to define the following subgroups of IWISH and control group residents:

- **Race and ethnicity:** Residents who identified as (1) Hispanic (of any race), (2) non-Hispanic White, (3) non-Hispanic African-American/Black, (4) non-Hispanic Asian, and (5) non-Hispanic other race.
- **Age group:** Residents aged 62 through 64, 65 through 74, 75 through 84, and 85 or older at the start of the demonstration.
- **Household size:** Residents who lived alone versus those in households with two or more people.

- **High healthcare utilizers:** High utilizers of health care for residents who were enrolled in Medicare Parts A and B from October 1, 2016, through September 30, 2017, and were in the 75th percentile of Medicare fee-for-service spending during that period.
- **Length of tenure:** Residents who continuously lived in the unit that they resided in for less than 1 year, 1 to 3 years, 3 to 7 years, 7 to 12 years, and more than 12 years at the start of the demonstration.

To examine how the effects of IWISH varied between subgroups, the study team reestimated the regression models for confirmatory and secondary outcomes to calculate the percentage difference in the average outcomes between IWISH and control group residents in a given subgroup. The team estimated each outcome and subgroup category separately, adjusting the estimates for the same set of variables that were adjusted for in the main analysis. The statistical approach to exploring the impact of IWISH across subgroups is described in appendix H.

The study team found no clear evidence that the effect of IWISH on healthcare use was significant for subgroups defined by race and ethnicity, length of tenure, or household size or between high users of healthcare services and all other residents in the Healthcare Sample. However, the team found a consistent pattern of lower use of acute care among the youngest and oldest IWISH residents in the Healthcare Sample.

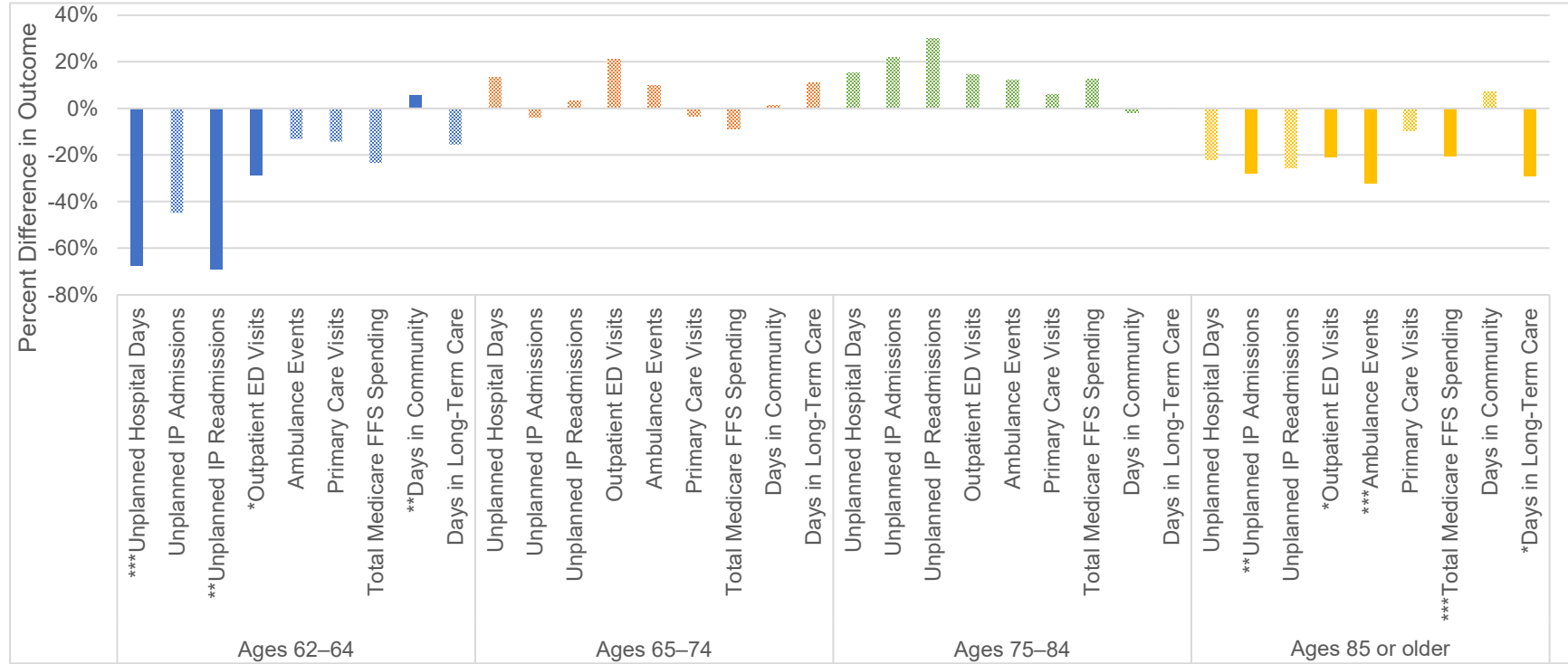
Although the study also found that residents whose primary language is English met more frequently with staff than those whose primary language is not English, the study team did not have individual-level data on the languages that IWISH and control group residents or IWISH staff speak to be able to analyze outcomes by the languages that residents and staff speak.

IWISH Reduced Acute Care Use Among the Youngest and Oldest Residents More Than Among Residents Age 65 to 84

The study team found consistent evidence that IWISH was effective at reducing the rates of unplanned hospitalizations, outpatient emergency department visits, and ambulance use among residents aged 62 through 64 (“youngest”) and 85 and older (“oldest”) but not for residents aged 65 through 84 (“middle”). On average, the youngest and oldest residents had fewer days of unplanned hospitalizations, unplanned hospital admissions, unplanned hospital readmissions, outpatient emergency department visits, and ambulance events during the demonstration period than did control group residents of the same ages (exhibit 6-5).

Residents aged 65 through 74 and 75 through 84 had higher or similar rates of these acute care services, on average, compared with control group residents in the same age groups. Not every estimated difference for residents aged 62 through 64 and 85 and older was statistically significant across the confirmatory and secondary measures of acute care use. However, no difference was statistically significant among residents aged 65 through 74 or 75 through 84.

Exhibit 6-5. IWISH Reduced Acute Care Use Among Residents Age 62 Through 64 and 85 or Older but Had No Statistically Significant Impact for Residents Age 65 Through 84



* p -value $< .10$. ** p -value $< .05$. *** p -value < 0.01 .

Notes: Lighter-shaded bars indicate p -values $> .10$. Bars below zero mean that, on average, IWISH residents had fewer days, events, or spending than control residents in the same age group over the 3-year demonstration period. Solid-colored bars indicate statistical significance at the 1-, 5-, or 10-percent level. Bars represent the percentage difference between the risk-adjusted average rate of use by IWISH residents of a given age group versus the risk-adjusted average rate of use by control group residents of the same age group. Risk-adjusted averages control for any observed differences in the characteristics of residents of treatment and control properties. The data included 132 IWISH residents and 347 control group residents age 62–64, 765 IWISH residents and 1,601 control group residents aged 65–74, 776 IWISH residents and 1,754 control group residents aged 75–84, and 358 IWISH residents and 1,074 control group residents aged 85 or older. All residents were enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Analysis of the Association of Healthcare Use with IWISH Implementation Ratings

Using the fidelity ratings developed for the implementation study, the team conducted an additional set of analyses to assess whether IWISH residents' outcomes are correlated with how certain aspects of the IWISH model were implemented at their properties during the first 3 years of the demonstration. Those results are nonexperimental,³⁰ so the estimates are only correlations and not evidence of a causal relationship, but they can suggest which aspects of the IWISH model could have greater potential to result in positive changes in residents' health and well-being or in what context the IWISH model has the most effect.

The results of the analysis found no difference in impacts for properties that had higher ratings of implementation fidelity overall but did find relationships between greater impacts of IWISH and two specific aspects of the IWISH model: the Individual Healthy Aging Plan (IHAP) and transitional care provided to a resident returning home from a hospital or long-term care stay.

Properties With Higher Percentages of Residents with Recorded Wellness Goals Were Associated with More Positive Outcomes for Healthcare Use

The analysis shows that IWISH properties with higher rates of enrolled residents with recorded goals in IHAPs were associated with greater impacts of IWISH on healthcare use than properties with lower rates. Properties with higher IHAP ratings were correlated with lower rates of acute care use, more primary care visits, and more days in the community (see exhibit 6-6). The correlations with ambulance events and days in the community were statistically significant at the 5-percent level, as indicated by *p*-values less than .05.

The study found statistically significant associations between the percentage of enrolled residents with recorded goals in IHAPs and lower rates of ambulance events and between more days that residents were in the community during the demonstration.³¹ Although many properties were already conducting some sort of assessment before the demonstration, IWISH's explicit focus on using assessment information to help residents identify wellness goals or direct services to residents could have better leveraged those data.

³⁰ The nonexperimental analyses use individual-level data on control group residents but only as a reference point for characterizing the size of IWISH's effects on IWISH residents' healthcare use rates, thereby adjusting for underlying trends in use common to both IWISH and control group residents. The regression models also adjust for the same individual-level demographics and chronic conditions used to risk-adjust the main estimates. The methodology is described in more detail in appendix H.

³¹ The association between the percentage of residents with IHAPs and fewer ambulance events was statistically significant before and after the study team excluded residents with inordinately high rates of ambulance events compared with all other IWISH and control group residents. The team did not exclude outlier residents with respect to days in the community because spending every day of the demonstration in the community was not unusual for IWISH and control group residents.

Exhibit 6-6. Associations Between Health Use Rates and the Percentage of Residents at IWISH Properties Who Participated in Person-Centered Interviews, Participated in Health and Wellness Assessments, or Recorded Goals in Individual Healthy Aging Plans

Outcome ^a	Residents Who Participated in Person-Centered Interviews		Residents Who Participated in Health and Wellness Assessments		Residents With Individual Healthy Aging Plans	
	Percentage Difference	p-Value	Percentage Difference	p-Value	Percentage Difference	p-Value
Days With a Primary Care Visit	1.8	.202	2.0	.134	1.8	.138
Days of Unplanned Hospitalization	- 2.3	.300	- 3.2	.156	- 3.1	.204
Unplanned Hospital Admissions	- 2.7	.174	- 3.0	.125	- 3.3	.133
Outpatient Emergency Department Visits	- 0.2	.880	- 0.8	.614	- 1.4	.329
Ambulance Events	- 1.4	.468	- 2.0	.287	- 3.4	.047**
Total Medicare Fee-for-Service Spending	2.2	.061*	1.9	.098*	1.9	.070*
Days in Long-Term Care	6.1	.101	4.8	.194	2.4	.406
Days in Community	0.4	.253	0.3	.362	0.5	.036**

* p-value <.10. ** p-value <.05. *** p-value <0.01.

“Percentage Difference” is the percentage increase in the average outcome among IWISH residents versus the average outcome among all control group residents, for every 1 percentage-point increase in residents at IWISH properties who participated in interviews, assessments, or Individual Healthy Aging Plans (IHAPs). Negative percent differences represent a negative correlation between the percentage of residents at IWISH properties who participated in these core components of the IWISH model and the healthcare use rates among residents at those properties.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration period in the community was not unusual for residents. The pattern in the correlations between residents with IHAPs and all outcomes was consistent before and after dropping outliers and suggests an underlying trend.

Notes: Associations between resident participation in these core components of the IWISH model and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: Abt Associates analysis of program data from the Population Health Logistics system; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; analysis of monthly implementation team reports; HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Properties with Higher Transitional Care Were Associated with More Positive Outcomes for Healthcare Use

The analysis found that IWISH residents in properties with High fidelity ratings in transitional care had more positive outcomes than other IWISH properties. IWISH residents tended to have more primary care visits and fewer unplanned hospitalizations, outpatient emergency department visits, and ambulance events at properties where Resident Wellness Directors and Wellness Nurses provided more coordinated

care for residents returning home from a hospital or nursing home stay (exhibit 6-7).³² The exhibit shows which of the differences are statistically significant.

Exhibit 6-7. Association Between Levels of Transitional Care Primary Care Visits, Unplanned Hospitalizations, Outpatient Emergency Room Visits, and Ambulance Events

Outcome ^a	Low or Medium Level of Transitional Care		High Level of Transitional Care		Subgroup Difference ^c
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value	
Days with a Primary Care Visit	2.1	.518	12.7	<.001***	Yes**
Days of Unplanned Hospitalization	- 1.8	.826	- 17.4	.083*	No
Unplanned Hospital Admissions	- 6.8	.364	- 20.9	.020**	No
Outpatient Emergency Department Visits	7.2	.152	- 12.8	.030**	Yes**
Ambulance Events	0.4	.948	- 14.4	.044**	Yes*
Total Medicare Fee-for-Service Spending	5.1	.201	10.0	.110	No
Days in Long-Term Care	8.5	.569	26.8	.122	No
Days in Community	1.2	.495	1.8	.232	No

* p-value <.10. ** p-value <.05. *** p-value <0.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration period in the community was not unusual for residents.

^b “Percentage Difference” is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents.

^c “Subgroup Difference” indicates whether there is a statistically significant difference in the estimated “Percentage Difference” between IWISH residents at properties with high levels of transitional care and low or medium levels of transitional care. Asterisks indicate a statistically significant difference between the two estimates at the 5- or 10-percent level.

Notes: The level of transitional care at two IWISH properties was not rated; the estimates for those properties were suppressed from this table. Associations between property characteristics and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: Abt Associates analysis of program data from the Population Health Logistics system; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; analysis of monthly implementation team reports; HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Analysis of the Association of IWISH Outcomes on Healthcare Use with Property and Neighborhood Characteristics

The study team conducted additional analyses to explore whether the healthcare use of IWISH residents is correlated with characteristics of the IWISH properties or the neighborhoods in which they are located.

³² The associations between transitional care and primary care visits, unplanned inpatient admissions, outpatient emergency department visits, and ambulance events were consistent before and after the study team excluded residents with inordinately high rates of the given outcome compared with all other IWISH and control group residents.

Those results are nonexperimental because the data on property and neighborhood characteristics used in the analysis were for IWISH properties only. The estimates discussed below draw inferences about relationships between certain property and neighborhood characteristics and select outcome measures based on how use rates varied across IWISH properties.³³ The results of those analyses should be viewed only as associations between the property and neighborhood characteristics and resident outcomes and not a causal relationship, but the analyses will help the study team understand under which contexts the IWISH model could be more or less successful in affecting resident tenure or healthcare use.

Approach to Analyzing Relationships Between IWISH Resident Outcomes and Property and Neighborhood Characteristics

The study team examined whether the effect of IWISH on healthcare use rates varied with several property and neighborhood characteristics based on HUD inspection data, data from the U.S. Census Bureau's American Community Survey, and information collected by the implementation study team through telephone surveys and interviews.

The study team reestimated the models used to estimate impacts for confirmatory and secondary outcomes, replacing the indicator for residents who reside at an IWISH property with categorical or continuous variables that characterize the IWISH property or neighborhood (e.g., properties for which the Resident Wellness Directors reported a lack of social services in their neighborhoods, a potential challenge to aging in place). The team shows the association between neighborhood or property characteristics and the outcome of interest as a percentage of the average outcome among control group residents. In this nonexperimental analysis, the control group average serves as a benchmark.

The study team found evidence that IWISH residents' healthcare use during the demonstration varied on the basis of whether properties had a service coordinator before the start of the demonstration and whether, according to IWISH staff, the property was located in an isolated area or lacked access to nutritious food. The comprehensive set of estimates examining the relationship between property and neighborhood characteristics and healthcare use rates among IWISH residents is presented in appendix F.

Properties Without Service Coordinators Before IWISH Are Associated with Fewer Unplanned Hospitalizations, Fewer Days Hospitalized, and More Primary Care Visits

Seven IWISH properties (18 percent) did not have a Service Coordinator before the demonstration. Compared with the average number of days with a primary care visit among all control group residents, IWISH residents at those seven properties had 14.0 percent more primary care visits during the demonstration period; residents at all other IWISH properties had 3 percent more primary care visits. (The difference between those two estimates was statistically significant at the 5-percent level.)

Compared with the average number of days of unplanned hospitalization among all control group residents, IWISH residents at properties without Service Coordinators before the demonstration had 39 percent fewer days of unplanned hospitalization, whereas the residents at all other IWISH properties had 6 percent fewer days of unplanned hospitalization. Similarly, IWISH residents at properties without Service Coordinators had 43 percent fewer unplanned inpatient admissions during the demonstration

³³ The nonexperimental analyses use individual-level data on control group residents but only as a reference point for characterizing the size of IWISH's effects on IWISH residents' use rates, thereby adjusting for underlying trends in use common to both IWISH and control group residents. The regression models also adjust for the same individual-level demographics and chronic conditions used to risk-adjust the main estimates. The methodology is summarized below and described in more detail in appendix H.

period than did comparison residents; all other residents had 9 percent fewer unplanned hospitalizations. (Both comparisons were statistically significant at the 10-percent level.)

Those results suggest the value of HUD's Multifamily Service Coordinator program in supporting residents' well-being. They also could reflect that residents of properties without Service Coordinator programs might have unmet needs that could be addressed by adding onsite wellness staff. For example, Service Coordinators could help residents obtain public benefits, transportation services, or food assistance, and those small actions by a staff member could have lasting effects on residents' well-being.

IWISH Properties in Isolated Communities or in Neighborhoods Lacking Access to Nutritious Food Are Associated with Fewer Improvements in Healthcare Use

Resident Wellness Directors at eight IWISH properties (20 percent) reported that their properties were located in isolated communities, which affected residents' ability to access services and supports needed to age in place. The Resident Wellness Directors at 13 IWISH properties (33 percent) reported a lack of access to nutritious food in their neighborhoods. For example, they commented on the lack of public transportation, the distance to the nearest grocery store (three to four blocks being too far) and the cost of food available locally.

IWISH residents living in isolated communities or who lacked access to nutritious food had higher rates of outpatient emergency department visits and ambulance use than did other IWISH residents, had fewer primary care visits, spent more days in a long-term care facility, and spent fewer days in the community (exhibit 6-8). Those correlations suggest that challenges for residents in accessing needed healthcare services or nutritious food because of the location of their property could limit the potential impact of IWISH on residents' healthcare use and tenure.

Exhibit 6-8. Association Between Isolated Communities or in Neighborhoods Lacking Access to Nutritious Food, Outpatient Emergency Room Visits, Ambulance Events, and Days in Long-Term Care and Fewer Primary Care Visits and Days in the Community

Outcome ^a	Isolated Community				Sub-group Difference ^c	Lacks Access to Nutritious Food				Sub-group Difference
	No		Yes			No		Yes		
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value		Percentage Difference	p-Value	Percentage Difference	p-Value	
Days With a Primary Care Visit	9.5	<.001** *	- 12.5	.033**	Yes**	8.4	.003***	- 2.5	.579	Yes**
Days of Unplanned Hospitalization	- 10.0	.163	- 7.1	.647	No	- 13.9	.073*	0.0	.999	Yes*
Unplanned Hospital Admissions	- 15.1	.019**	- 1.4	.921	No	- 16.8	.016**	- 7.5	.486	No
Outpatient Emergency Department Visits	- 5.6	.194	25.7	.002** *	Yes**	- 6.0	.191	0.1	.059*	Yes**
Ambulance Events	- 11.2	.034**	18.8	.064*	Yes**	- 15.6	.006***	13.7	.098*	Yes**
Total Medicare Fee-for-Service Spending	8.0	.055*	1.2	.849	No	7.5	.093*	6.9	.228	No
Days in Long-Term Care	3.9	.766	69.3	.002** *	Yes**	3.3	.812	0.5	.010**	Yes**
Days in Community	2.7	.015**	- 5.5	.016**	Yes**	2.4	.040**	- 2.0	.396	Yes*

* p-value <.10. ** p-value <.05. *** p-value <0.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

^b "Percentage Difference" is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents.

^c "Subgroup Difference" indicates whether there is a statistically significant difference in the estimated "Percentage Difference" between residents at IWISH properties located in and not in isolated communities or IWISH properties located in and not in areas that lack access to nutritious food. Asterisks indicate a statistically significant difference between the two estimates at the 5- or 10-percent level.

Notes: Associations between property or community characteristics and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study.

7. Conclusion and Policy Implications

The primary goal of IWISH is to promote aging in place for residents of HUD-assisted properties, especially by delaying transfers to a long-term care institution. Through the services provided by the housing-based Resident Wellness Director and Wellness Nurse and through the availability of evidence-based health and wellness programming, IWISH is also hypothesized to increase the use of planned primary care and decrease the use of unplanned emergency care.

The cluster-randomized controlled trial design of the Supportive Services Demonstration permitted a rigorous assessment of the impact of the IWISH model across a range of residents and properties in seven states. The evaluation of the Supportive Services Demonstration looked for evidence of the IWISH model's impact on a range of outcomes during the first demonstration period, from October 2017 through September 2020.

This final chapter summarizes the key findings of the first 3 years of the Supportive Services Demonstration, discusses the generalizability of findings to a broader group of multifamily properties for older adults, and makes recommendations for improvements to the IWISH model should the demonstration be continued further or expanded to other properties.

7.1 Summary of Findings After the First Three Years

During this first phase of the evaluation, the impact study did not find evidence that IWISH prolonged resident tenure, reduced transitions to long-term care, increased primary care, reduced unplanned hospitalizations, or affected other types of healthcare use. The impact study found no significant impacts of the IWISH model across any confirmatory and secondary outcome measures during the first 3 years of the demonstration.

The interpretation of the impact findings of this Phase 1 evaluation is limited by several factors. First, the statistical power of the analyses of IWISH impact on healthcare use was diminished because the study team was unable to access Medicare data for about one-half of the residents in the demonstration sample, those who were enrolled in managed care plans under Medicare Part C. Reduced statistical power limited the team's ability to detect small but potentially significant differences between IWISH and control group residents.

Second, the impact findings are limited to the first 3 years of implementation of the IWISH model, which was curtailed by a 6-month delayed start of resident enrollment, and which coincided with the onset of the COVID-19 public health emergency, which had a fundamental impact on healthcare delivery and use.

Third, the information collected on model fidelity showed that not all properties implemented all components of the IWISH model or implemented them fully and that several properties had vacancies in one or both IWISH positions for several months during the demonstration period.

Finally, many of the same health and wellness services offered by IWISH were also available via service coordination and wellness programming at the active control properties and, presumably, the passive control properties. Therefore, residents at those control properties may have experienced some benefits similar to those at the IWISH properties.

Although the impact study found no clear evidence that the IWISH model had positive impacts on healthcare use by IWISH residents, qualitative data collected in the study suggest that staff and residents

who participated in the program experienced benefits from the model and that IWISH’s impact could increase over the long term. From interviews with Resident Wellness Directors and Wellness Nurses, the study team learned that IWISH staff took an active role in helping residents during health emergencies, providing support during and after emergencies that occurred at the property. IWISH staff also educated residents about how to prevent future emergencies through earlier identification of disease that could lead to emergencies if not treated. IWISH staff at one-third of treatment properties gave specific examples of when their support averted the unnecessary use of emergency services and promoted the use of more appropriate nonemergency care. Some IWISH staff also described how they were able to help some residents who were frequent users of emergency care services seek more appropriate avenues of care.

The study’s analyses of impacts among subgroups show that the youngest and oldest residents, perhaps in more need of wellness services, tended to benefit from IWISH. The study also found positive correlations between some outcome measures and two specific aspects of the IWISH wellness model: helping residents set and meet individual wellness goals and helping residents make transitions back from hospital and nursing home stays.

7.2 Generalizability of Findings

The demonstration’s cluster-randomized controlled trial design allowed the study team to estimate IWISH’s impacts on residents of HUD-assisted properties without the bias that could be introduced by self-selection. Both IWISH and control properties applied for the demonstration and were interested in obtaining HUD’s support for implementing housing-based wellness supports for their residents.³⁴

Although randomized controlled trials can obtain accurate estimates of an intervention’s effect for those participants in the trial (i.e., “internal validity”), the estimates are not always useful for a broader group of people or situations in which the intervention could be implemented (i.e., “external validity”). The demonstration properties and their residents reflect the broader universe of HUD-assisted multifamily properties that provide housing to older adults in some ways but not in others.

The 124 properties that were randomized to the IWISH and control groups all applied to participate in the demonstration and may differ from other HUD-assisted multifamily properties for older adults. Because the property owners that applied for the demonstration were interested in obtaining funding for housing-based wellness staff, those properties may have been more likely to have implemented wellness staff and programming before the demonstration. Approximately two-thirds of the control group properties had a Service Coordinator before the demonstration, compared with approximately one-half of all HUD-assisted properties for older adults.

Although the control group properties may not be representative of typical HUD multifamily properties for older adults in some ways, they are similar in serving residents with very low incomes, with a wide range of backgrounds, and in a wide range of communities. The residents of IWISH properties are a racially and ethnically diverse group of individuals in their 60s, 70s, and 80s, and most had already lived at the properties for several years. The properties are in average condition relative to other HUD-assisted multifamily properties and are in a wide variety of neighborhoods, most of which are reported to present

³⁴ All the treatment and control properties applied to participate in the demonstration, but only 40 were randomly selected to be in the treatment group. Internal validity is upheld because the study team presumes that by applying to be in the demonstration, all properties, across both arms of the experiment, were equally willing to accept HUD assistance to implement IWISH or similar programs for their residents.

one or more challenges to aging in place. Variation across the properties is substantial in terms of their resident characteristics, with properties having different racial and ethnic compositions and different age distributions. The types of neighborhoods where the properties are located also vary, including differences in the census-tract poverty rates and other indicators of neighborhood quality.

The external validity of the findings may also have been compromised by limitations on the availability of healthcare data. More than 95 percent of residents of IWISH properties were enrolled in Medicare at the beginning of the demonstration, but the sample used to estimate impacts on healthcare use does not include those with managed care coverage under Medicare Part C, about one-half of all residents in the demonstration properties.

An additional challenge to the external validity of the evaluation's findings is the unprecedented and dynamic social, economic, and public health conditions that occurred during the third year of the period for which impacts were estimated for this first-phase report. The onset of the public health emergency severely disrupted standard care protocols in all healthcare settings, and it affected older adults in congregate settings more than any other group. The pandemic and the resulting public health emergency also influenced individual behavior and likely changed the health and functional status of some residents in ways related to the outcomes the study team attempted to measure. However, IWISH and control properties are in similar locations. Although individual property policies related to the pandemic may have differed, state policies would have affected residents living in IWISH and control properties in similar ways.

IWISH Model Recommendations

The study team made several recommendations to HUD and other stakeholders in the *Second Interim Report* on how the IWISH model might be refined or enhanced on the basis of the results of the implementation study. The recommendations covered staffing, implementation of the core components, and support to properties for implementing the IWISH model. Some of the recommendations were adopted or are no longer relevant for the 2-year extension period. Here we revisit and update the other recommendations, considering the results of the impact study.

Expand the Time Wellness Nurses Spend at the Property

The study team previously recommended that HUD and other stakeholders consider expanding the time that Wellness Nurses spend on site. Nurses are the keystone of the IWISH model. Under the current model, with one part-time (20 hours a week) nurse for every 100 residents of the property, some nurses experienced workload issues and said they were not able to provide as much individual support to residents as they would have liked.

The part-time nature of the position may have contributed to the impact study's inability to detect its effect on resident healthcare use during the initial 3-year demonstration period. More time at the property would allow Wellness Nurses to not only work more closely with individual residents on their personal wellness goals but also increase the number of residents they assist one-on-one. In addition, because most properties have only one half-time nurse, often no nurse was on site when health events occurred outside the hours that the Wellness Nurse was at the property. A full-time position may also be more attractive for potential applicants for Wellness Nurse positions and help alleviate some of the hiring and retention challenges for this role found by the implementation study.

Reinforce the Person-Centered Approach

The two aspects of the IWISH model that the study team found to be associated with greater effects on resident use of health care are the Individual Healthy Aging Plans (IHAP) and transitional care provided to residents returning home from a hospital or long-term care stay. Both aspects reflect the person-centered approach to assisting residents with their wellness needs.

About two-thirds of enrolled residents identified wellness goals with IWISH staff, but residents and staff professed resistance to the specific tool used, the structured format of goal setting in IWISH, and the use of terms such as *goals* and *barriers* to identify resident preferences and service needs. However, the impact study showed that residents living in IWISH properties with higher rates of enrolled residents with recorded goals had greater effects on their use of health care than residents of other IWISH properties.

The study team previously recommended ***making the IWISH goal-setting process less formal*** and stands by that recommendation. The impact study showed the value of the IHAP process, but the implementation study identified the specific tools used to be problematic. Some IWISH staff reported that they adapted the tool and structure to fit individual resident needs and preferences, often helping residents identify wellness goals and action steps through natural conversation and by not using case management terms that may put off some residents. Emphasizing a person-centered approach that is based on each individual's needs, preferences, and personality, rather than a standard structured approach used with all residents, may empower residents to collaborate more effectively with IWISH staff in reaching their health and wellness-related objectives.

Regarding transitional care, the study team previously recommended that the IWISH model ***formalize systems within properties to notify IWISH staff in the event of emergencies and transitions***, particularly those that occur outside regular IWISH staff work hours. Limitations to the provision of transitional care support occurred when the nurse was not aware that a health event had occurred. After-hours staffing or a notification process could ensure that the nurse is notified of all sentinel events at the property—regardless of whether they occur during working hours—and enable the onsite staff to offer followup care and resources to the affected resident. Residents may always decline services from wellness staff and must consent to any sharing of their health information with others, including during emergency events.

The impact study findings reinforce the study team's recommendation for more formalized procedures or guidance around emergency events or transitions. Formalizing those structures, or even making transitional care a core component of IWISH, might help strengthen the ability of the staff to effect changes in use of use of planned or unplanned health care.

Reinforcing the person-centered approach may also ***help address resident privacy concerns*** about how their health and other private information is used. The study team recommended that HUD consider reducing the extent of information collected from residents by reexamining whether all assessment tools and questions are needed for IWISH participants. Many staff and residents commented that the assessment took a long time to complete and that it asked questions that residents felt were intrusive, embarrassing, or unnecessary. Although the assessment is completely voluntary for residents, rather than asking all enrolled residents to complete all aspects of the assessment, a risk-based or age-based determination of which assessment tools to deploy should be considered.

Future Research of the Supportive Services Demonstration

Issues related to implementation fidelity, duration, and representativeness have policy implications for HUD and other stakeholders and for the evaluation that is continuing during the 2-year extension period of the Social Services Demonstration. The longer observation period may reveal impacts that were not detectable or realizable in the short term. More complete data on Medicare beneficiaries enrolled in either fee-for-service or managed care might also reveal differences between IWISH and control group residents that could not be detected in this initial phase of the evaluation.

Because Congress authorized a 2-year extension to the initial 3-year Supportive Services Demonstration, HUD has an opportunity to gather more primary and secondary data and observe IWISH's effects on longer-term outcomes related to residents' housing tenure, healthcare use, and general well-being.

Since the start of the demonstration and its evaluation, the Centers for Medicare & Medicaid Services (CMS) has made great strides in making available timely, high-quality Medicare managed care data (that is, data at the "encounter" level). For the Phase 2 evaluation, HUD plans to reacquire the Medicare and patient assessment data that were used in the Phase 1 evaluation and then expand the Healthcare Sample by acquiring Medicare encounter data for the entire demonstration and extension period.

HUD also has the opportunity to collect additional primary data to further explore some of the early trends that emerged from the first 3 years and tease out some of the relationships between model components and resident outcomes. In-depth interviews with residents of IWISH properties will provide the study team with a better understanding of changes in resident behaviors and attitudes that may lead to positive changes in their health and well-being.

By increasing the duration of the Social Services Demonstration, the extension period will be critical for fully understanding if and how IWISH can achieve its goals and whether it should be scaled up to more multifamily housing developments for older adults.

Appendix A: Identification and Characteristics of the Healthcare Sample

The study initially identified 4,003 individuals aged 62 and older who resided at the IWISH and control properties on October 1, 2017, or moved into a property before October 1, 2018. The source of that information was the household-level data in HUD’s administrative data system known as the Tenant Rental Assistance Certification System (TRACS). The IWISH Healthcare Sample consists of 2,031 individuals, and the Control Healthcare Sample consists of 4,776 individuals, following several adjustments the study team made to account for available data, as summarized in exhibit A-1. Because the team did not have access to Medicare managed care encounter data for the entire demonstration period, they restricted the sample to individuals continuously enrolled in a Medicare FFS plan, or any Medicaid plan with full coverage, for at least 6 consecutive months after baseline; the team also required that Medicare beneficiaries be continuously enrolled in *both* Medicare Part A (hospital insurance) and Part B (medical insurance).

Exhibit A-1. Determination of the Healthcare Sample

Residents Age 62 or Older	IWISH		Control	
	Number	Percentage of All Residents	Number	Percentage of All Residents
Residents who moved into the HUD-assisted properties before October 1, 2018	4,003	100	9,354	100
<i>Ever</i> enrolled in Medicare, 4Q 2015–3Q 2020	3,886	97.1	8,900	95.1
<i>Ever</i> enrolled in Medicaid, 4Q 2015–3Q 2020	3,157	78.9	7,220	77.2
<i>Ever</i> dual-enrolled in Medicare and Medicaid, 4Q 2015–3Q 2020	3,069	76.7	6,854	73.3
<i>Not enrolled in Medicaid</i> but enrolled in Medicare Parts A and B (not managed care) at baseline and at least 6 consecutive months thereafter	417	10.4	1,067	11.4
<i>Not enrolled in Medicare</i> but enrolled in Medicaid (full coverage) at baseline, with at least 6 consecutive months of Medicaid or Medicare Parts A and B coverage thereafter	10	0.2	31	0.3
<i>Dual-enrolled in Medicaid</i> (full coverage) and Medicare Parts A and B (not managed care) at baseline, with at least 6 consecutive months of Parts A and B coverage thereafter	1,604	40.1	3,678	39.3
Healthcare Sample	2,031	50.7	4,776	51.1
IWISH Healthcare Sample enrolled in IWISH during the demonstration	1,196	29.9	NA	NA

4Q = fourth quarter. 3Q = third quarter. NA = not applicable.

Notes: Baseline is October 1, 2017, for residents who moved in on or before October 1, 2017. Baseline is equal to the move-in date for residents who moved in between October 1, 2017 and September 30, 2018. The final sample of residents aged 62 or older, before exclusions due to Medicare and Medicaid coverage, included 3,708 IWISH residents and 8,542 control residents who moved in before October 1, 2017, and 295 IWISH residents and 812 control residents who moved in between October 1, 2017 and October 1, 2018.

Sources: HUD TRACS data, September 2017–2018; Centers for Medicare & Medicaid Services, Medicare enrollment records, October 2017–March 2019; Medicaid enrollment records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

APPENDIX A: IDENTIFICATION AND CHARACTERISTICS OF THE
HEALTHCARE SAMPLE

Exhibit A-2. Characteristics of Residents of IWISH Properties: Residents Included in Analysis of Healthcare Use Compared with All IWISH Residents

Variable	IWISH Healthcare Sample (n = 2,031)		All IWISH Residents (n = 4,003)		p-Value ^b
	Percentage /Mean	Standard Deviation ^a	Percentage/ Mean	Standard Deviation	
Residents by Age Category^c					
Age 62–64	6.5		5.6		.011
Age 65–74	37.7		42.0		<.001
Age 75–84	38.2		37.2		.190
Age 85+	17.6		15.2		<.001
Residents by Sex					
Women	70.3		68.9		.064
Residents by Race and Ethnicity					
African-American or Black	22.8		25.8		<.001
Asian	18.0		17.3		.228
White	45.3		39.9		<.001
Hispanic	9.4		12.6		<.001
Other race	1.7		1.9		.350
Unknown race	2.7		2.5		.514
Residents by Household Characteristics^d					
One-person households	83.7		83.4		.647
Resident tenure, years	7.4	6.4	6.8	6.2	<.001

^a Standard deviations are shown for continuous variables only.

^b p-Values were calculated using estimates from regression of each variable on an indicator for treatment or control using individual-level data and robust standard errors.

^c Age at baseline calculated as of October 1, 2017, for residents who moved in before the demonstration began, and as of the resident's move-in date if they moved in after the demonstration began but before October 1, 2018.

^d Duration of stay from move-in date until October 1, 2017; duration of stay is equal to zero if the resident moved in after October 1, 2017, but before October 1, 2018.

Note: Residents in the IWISH Healthcare Sample were aged 62 or older at baseline, enrolled in Medicare Parts A and B or Medicaid with full coverage at baseline, and covered during their first 6 months in the demonstration.

Sources: HUD TRACS data, September 2017–2018; Centers for Medicare & Medicaid Services, Medicare enrollment records, October 2017–September 2020.

APPENDIX A: IDENTIFICATION AND CHARACTERISTICS OF THE HEALTHCARE SAMPLE

Exhibit A-3. Prevalence of 27 Chronic Conditions Among Residents of IWISH and Control Group Properties in the Healthcare Sample

Chronic Condition ^a	IWISH (%)	Control (%)	Difference	p-Value ^b
Hypertension (high blood pressure)	69.9	71.5	- 1.6	.165
Hyperlipidemia (high cholesterol)	52.1	54.6	- 2.5	.059
Rheumatoid arthritis/osteoarthritis	42.6	40.7	1.8	.158
Diabetes	37.3	37.0	0.3	.830
Ischemic heart disease (coronary artery disease)	31.7	31.9	- 0.2	.857
Anemia	31.2	32.0	- 0.8	.502
Chronic kidney disease	29.4	30.8	- 1.4	.260
Benign prostatic hyperplasia (enlarged prostate), males	26.3	25.4	0.9	.660
Depression, bipolar, or other depressive mood disorders	22.6	20.3	2.3	.035
Chronic obstructive pulmonary disease (COPD)	17.5	15.6	1.8	.064
Congestive heart failure	17.4	19.8	- 2.4	.017
Acquired hypothyroidism (underactive thyroid gland)	16.6	16.4	0.2	.874
Cataract	15.1	16.7	- 1.6	.093
Glaucoma	12.9	14.3	- 1.5	.102
Alzheimer's disease and related disorders or senile dementia	12.3	13.2	- 1.0	.278
Osteoporosis	10.9	12.3	- 1.4	.100
Atrial fibrillation (irregular heartbeat)	8.5	9.1	- 0.6	.413
Asthma	8.2	7.6	0.6	.426
Prostate cancer, men	7.1	7.5	- 0.4	.739
Breast cancer, women	6.0	5.9	- 0.1	.958
Stroke/transient ischemic attack	3.5	4.6	- 1.1	.029
Alzheimer's disease ^c	3.0	4.0	- 1.0	.035
Colorectal cancer	1.7	1.6	0.1	.758
Lung cancer	1.5	1.2	0.3	.292
Endometrial cancer, women	0.8	0.6	0.1	.647
Hip fracture	0.7	0.9	- 0.2	.388
Acute myocardial infarction (heart attack)	0.6	0.8	- 0.2	.422

^a Each individual was coded as having a condition if they were identified in the data as having met the algorithm's claims criteria on the basis of Medicare fee-for-service (FFS) claims or Medicaid FFS or managed care encounter claims in 2016–2017 (given a 2-year look-back period for most diagnoses) or 2017–2018, depending on whether the individual lived at a property on December 31, 2017, or moved in during 2018. The study team did not require the more restrictive inclusion criteria that all people in the denominators had a minimum number of months of Medicare FFS coverage during the years that they were in the data.

^b p-Values were calculated using estimates from regression of each variable on an indicator for treatment or control using individual-level data and robust standard errors. All comparisons of healthcare use in the impact study are risk adjusted for the conditions with p-values less than .10.

^c The flag for Alzheimer's disease is a subset of the flag for Alzheimer's disease and related disorders or senile dementia.

Notes: Only women are included in the denominator for breast cancer and endometrial cancer; only males are included for prostate cancer and enlarged prostate. Beneficiaries may be counted in more than one chronic condition category. The Healthcare Sample consists of 2,031 IWISH residents (604 men, 1,427 women) and 4,776 Control residents (1,379 men, 3,397 women). The algorithms used to assign the flags are available at <https://www.ccwdata.org/web/quest/condition-categories>.

Sources: Centers for Medicaid and Medicaid Services, Medicare Beneficiary Summary Files: Chronic Conditions Segment, 2017–2018; Medicaid administrative data from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–March 2020.

APPENDIX A: IDENTIFICATION AND CHARACTERISTICS OF THE HEALTHCARE SAMPLE

Exhibit A-4. Prevalence of 35 Chronic or Potentially Disabling Conditions Among Residents of IWISH and Control Group Properties in the Healthcare Sample

Chronic Condition ^a	IWISH (%)	Control (%)	Difference	p-Value ^b
Fibromyalgia & chronic pain and fatigue	24.7	23.4	1.2	.276
Peripheral vascular disease (PVD)	23.0	22.9	0.1	.923
Obesity	20.9	20.2	0.7	.545
Anxiety disorders	17.7	17.5	0.2	.859
Deafness or hearing impairment	7.5	8.0	- 0.5	.510
Tobacco use	7.5	7.5	0.0	.990
Liver disease, cirrhosis, & other liver conditions	5.3	5.1	0.2	.724
Pressure & chronic ulcers	4.4	4.3	0.1	.798
Bipolar disorder	3.3	3.0	0.4	.424
Migraine & chronic headache	3.3	2.8	0.5	.244
Mobility impairments	3.1	3.7	- 0.6	.201
Drug use disorders	2.9	3.0	- 0.1	.806
Schizophrenia & other psychotic disorders	2.5	2.7	- 0.2	.686
Viral hepatitis	2.5	3.1	- 0.6	.170
Alcohol use disorders	1.8	2.2	- 0.4	.262
Opioid use disorder	1.6	1.9	- 0.3	.431
Epilepsy	1.5	2.1	- 0.6	.088
Schizophrenia	1.4	1.4	0.0	.936
Leukemias & lymphomas	1.4	1.4	- 0.1	.832
Personality disorders	1.3	1.4	- 0.2	.588
Blindness & visual impairment	1.3	1.2	0.1	.769
Spinal cord injury	1.0	0.8	0.2	.457
Post-traumatic stress disorder (PTSD)	0.9	1.1	- 0.2	.430
Cystic fibrosis & other metabolic developmental disorders	0.8	0.7	0.1	.607
Multiple sclerosis & transverse myelitis	0.5	0.3	0.2	.259
ADHD, conduct disorders, & hyperkinetic syndrome	0.3	0.4	0.0	.942
HIV/AIDS	0.3	0.4	- 0.1	.738
Intellectual disabilities & related conditions	0.2	0.2	0.0	.798
Traumatic brain injury & nonpsychotic mental disorders due to brain damage	0.2	0.5	- 0.3	.017
Cerebral palsy	0.1	0.1	0.0	.658
Learning disabilities	0.1	0.1	0.0	.753
Spina bifida & other congenital anomalies of nervous system	0.1	0.1	0.0	.941
Other developmental delays	0.0	0.0	0.0	.898
Muscular dystrophy	0.0	0.0	0.0	.157
Autism spectrum disorders	0.0	0.0	0.0	NA

NA = not applicable.

^a Each individual was coded as having a condition if they were identified in the data as having met the algorithm’s claims criteria on the basis of Medicare fee-for-service (FFS) claims or Medicaid FFS or managed care encounter claims in 2016–2017 (given a 2-year look-back period for most diagnoses) or 2017–2018, depending on whether the individual lived at a property on December 31, 2017, or moved in during 2018. The study team did not require the more restrictive inclusion criteria that all people in the denominators had a minimum number of months of Medicare FFS coverage during the years that they were in the data.

^b p-Values were calculated using estimates from regression of each variable on an indicator for treatment or control using individual-level data and robust standard errors. All comparisons of healthcare use in the impact study are risk adjusted for the conditions with p-values less than .10.

Notes: The Healthcare Sample consists of 2,031 IWISH residents and 4,776 Control residents. Beneficiaries may be counted in more than one chronic condition category. The algorithms used to assign the flags are available at <https://www.cwdata.org/web/guest/condition-categories>.

Sources: Centers for Medicaid and Medicare Services, Medicare Beneficiary Summary Files: Chronic Conditions Segment, 2017–2018;

APPENDIX A: IDENTIFICATION AND CHARACTERISTICS OF THE HEALTHCARE SAMPLE

Medicaid administrative data from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–March 2020

Appendix B: Healthcare Use Measures

The measure specifications described here were applied to Medicare Research Identifiable Files for Q4 2015–Q4 2020 obtained through the Research Data Assistance Center (ResDAC). Analogous specifications were applied to FFS claims and managed care encounters data from the state Medicaid databases of California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, which required adaptation to their specific data structures, formats, and contents. The latter specifications are available upon request.

Unplanned Acute Care Hospitalizations

Hospitalization-related measures include all *unplanned* admissions to short-stay acute care hospitals (CLM_FAC_TYPE_CD = 1 and CLM_SRVC_CLSFCTN_TYPE_CD = 1 or 2) or Critical Access Hospitals (CLM_FAC_TYPE_CD = 8 and CLM_SRVC_CLSFCTN_TYPE_CD = 5). Hospitalizations are identified by at least one claim line with REV_CNTR_CD = 0101 – 017X or 020X – 021X but not 0118, 0128, 0138, 0148, or 0158 (i.e., HEDIS Inpatient Stays Value Set excluding the HEDIS Non-acute Inpatient Stays Value Set). Multiple claims that represent transfers between facilities (*PTNT_DSCHRG_STUS_CD = 02, 30, 43, or 66*) are counted as a single admission.

Unplanned hospital admissions were defined using the Planned Readmission Algorithm (Version 4.0 2021) featured in the 2021 All-Cause Hospital Wide Measure of 30-Day Readmissions (Version 10.0); specifications were provided on request by the Centers for Medicare and Medicaid Services. The planned readmission algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. The planned readmission algorithm has three fundamental principles: A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, and rehabilitation); otherwise, a planned readmission is defined as a nonacute readmission for a scheduled procedure; and Admissions for acute illness or for complications of care are never planned.

Unplanned 30-Day Hospital Readmissions

Hospital readmissions include all unplanned admissions to a short-stay acute care hospital within 30 days of a previous (planned or unplanned) hospital discharge. Hospitalizations and Readmissions were defined in the same way as Unplanned Acute Care Hospitalizations, but the Planned Readmission Algorithm (Version 4.0 2021) was applied only to readmissions, not the index hospitalization.

Outpatient Emergency Department Visits

Outpatient emergency department visits are emergency department visits that do not lead to a hospitalization for acute or nonacute care. Visits that do not lead to a hospitalization are identified from outpatient hospital claims using revenue center line items equal to 045X and 0981, CPT codes 99281–99285, or both a Place of Service code equal to 23 (emergency room – hospital) and at least one line-item procedure code from the HEDIS Emergency Department Procedure Code Value Set. Multiple claims for emergency department visits on the same day are counted as a single emergency department visit.

Emergency department visits on outpatient claims but within 1 day or during an inpatient stay are also excluded. Inpatient stays are identified as inpatient claims with BILL_TYPE_CD 011X, 012X, and 085X and at least one claim line where REV_CNTR_CD = 0101–017X or 020X–021X (i.e., the HEDIS Inpatient Stay Value Set).

Ambulance Events

Ambulance events include outpatient and carrier claims for emergency or nonemergency medical transportation, identified by HCPCS codes = A0XXX or REV_CNTR_CD = 054X. Multiple claims for emergency or nonemergency transportation on the same day are counted as a single ambulance event.

Primary Care Visits

Primary care is defined as a carrier claim for a visit to a primary care practitioner for evaluation and management (HCPCS/CPT codes = 99201-99215, 99304-99350, 99354, 99355, 99381-99429, 99483, 99492-99494, 99487, 99489-99491, 99495-99498, G0402, G0438, G0439, G0502-G0505, G0466-G0470) at an office; the patient's home; a walk-in retail, independent, public health, or rural health clinic; a Federally Qualified or Community Mental Health Center; via telehealth; or at a long-term care facility (i.e., group home or assisted living, nursing, skilled nursing, custodial care, or intermediate care facility) [LINE_PLACE_OF_SRVC_CD = 02, 11, 12, 13, 14, 17, 31, 32, 33, 49, 50, 53, 54, 71, or 72]. Primary care practitioners include (1) physicians with a specialty (PRVDR_SPCLTY) of 01-general practice, 08-family practice, 11-internal medicine, 38-geriatrics; (2) nonphysicians with a specialty of 50-nurse practitioner, 89-certified clinical nurse specialist, or 97-physician assistant; or (3) Federally Qualified Health Centers, Rural Health Clinics, or Community Mental Health Centers. Multiple claims for primary care visits on the same day are counted as a single primary care visit.

New Use of Specialty Care Services: Cardiologists, Rheumatologists, Endocrinologists, and Ophthalmologists

These four measures (new visit to a cardiologist, rheumatologist, endocrinologist, or ophthalmologist) are indicators for whether a resident had at least one visit with the specific type of specialist during the 3-year demonstration period (while residing at the IWISH or Control property) and had zero visits to the same type of specialist during the 12 months preceding the baseline date (which is October 1, 2017 for residents who moved in beforehand, or the date the resident moved in if they moved in after September 30, 2017, but before October 1, 2018). The sample is restricted to residents continuously enrolled in Medicare FFS or Medicaid with full coverage during the 12 preceding months.

The study team identified visits with a specialist as a carrier claim for evaluation and management (CPT codes = 99201-99215) at an office, off- or on-campus outpatient hospital, or ambulatory surgical center (LINE_PLACE_OF_SRVC_CD = 11, 19, 22, 24). The team defined cardiologists as specialty codes (PRVDR_SPCLTY) 06-cardiovascular disease (cardiology) or 78-cardiac surgery, rheumatologists as specialty code 66-rheumatology, endocrinologists as specialty code 46-endocrinology, and ophthalmologists as specialty code 18-ophthalmology.

Total Medicare FFS Spending

Total Medicare FFS expenditures are for covered health care services (Parts A, B, and D) during the demonstration and while residents were residing at the IWISH or Control property. This measure includes only payments/reimbursements to providers, not third-party and out-of-pocket payments.

Days in the Community

Days in the community are days the beneficiary spent at home or in the community. The measure is calculated as the total number of days the beneficiary was alive and residing at the IWISH or Control property minus the number of those days that the beneficiary was admitted to any institution/facility for

short- or long-term care, had an emergency department visit, or was admitted for an outpatient observation stay.

Institutional short- or long-term care is defined as any Medicare or Medicaid inpatient claim/service (excluding home health care), any days admitted to a nursing or skilled nursing facility according to patient assessments in the Minimum Data Set 3.0 (according to entry/reentry and discharge dates on any type of assessment), or any Medicaid institutional long-term care claim.

Emergency department visits are defined in the same way as above, and outpatient observation stays were defined as an outpatient hospital claim with at least one HCPCS_CD = 99224, 99225, 99226, 99234, 99235, 99236, G0378, or G0379 or at least one revenue center code (REV_CNTR) = 0760, 0761, 0762, or 0769.

The study team based its definition of days in the community on the population-based measure, *Home and Community Days*, previously examined by MedPAC. MedPAC used Medicare FFS data to calculate the measure, broadly defining home and community days as the number of days in a year that beneficiaries are alive and out of healthcare institutions (i.e., hospital inpatient, emergency department, or observation stay and any post-acute care facility): https://www.medpac.gov/wp-content/uploads/import_data/scrape_files/docs/default-source/default-document-library/population-based-measures_0318_black-linesv-2.pdf.

Days Admitted to Long-Term Care Facilities

Days of institutional long-term care is defined as any days the beneficiary was alive and residing at the IWISH or Control property but was admitted to a nursing or skilled nursing facility according to patient assessments in the Minimum Data Set 3.0 (according to entry/reentry and discharge dates on any type of assessment) or any long-term care institution according to Medicaid institutional long-term care claims.

Appendix C: Impact Study Results and Sensitivity Analysis

Impact of IWISH on Healthcare Use

Exhibit C-1. Impact of the IWISH Model on Healthcare Use, Medicare Fee-for-Service Spending, and Days in the Community for IWISH Residents Age 62 or Older in the Healthcare Sample

Statistic ^a	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Primary Care Visits per 1,000 Beneficiary Months								
Unadjusted Average	479.4	494.8	470.1	476.0	489.2	493.5	424.8	446.2
Risk-Adjusted Average	489.6	489.9	472.0	464.6	500.0	493.7	442.4	447.2
Risk-Adjusted Difference (95% Confidence Interval)	-0.3 (- 47.2, 46.5)		7.3 (- 45.2, 59.8)		6.2 (- 57.6, 70.0)		-4.8 (- 69.6, 59.9)	
p-Value	.990		.785		.850		.884	
New Use of Specialty Care Services, Cardiology								
Unadjusted Average	15.0%	16.3%	- ^b	-	-	-	-	-
Risk-Adjusted Average	15.0%	16.4%	-	-	-	-	-	-
Risk-Adjusted Difference (95% Confidence Interval)	- 1.4% (- 0.4, 1.1)		-		-		-	
p-Value	.271		-		-		-	
New Use of Specialty Care Services, Rheumatology								
Unadjusted Average	3.6%	2.7%	- ^b	-	-	-	-	-
Risk-Adjusted Average	3.5%	2.7%	-	-	-	-	-	-
Risk-Adjusted Difference (95% Confidence Interval)	0.8% (- 0.8, 2.3)		-		-		-	
p-Value	.343		-		-		-	
New Use of Specialty Care Services, Endocrinology								
Unadjusted Average	4.4%	3.6%	- ^b	-	-	-	-	-
Risk-Adjusted Average	4.4%	3.6%	-	-	-	-	-	-
Risk-Adjusted Difference (95% Confidence Interval)	0.8% (- 0.4, 2.0)		-		-		-	
p-Value	.184		-		-		-	
New Use of Specialty Care Services, Ophthalmology								
Unadjusted Average	13.3%	13.3%	- ^b	-	-	-	-	-
Risk-Adjusted Average	13.4%	13.3%	-	-	-	-	-	-
Risk-Adjusted Difference (95% Confidence Interval)	0.1% (- 2.5, 2.6)		-		-		-	
p-Value	.975		-		-		-	

APPENDIX C: IMPACT STUDY RESULTS AND SENSITIVITY ANALYSIS

Statistic ^a	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Total Days of Unplanned Hospitalization per 1,000 Beneficiary Months								
Unadjusted Average	160.7	165.1	134.8	127.3	144.4	170.1	152.1	168.1
Risk-Adjusted Average	170.4	160.7	133.7	121.6	152.2	166.4	153.7	178.8
Risk-Adjusted Difference (95% Confidence Interval)	9.7 (- 17.7, 37.2)		12.1 (- 17.4, 41.7)		-14.1 (- 51.0, 22.7)		-25.1 (- 68.4, 18.2)	
p-Value	.487		.421		.452		.256	
Total Unplanned Hospital Admissions per 1,000 Beneficiary Months								
Unadjusted Average	24.5	27.4	22.4	24.1	22.9	27.2	21.3	24.5
Risk-Adjusted Average	25.3	27.3	21.9	23.1	23.5	26.6	22.6	26.2
Risk-Adjusted Difference (95% Confidence Interval)	- 2.0 (- 6.1, 2.0)		- 1.2 (- 5.9, 3.5)		- 3.1 (- 7.9, 1.7)		- 3.6 (- 9.5, 2.4)	
p-Value	.331		.614		.204		.237	
Total Unplanned 30-Day Hospital Readmissions per 1,000 Beneficiary Months								
Unadjusted Average	6.3	6.3	5.6	5.0	5.5	5.5	5.9	6.5
Risk-Adjusted Average	6.3	6.2	5.4	4.8	5.5	5.5	5.8	7.1
Risk-Adjusted Difference (95% Confidence Interval)	0.1 (- 1.5, 1.6)		0.6 (- 1.4, 2.5)		0.0 (- 2.2, 2.3)		- 1.4 (- 4.3, 1.6)	
p-Value	.949		.563		.969		.365	
All-Cause Emergency Department Visits Not Resulting in Hospitalization per 1,000 Beneficiary Months								
Unadjusted Average	55.7	53.4	55.5	53.8	51.1	49.6	43.2	43.5
Risk-Adjusted Average	54.7	53.8	53.5	52.9	50.8	50.0	44.7	44.7
Risk-Adjusted Difference (95% Confidence Interval)	0.9 (- 7.1, 8.9)		0.6 (- 8.4, 9.6)		0.9 (- 6.5, 8.3)		0.0 (- 7.0, 6.9)	
p-Value	.832		.898		.821		.990	
Ambulance Events per 1,000 Beneficiary Months								
Unadjusted Average	81.9	89.5	75.2	80.5	84.7	87.3	70.3	90.8
Risk-Adjusted Average	83.1	89.1	72.0	76.1	85.5	85.0	78.4	98.3
Risk-Adjusted Difference (95% Confidence Interval)	- 6.0 (- 20.7, 8.8)		- 4.1 (- 21.2, 13.1)		0.5 (- 20.1, 21.2)		- 20.0 (- 42.1, 2.2)	
p-Value	.429		.643		.959		.077	
Medicare Fee-for-Service Spending per Calendar Quarter								
Unadjusted Average	\$5,254	\$5,535	\$4,614	\$4,789	\$5,404	\$5,767	\$5,130	\$5,375
Risk-Adjusted Average	\$5,286	\$5,625	\$4,524	\$4,726	\$5,424	\$5,886	\$5,237	\$5,743
Risk-Adjusted Difference (95% Confidence Interval)	- \$339 (- 956, 278)		- \$202 (- 830, 426)		- \$462 (- 1,245, 321)		- \$505 (- 1,323, 312)	
p-Value	.282		.528		.248		.226	

APPENDIX C: IMPACT STUDY RESULTS AND SENSITIVITY ANALYSIS

Statistic ^a	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Days Admitted to Long-Term Care Facilities per 1,000 Beneficiary Months								
Unadjusted Average	441.5	531.5	326.0	380.7	480.0	550.7	382.8	496.9
Risk-Adjusted Average	482.0	514.4	332.9	339.9	536.1	525.5	409.9	560.8
Risk-Adjusted Difference (95% Confidence Interval)	– 32.4 (– 156.8, 92.0)		– 7.0 (– 118.1, 104.1)		10.6 (– 161.7, 182.8)		– 150.9 (– 333.2, 31.5)	
p-value	0.610		0.902		0.904		0.105	
Days in the Community per Calendar Quarter								
Unadjusted Average	77.5	75.7	77.7	76.0	80.6	78.6	84.9	82.9
Risk-Adjusted Average	77.0	76.0	77.7	76.7	80.1	78.8	84.0	82.3
Risk-Adjusted Difference (95% Confidence Interval)	1.0 (– 0.8, 2.9)		1.0 (– 1.0, 2.9)		1.3 (– 0.4, 2.9)		1.7 (0.2, 3.2)	
p-Value	.290		.326		.127		.030	

^a Risk-adjusted averages, controlling for whether the residents were age 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions.

^b New use of specialist physicians was not calculated annually because the outcome measure is defined as first use of a specialty physician during any year of the demonstration.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care. The data for Medicare spending per calendar quarter included 1,940 IWISH residents and 4,564 control group residents. The cardiology sample included 1,323 IWISH and 3,209 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The rheumatology sample included 1,715 IWISH and 4,127 control residents. The endocrinology sample included 1,685 IWISH and 4,027 control residents. The ophthalmology sample included 1,611 IWISH and 3,755 control residents. The data for days in the community excludes South Carolina residents and included 1,931 IWISH residents and 4,705 Control residents.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020.

Treatment on the Treated Analysis

Exhibit C-2. Impact of the IWISH Model on Healthcare Use, Medicare Fee-for-Service Spending, and Days in the Community for IWISH Residents Who Enrolled in IWISH During the Demonstration

Statistic ^a	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Primary Care Visits per 1,000 Beneficiary Months								
Risk-Adjusted Difference (95% Confidence Interval)	0.5 (- 99.3, 100.3)		15.8 (- 82.8, 114.4)		8.5 (- 111.0, 128.0)		-8.9 (- 122.4, 104.6)	
p-Value	.992		.753		.889		.878	
New Use of Specialty Care Services, Cardiology								
Risk-Adjusted Difference (95% Confidence Interval)	- 2.4% (- 7.1, 2.2)		._b		-		-	
p-Value	.303		-		-		-	
New Use of Specialty Care Services, Rheumatology								
Risk-Adjusted Difference (95% Confidence Interval)	1.2% (- 1.2, 3.7)		._b		-		-	
p-Value	.326		-		-		-	
New Use of Specialty Care Services, Endocrinology								
Risk-Adjusted Difference (95% Confidence Interval)	1.3% (- 0.6, 3.2)		._b		-		-	
p-Value	.167		-		-		-	
New Use of Specialty Care Services, Ophthalmology								
Risk-Adjusted Difference (95% Confidence Interval)	0.1% (- 4.4, 4.6)		._b		-		-	
p-Value	.976		-		-		-	
Total Days of Unplanned Hospitalization per 1,000 Beneficiary Months								
Risk-Adjusted Difference (95% Confidence Interval)	16.7 (- 34.8, 68.2)		20.5 (- 27.9, 69.0)		- 24.5 (- 82.7, 33.7)		- 41.7 (- 120.8, 37.4)	
p-Value	.524		.406		.409		.301	
Total Unplanned Hospital Admissions per 1,000 Beneficiary Months								
Risk-Adjusted Difference (95% Confidence Interval)	- 3.5 (- 10.9, 4.0)		- 1.6 (- 9.6, 6.4)		- 5.1 (- 12.7, 2.4)		- 6.7 (- 17.7, 4.4)	
p-Value	.362		.697		.183		.238	
Total Unplanned 30-Day Hospital Readmissions per 1,000 Beneficiary Months								
Risk-Adjusted Difference (95% Confidence Interval)	0.1 (- 2.8, 3.0)		1.1 (- 2.3, 4.5)		0.0 (- 4.0, 3.9)		- 2.5 (- 8.5, 3.6)	
p-Value	.947		.536		.997		.421	
All-Cause Emergency Department Visits Not Resulting in Hospitalization per 1,000 Beneficiary Months								
Risk-Adjusted Difference (95% Confidence Interval)	1.5 (- 14.2, 17.1)		1.5 (- 16.1, 19.0)		1.2 (- 10.8, 13.2)		-0.4 (- 12.5, 11.7)	
p-Value	.853		.870		.843		.949	

APPENDIX C: IMPACT STUDY RESULTS AND SENSITIVITY ANALYSIS

Statistic ^a	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Ambulance Events per 1,000 Beneficiary Months								
Risk-Adjusted Difference (95% Confidence Interval)	- 10.2 (- 40.2, 19.8)		- 5.5 (- 37.3., 26.4)		0.1 (- 40.1, 40.2)		- 34.5 (- 70.4, 1.3)	
p-Value	.504		.737		.997		.059	
Medicare Fee-for-Service Spending per Calendar Quarter								
Risk-Adjusted Difference (95% Confidence Interval)	- \$585 (- 1,686, 516)		- \$266 (- 1,324, 792)		- \$779 (- 2,173, 614)		- \$932 (- 2,338, 473)	
p-Value	.298		.623		.273		.194	
Days Admitted to Long-Term Care Facilities per 1,000 Beneficiary Months								
Risk-Adjusted Difference (95% Confidence Interval)	- 55.6 (- 277.7, 166.5)		- 11.0 (- 202.5, 180.6)		11.5 (- 246.7, 269.7)		- 253.8 (- 574.1, 66.5)	
p-value	.624		.911		.930		.120	
Days in the Community per Calendar Quarter								
Risk-Adjusted Difference (95% Confidence Interval)	1.7 (- 1.5, 4.9)		1.5 (- 1.7, 4.7)		2.1 (- 0.6, 4.8)		2.7 (0.3, 5.2)	
p-Value	.300		.348		.133		.030	

^a Risk-adjusted averages, controlling for whether the residents were age 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions.

^b New use of specialist physicians was not calculated annually because the outcome measure is defined as first use of a specialty physician during any year of the demonstration.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. Impacts of the treatment on residents who enrolled in IWISH were estimated using a two-staged instrument variable estimator with bootstrapped standard errors, where the instrument is individual-level data on whether IWISH residents enrolled in IWISH at any time during the demonstration. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care. The data for Medicare spending per calendar quarter included 1,940 IWISH residents and 4,564 control group residents. The cardiology sample included 1,323 IWISH and 3,209 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The rheumatology sample included 1,715 IWISH and 4,127 control residents. The endocrinology sample included 1,685 IWISH and 4,027 control residents. The ophthalmology sample included 1,611 IWISH and 3,755 control residents. The data for days in the community excludes South Carolina residents and included 1,931 IWISH residents and 4,705 Control residents.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Intent to Treat Analysis Excluding Outliers

Exhibit C-3. Impact of the IWISH Model on Healthcare Use, Medicare Fee-for-Service Spending: Excluding IWISH and Control Group Residents with Abnormally High Use Rates During the Demonstration Period

Statistic ^a	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Primary Care Visits per 1,000 Beneficiary Months								
Risk-Adjusted Average	336.2	319.6	332.8	314.1	353.7	346.5	347.6	311.7
Risk-Adjusted Difference (95% Confidence Interval)	16.6 (– 13.7, 46.9)		18.7 (– 17.8, 55.3)		7.2 (– 33.0, 47.3)		35.8 (– 17.9, 89.6)	
p-Value	.282		.315		.726		.191	
Total Days of Unplanned Hospitalization per 1,000 Beneficiary Months								
Risk-Adjusted Average	72.5	79.0	57.0	58.1	81.5	86.0	80.6	122.8
Risk-Adjusted Difference (95% Confidence Interval)	– 6.5 (– 16.3, 3.4)		– 1.1 (– 12.6, 10.4)		– 4.5 (– 23.4, 14.4)		– 42.2 (– 68.7, –15.7)	
p-Value	.196		.853		.641		0.002	
Total Unplanned Hospital Admissions per 1,000 Beneficiary Months								
Risk-Adjusted Average	13.8	15.5	10.9	11.9	15.4	17.8	15.3	21.9
Risk-Adjusted Difference (95% Confidence Interval)	– 1.7 (– 3.4, –0.1)		– 1.0 (– 2.9, 0.9)		– 2.4 (– 5.4, 0.6)		– 6.5 (– 10.7, –2.3)	
p-Value	.041		.301		.115		.002	
Total Unplanned 30-Day Hospital Readmissions per 1,000 Beneficiary Months								
Risk-Adjusted Average	3.6	3.8	3.3	2.5	3.4	4.2	4.3	6.0
Risk-Adjusted Difference (95% Confidence Interval)	– 0.2 (– 1.0, 0.7)		0.7 (– 0.4, 1.9)		– 0.7 (– 2.2, 0.8)		– 1.6 (– 3.8, 0.5)	
p-Value	.690		.189		.337		.136	
All-Cause Emergency Department Visits Not Resulting in Hospitalization per 1,000 Beneficiary Months								
Risk-Adjusted Average	32.2	32.3	30.6	31.8	33.5	32.8	32.9	30.6
Risk-Adjusted Difference (95% Confidence Interval)	– 0.1 (– 3.3, 3.1)		– 1.2 (– 5.5, 3.2)		0.7 (– 4.2, 5.5)		2.3 (– 3.1, 7.6)	
p-Value	.950		.599		.793		.406	
Ambulance Events per 1,000 Beneficiary Months								
Risk-Adjusted Average	35.8	37.6	28.6	28.7	42.7	42.9	46.7	55.2
Risk-Adjusted Difference (95% Confidence Interval)	– 1.9 (– 6.0, 2.3)		– 0.1 (– 4.2, 4.0)		– 0.2 (– 7.8, 7.5)		– 8.5 (– 21.6, 4.7)	
p-Value	.378		.968		.967		.207	
Medicare Fee-for-Service Spending per Calendar Quarter								
Risk-Adjusted Average	\$2,576	\$2,402	\$2,298	\$2,185	\$3,100	\$2,733	\$2,655	\$2,691
Risk-Adjusted Difference (95% Confidence Interval)	\$174 (– 19, 366)		\$112 (– 132, 356)		\$366 (32, 700)		–\$36 (– 427, 354)	
p-Value	.076		.368		.032		.855	

APPENDIX C: IMPACT STUDY RESULTS AND SENSITIVITY ANALYSIS

Statistic ^a	Overall Q4 2017–Q3 2020		Year 1 Q4 2017–Q3 2018		Year 2 Q4 2018–Q3 2019		Year 3 Q4 2019–Q3 2020	
	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample	IWISH Sample	Control Sample
Days Admitted to Long-Term Care Facilities per 1,000 Beneficiary Months								
Risk-Adjusted Average	275.8	234.9	181.5	121.6	372.5	342.1	362.5	443.9
Risk-Adjusted Difference (95% Confidence Interval)	40.9 (– 25.6, 107.5)		59.9 (– 4.2, 124.0)		30.4 (– 97.2, 158.0)		– 81.4 (– 244.5, 81.7)	
p-value	.228		.067		.641		.328	

^a Risk-adjusted averages, controlling for whether the residents were age 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions.

Notes: Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors. The data included IWISH and control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care. For each outcome, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The data for days with a primary care visit included 1,782 IWISH residents and 4,134 control group residents. The data for days of unplanned hospitalization included 1,934 IWISH residents and 4,532 control group residents. The data for unplanned hospital admissions included 1,950 IWISH residents and 4,577 control group residents. The data for unplanned hospital re-admissions excludes residents from South Carolina due to data limitations and included 2,000 IWISH residents and 4,731 control group residents. The data for outpatient emergency department visits included 1,853 IWISH residents and 4,352 control group residents. The data for ambulance events included 1,878 IWISH residents and 4,397 control group residents. The data for Medicare spending per calendar quarter included 1,597 IWISH residents and 3,645 control group residents. The data for days of long-term care include 2,005 IWISH residents and 4,683 control group residents.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Sensitivity Analysis

Exhibit C-4. Cumulative Impact of IWISH Healthcare Use and Days in the Community Using Alternative Statistical Approaches

Secondary Outcomes	No Risk Adjustment		Adjust for Attrition for Any Reason		Adjust for Attrition Due to Mortality		No Censoring Due to Housing Exits		No Censoring Due to Housing Exit, Adjust for Attrition for Any Reason	
	Diff	p-Value	Diff	p-Value	Diff	p-Value	Diff	p-Value	Diff	p-Value
Days of Unplanned Hospitalization	- 4.4	.788	7.6	.589	1.1	.952	2.7	.840	1.2	.926
Unplanned Hospital Admissions	- 2.9	.256	-2.3	.281	- 2.4	.271	- 1.8	.349	- 1.8	.338
Unplanned 30-Day Hospital Readmissions	0.0	.989	- 0.1	.926	0.0	.984	0.0	.977	- 0.1	.882
Outpatient Emergency Department Visits	2.2	.714	0.9	.815	- 3.0	.507	1.1	.739	1.7	.595
Total Ambulance Events	- 7.6	.559	- 5.8	.418	- 8.1	.258	- 8.8	.215	- 7.9	.271
Primary Care Visits	- 15.3	.594	- 1.2	.960	- 18.7	.509	2.3	.922	0.2	.993
New Visit, Cardiology	- 1.3%	.292	- 1.5%	.230	- 1.2%	.470	- 1.4%	.310	- 1.6%	.242
New Visit, Rheumatology	0.9%	.307	0.9%	.315	0.5%	.565	0.8%	.294	0.9%	.270
New Visit, Endocrinology	0.8%	.175	0.9%	.549	0.4%	.549	0.8%	.170	0.9%	.121
New Visit, Ophthalmology	0.0%	.998	0.0%	.993	0.1%	.972	0.3%	.814	0.2%	.876
Days in the Community	1.8	.147	1.1	.192	0.7	.582	1.3	.171	1.4	.122
Medicare FFS Expenditures	- \$281	.401	- \$364	.241	- \$466	.247	- \$369	.220	- \$360	.224
Days in Long-Term Care	- 95.7	.115	- 50.1	.518	- 67.2	.510	- 60.5	.514	- 31.0	.628

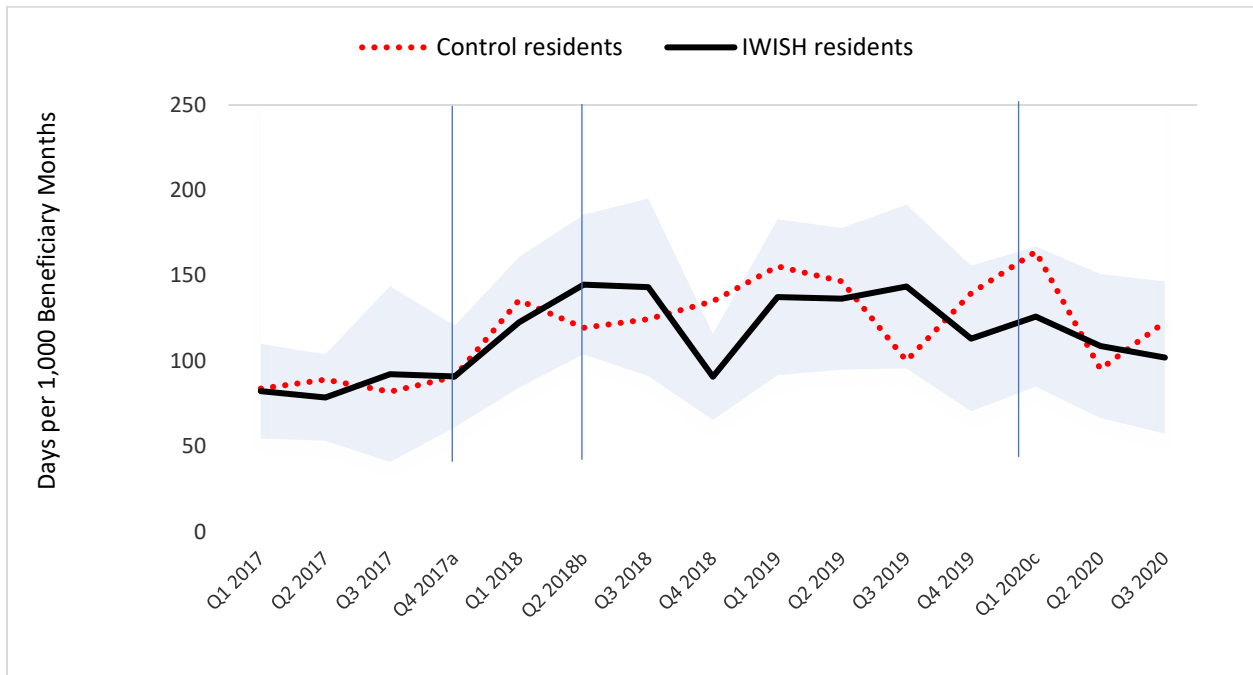
Diff = difference. FFS = fee-for-service.

Note: All measures except New Visits, Days in the Community, and Medicare FFS Expenditures are expressed in terms of per 1,000 beneficiary months. New Visits are expressed in percentages, and Days in the Community and Medicare FFS Expenditures are expressed as per beneficiary per quarter. Risk-adjusted differences were estimated using generalized linear regression and cluster-robust standard errors, controlling for whether the residents were age 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone; length of residency; and nine chronic or disabling conditions. “Censored” estimates censor residents’ healthcare use data if the resident exited the property for any reason or when they enrolled in Medicare managed care. The study team adjusted for Attrition using the straightforward approach proposed by Hayden et al. (2005), where IWISH outcomes are weighted by the fitted probabilities of survival calculated in the control group, and Control outcomes are weighted by the fitted probabilities of survival calculated in the IWISH group. All analyses, except for New Visits and Medicare FFS Expenditures, included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. The data for Medicare spending per calendar quarter included 1,940 IWISH residents and 4,564 control group residents. The cardiology sample included 1,323 IWISH and 3,209 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The Medicare FFS expenditures sample included 1,940 IWISH residents and 4,563 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. The rheumatology sample included 1,715 IWISH and 4,127 control group residents. The endocrinology sample included 1,685 IWISH and 4,027 control group residents. The ophthalmology sample included 1,611 IWISH and 3,755 control residents. The data for days in the community exclude South Carolina residents and included 1,931 IWISH residents and 4,705 control group residents.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Appendix D: Impact Study Quarterly Trends

Exhibit D-1. Quarterly Trends in Days of Unplanned Hospitalization per 1,000 Beneficiary Months

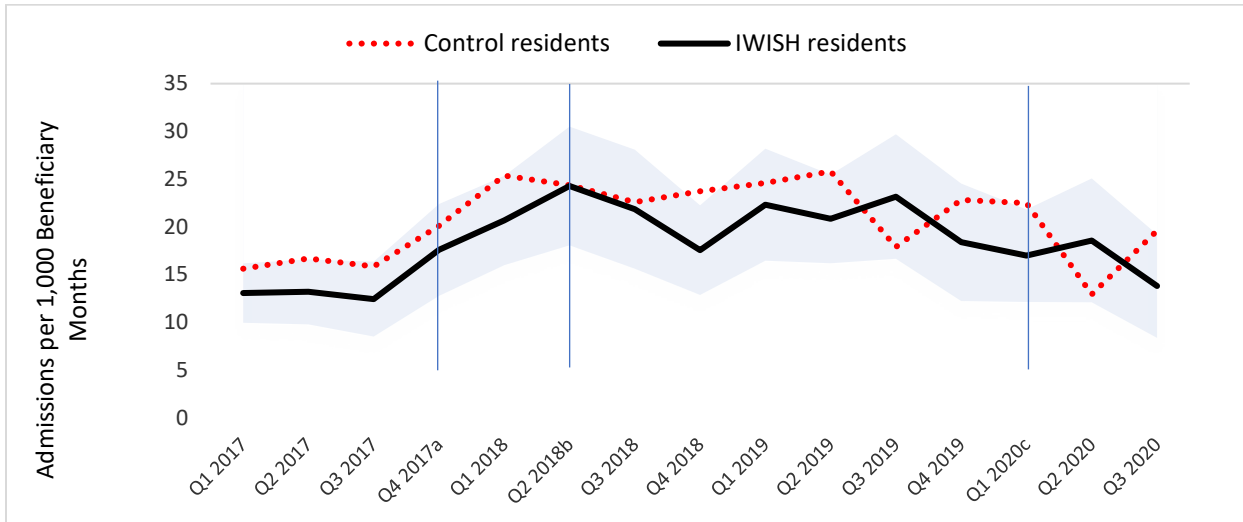


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-2. Quarterly Trends in Unplanned Hospital Admissions per 1,000 Beneficiary Months

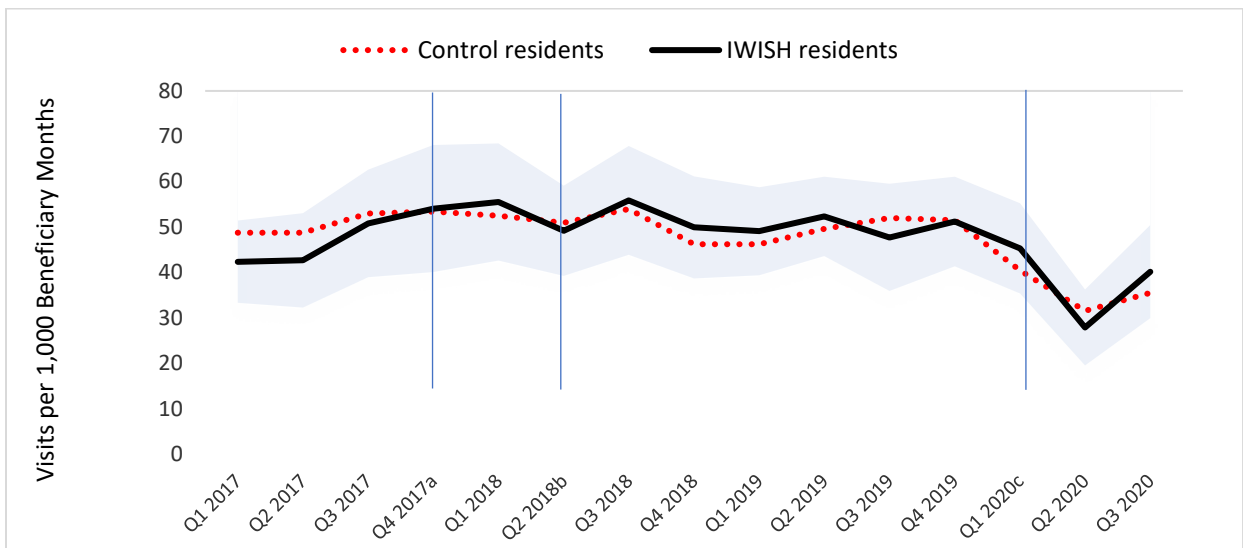


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Note: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data included 2,031 IWISH residents and 4,776 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-3. Quarterly Trends in Outpatient Emergency Department Visits per 1,000 Beneficiary Months

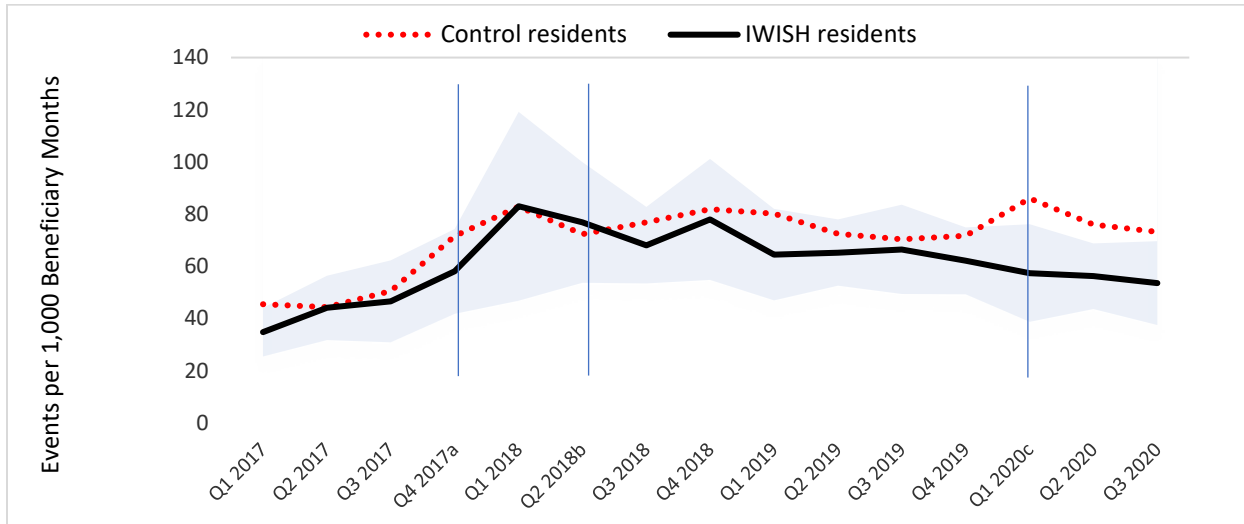


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-4. Quarterly Trends in Ambulance Events per 1,000 Beneficiary Months

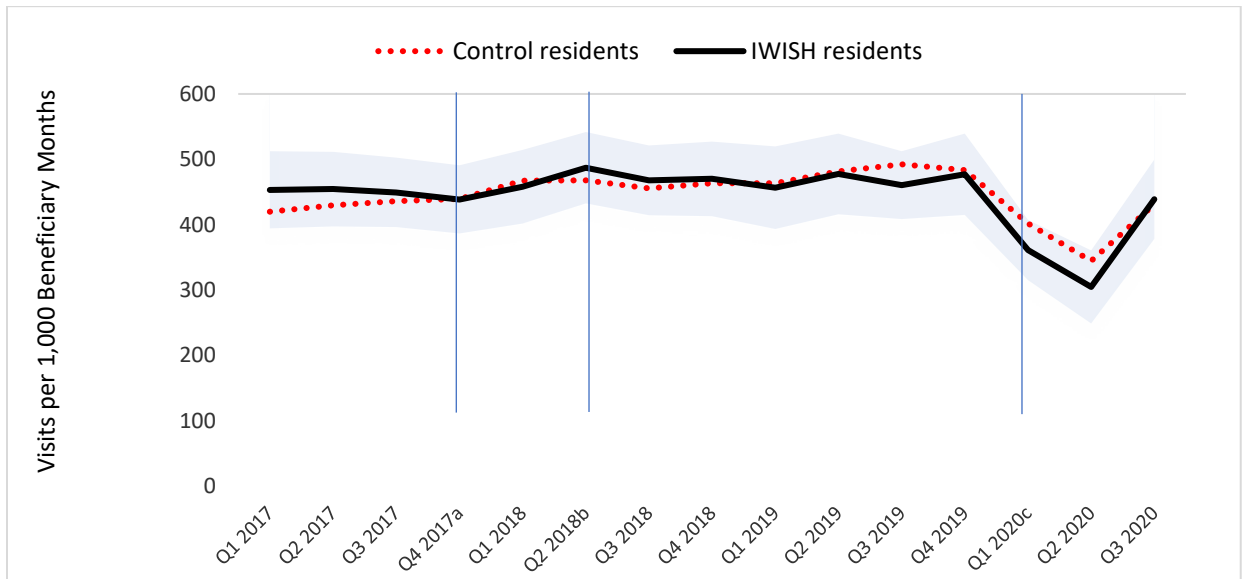


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data included 2,031 IWISH residents and 4,776 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-5. Quarterly Trends in Primary Care Visits per 1,000 Beneficiary Months

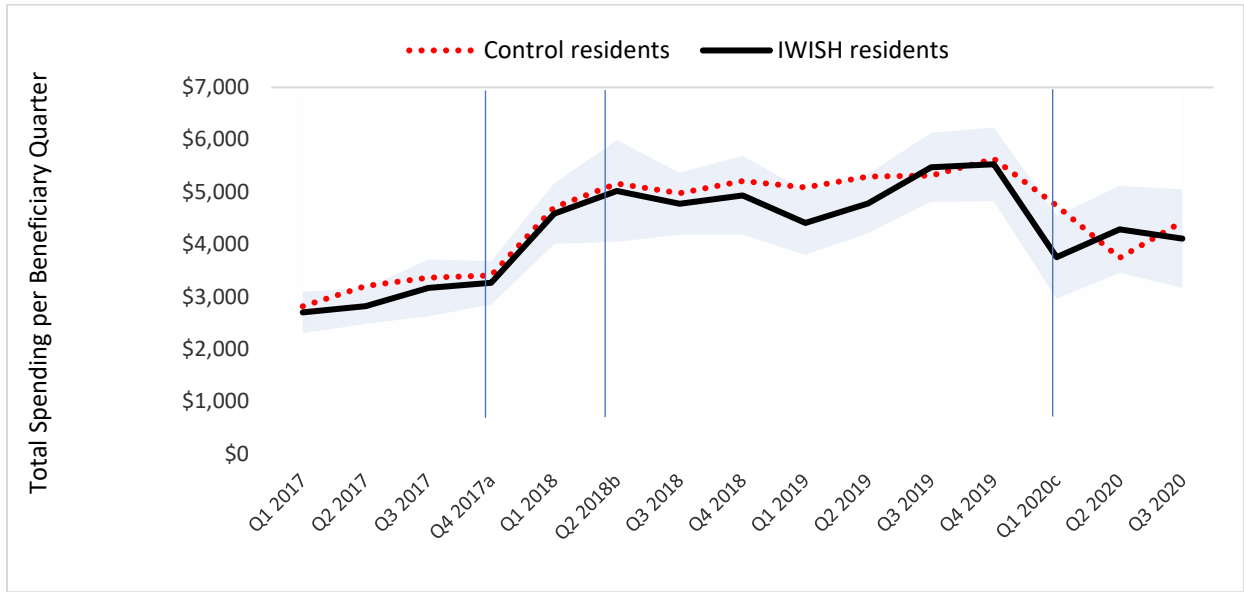


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data included 2,031 IWISH residents and 4,776 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-6. Quarterly Trends in Total Medicare Fee-for-Service Spending

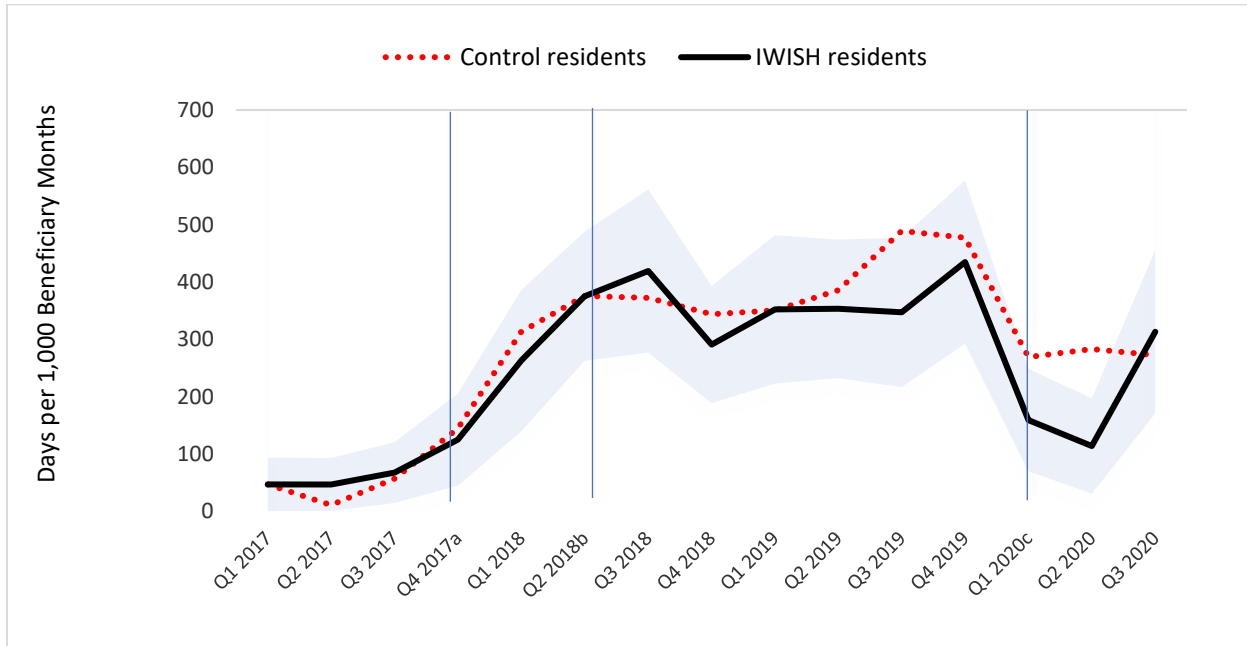


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data included 1,940 IWISH residents and 4,564 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-7. Quarterly Trends in Days Admitted to a Long-Term Care Institution per 1,000 Beneficiary Months



Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data included 2,031 IWISH residents and 4,776 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-8. Quarterly Trends in Days in the Community

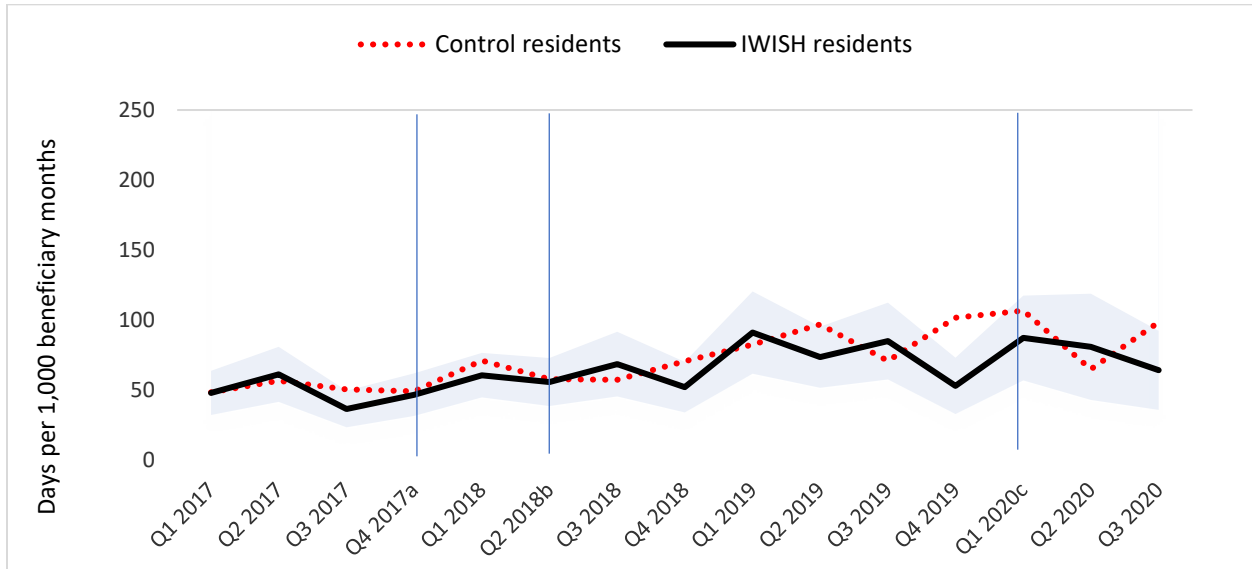


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. The data for days in the community exclude South Carolina residents. The data included 1,931 IWISH residents and 4,705 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, and New Jersey, October 2017–September 2020

Exhibit D-9. Quarterly Trends in Days of Unplanned Hospitalization per 1,000 Beneficiary Months, Excluding Outliers

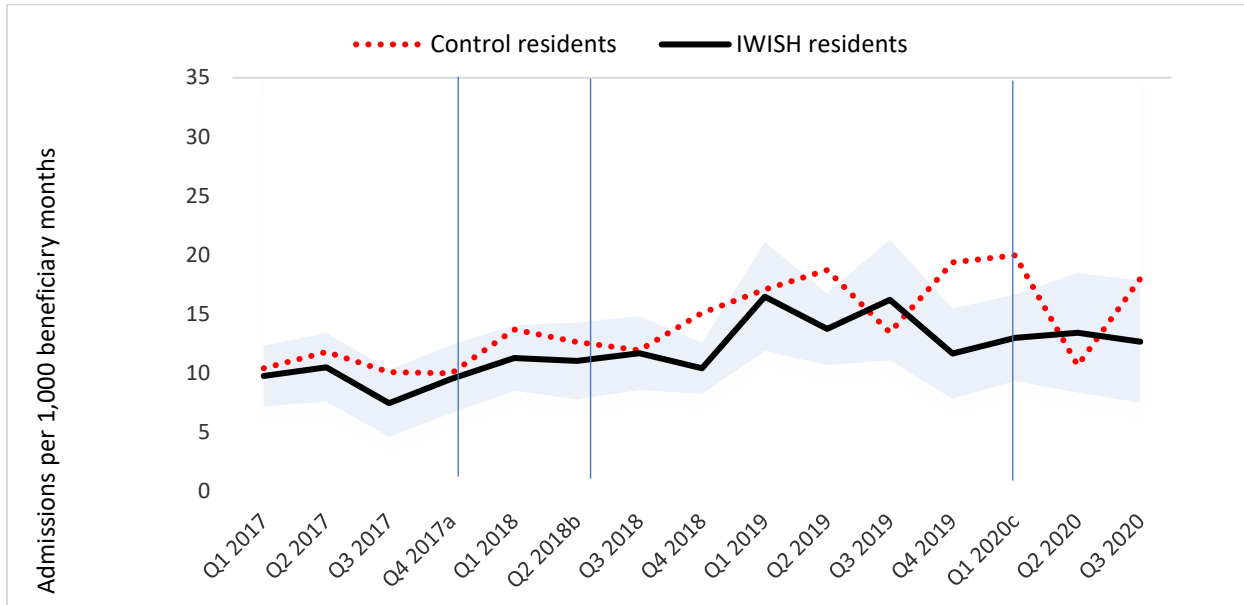


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. Excludes outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The data included 1,934 IWISH residents and 4,532 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-10. Quarterly Trends in Unplanned Hospital Admissions per 1,000 Beneficiary Months, Excluding Outliers

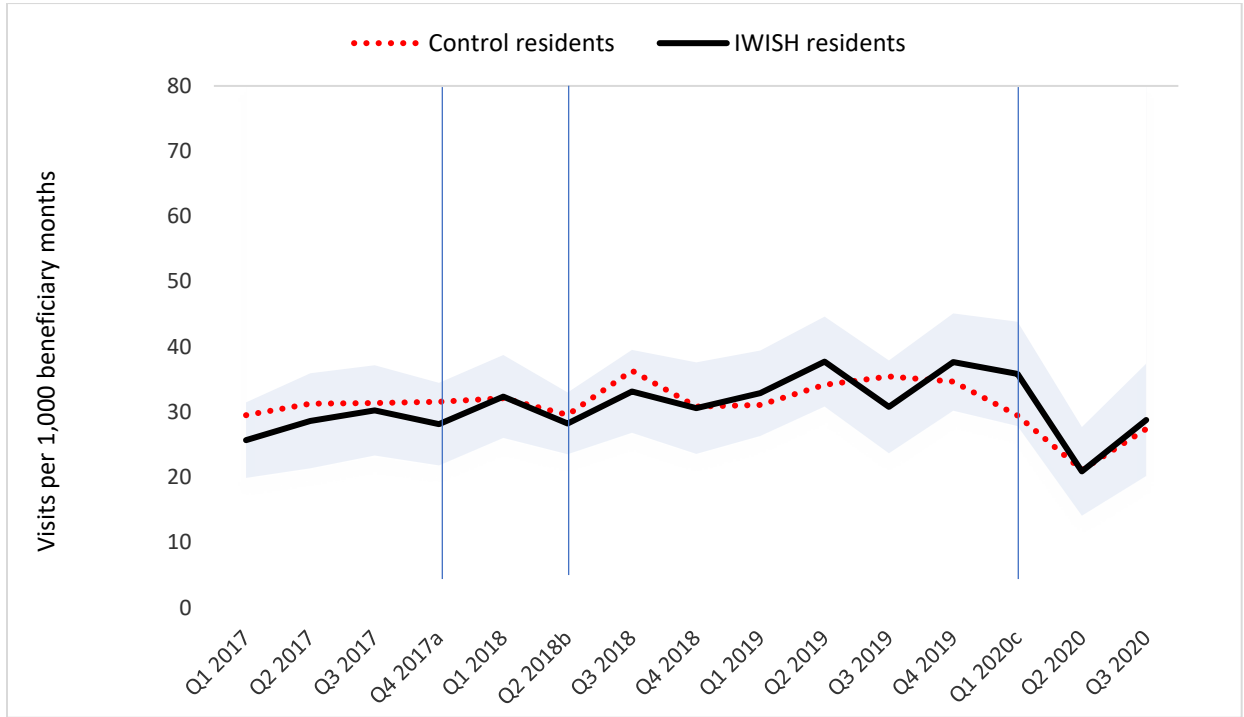


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. Excludes outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The data included 1,950 IWISH residents and 4,577 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-11. Quarterly Trends in Outpatient Emergency Department Visits per 1,000 Beneficiary Months, Excluding Outliers

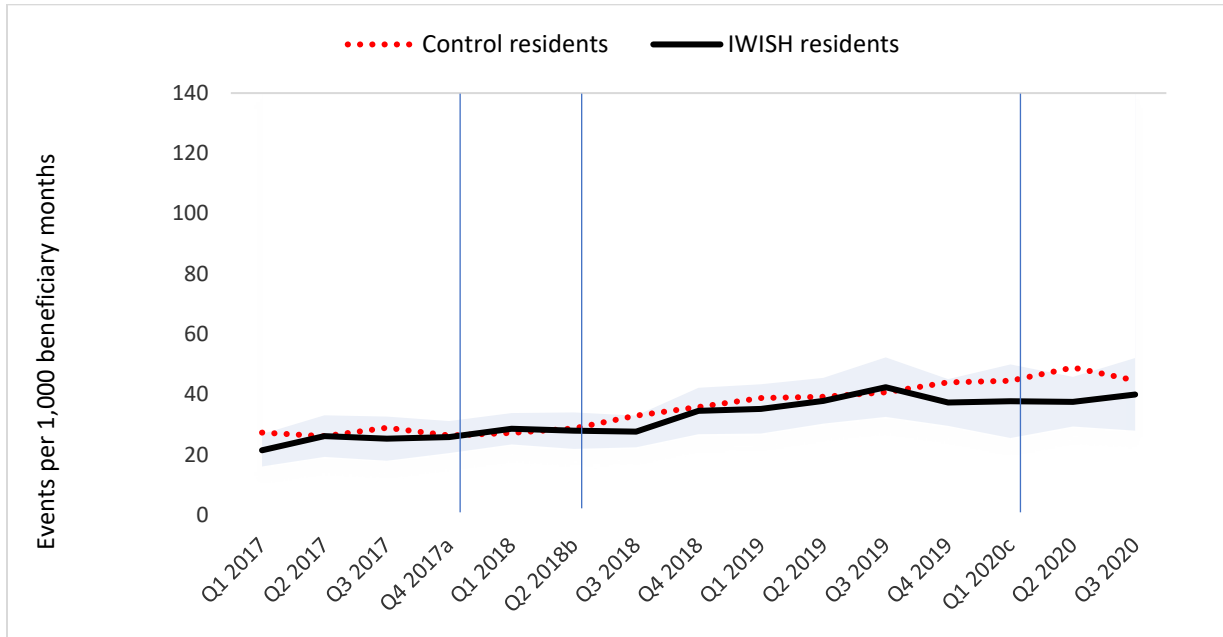


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. Excludes outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The data included 1,853 IWISH residents and 4,352 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-12. Quarterly Trends in Ambulance Events per 1,000 Beneficiary Months, Excluding Outliers

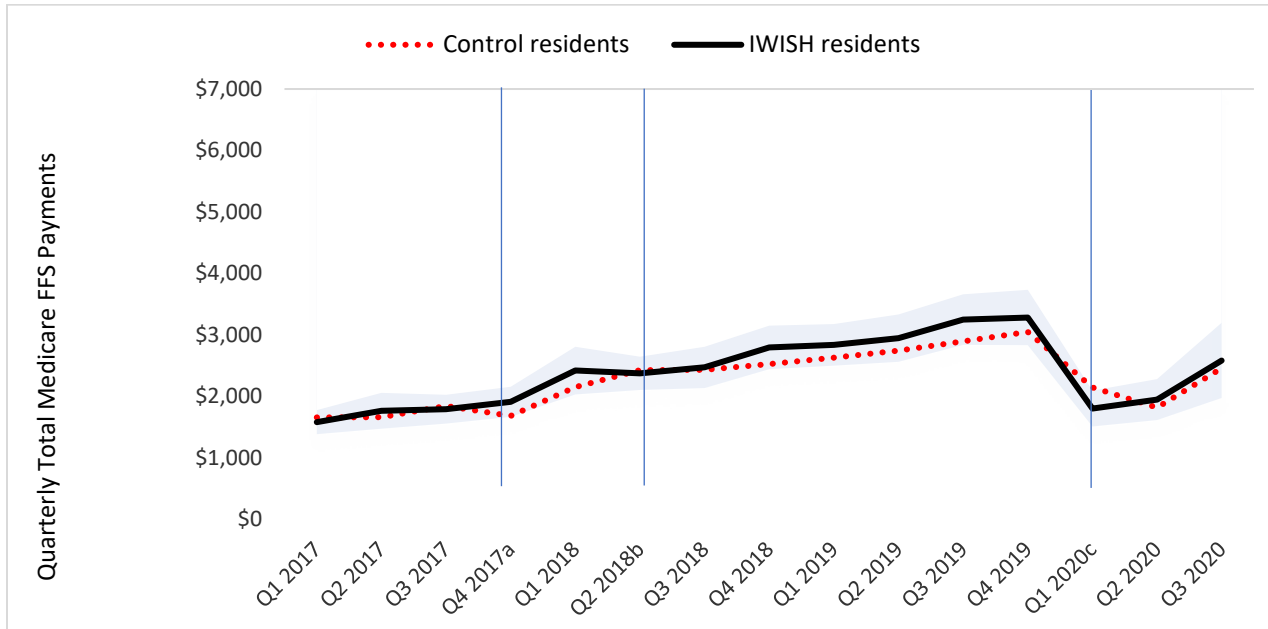


Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. Excludes outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The data included 1,878 IWISH residents and 4,397 control residents enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit D-13. Quarterly Trends in Total Medicare Fee-for-Service Spending, Excluding Outliers



Q4 2017a = Start of IWISH demonstration. Q2 2018b = Formal start of IWISH enrollment at IWISH properties. Q1 2020c = Start of COVID-19 pandemic and public health emergency.

Notes: Trends represent the average outcomes of the IWISH and control groups, adjusting for the secular trend. The shaded region represents 95% confidence intervals of the trend among IWISH residents. Excludes outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The data included 1,597 IWISH residents and 3,645 control group residents enrolled in Medicare Parts A and B for at least 6 consecutive months after baseline. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Appendix E: Impact Study Subgroup Analysis

Exhibit E-1. Impact of the IWISH Model on Healthcare Use, Medicare Fee-for-Service Spending, and Days in the Community, by Race and Ethnicity

Outcomes		African-American or Black, Non-Hispanic	Asian, Non-Hispanic	White, Non-Hispanic	Hispanic	Other, Non-Hispanic	Unknown
Days with a Primary Care Visit	Percentage Difference	- 10.4%	10.8%	- 2.2%	- 8.5%	- 26.8%	- 24.3%
	p-Value	.313	.476	.768	.584	.236	.283
Total Days of Unplanned Hospitalization	Percentage Difference	4.7%	22.5%	- 10.3%	- 7.9%	- 112.2%	- 29.6%
	p-Value	.776	.415	.407	.808	.050*	.564
Unplanned Hospital Admissions	Percentage Difference	10.8%	0.8%	- 20.3%	- 45.6%	- 82.0%	- 42.9%
	p-Value	.517	.973	.066*	.256	.092*	.377
Emergency Department Visits Not Resulting in Hospitalization	Percentage Difference	10.4%	- 13.2%	- 4.1%	9.3%	- 50.0%	11.7%
	p-Value	.410	.487	.765	.622	.065*	.708
Ambulance Events	Percentage Difference	- 23.4%	1.4%	- 4.4%	- 8.1%	- 102.6%	- 46.1%
	p-Value	.405	.945	.786	.799	.029**	.199
Total Medicare Fee-For-Service Spending	Percentage Difference	5.0%	14.4%	- 16.4%	- 12.6%	- 66.9%	- 11.7%
	p-Value	.658	.347	.011**	.514	.113	.678
Days in Long-Term Care	Percentage Difference	12.3%	- 56.8%	- 24.5%	4.7%	- 191.6%	- 23.3%
	p-Value	.650	.048**	.169	.908	.072*	.773
Days in the Community	Percentage Difference	1.0%	1.1%	3.3%	2.9%	7.2%	4.5%
	p-Value	.758	.615	.094*	.313	.411	.401

* p-value <.10. ** p-value <.05.

Notes: IWISH's effect on healthcare use, spending, and days in the community in subgroups was estimated using generalized least squares regression with cluster-robust standard errors and control for any observed differences in the characteristics of residents of treatment and control properties. Percentage Difference represents the percentage difference between the risk-adjusted average rate of use by IWISH residents of a given race and ethnicity group versus the risk-adjusted average rate of use by control group residents of the same race and ethnicity. The overall data included 2,031 IWISH residents (464 Black/African-American, 365 Asian, 921 White, 191 Hispanic, 35 other race, 55 unknown) and 4,776 control residents (961 Black/African-American, 1,017 Asian, 2,247 White, 361 Hispanic, 82 other race, 108 unknown) enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The overall data for Medicare spending included 1,940 IWISH residents and 4,564 control group residents. The data for days in the community excluded South Carolina residents and included 1,931 IWISH residents and 4,705 control group residents. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

APPENDIX E: IMPACT STUDY SUBGROUP ANALYSIS

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit E-2. Impact of the IWISH Model on Healthcare Use, Medicare Fee-for-Service Spending, and Days in the Community, by Age Group

Outcomes		Aged 62–64	Aged 65–74	Aged 75–84	Aged 85 or Older
Days with a Primary Care Visit	Percentage Difference	– 15.3%	– 3.5%	5.9%	– 10.1%
	p-Value	.448	.634	.447	.178
Total Days of Unplanned Hospitalization	Percentage Difference	– 112.0%	12.4%	14.4%	– 24.9%
	p-Value	<.001***	.461	.368	.198
Unplanned Hospital Admissions	Percentage Difference	– 59.5%	– 3.7%	19.8%	– 32.6%
	p-Value	.185	.828	.142	.041**
Emergency Department Visits Not Resulting in Hospitalization	Percentage Difference	– 33.7%	19.3%	13.5%	– 23.6%
	p-Value	.082*	.219	.249	.109
Ambulance Events	Percentage Difference	– 14.0%	9.4%	11.3%	– 38.8%
	p-Value	.757	.691	.411	.007***
Total Medicare Fee-For-Service Spending	Percentage Difference	– 26.8%	– 9.1%	12.0%	– 22.9%
	p-Value	.328	.356	.180	.006***
Days in Long-Term Care	Percentage Difference	– 16.8%	10.5%	– 0.1%	– 34.1%
	p-Value	.756	.726	.997	.095*
Days in the Community	Percentage Difference	5.4%	1.4%	– 1.8%	6.9%
	p-Value	.046**	.408	.509	.118

* p-value <.10. ** p-value <.05. *** p-value <.01.

Notes: IWISH’s effect on healthcare use, spending, and days in the community in subgroups was estimated using generalized least squares regression with cluster-robust standard errors control for any observed differences in the characteristics of residents of treatment and control properties. Percentage Difference represents the percentage difference between the risk-adjusted average rate of use by IWISH residents of a given age group versus the risk-adjusted average rate of use by control group residents of the same age group. The overall data included 2,031 IWISH residents (132 aged 62–64, 765 aged 65–74, 776 aged 75–84, 358 aged 85 or older) and 4,776 control residents (347 aged 62–64, 1,601 aged 65–74, 1,754 aged 75–84, 1,074 aged 85 or older) enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The overall data for Medicare spending included 1,940 IWISH residents and 4,564 control group residents. The data for days in the community excluded South Carolina residents and included 1,931 IWISH residents and 4,705 control group residents. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit E-3. Impact of the IWISH Model on Healthcare Use, Medicare Fee-for-Service Spending, and Days in the Community, by Length of Residency When the Demonstration Started

Outcomes		Less Than 1 Year	1–3 Years	3–7 Years	7–12 Years	12 or More Years
Days with a Primary Care Visit	Percentage Difference	30.7%	4.8%	-4.2%	-6.0%	-13.5%
	p-Value	.080*	.533	.623	.493	.226
Total Days of Unplanned Hospitalization	Percentage Difference	-39.4%	3.2%	-14.6%	9.4%	-5.1%
	p-Value	.372	.869	.468	.648	.763
Unplanned Hospital Admissions	Percentage Difference	-46.8%	-6.8%	-23.3%	17.0%	-21.9%
	p-Value	.214	.681	.212	.359	.238
Emergency Department Visits Not Resulting in Hospitalization	Percentage Difference	-9.8%	11.0%	8.7%	0.4%	-2.6%
	p-Value	.711	.446	.629	.981	.840
Ambulance Events	Percentage Difference	18.5%	9.9%	-35.5%	-4.3%	-15.4%
	p-Value	.756	.598	.321	.798	.236
Total Medicare Fee-For-Service Spending	Percentage Difference	-29.5%	-12.0%	-5.8%	3.5%	-3.6%
	p-Value	.112	.135	.600	.765	.750
Days in Long-Term Care	Percentage Difference	81.7%	7.5%	-40.6%	-21.8%	-30.6%
	p-Value	.216	.800	.240	.348	.145
Days in the Community	Percentage Difference	-1.5%	4.0%	4.4%	-2.2%	3.7%
	p-Value	.731	.060*	.045**	.530	.294

* p-value <.10. ** p-value <.05.

Notes: IWISH’s effect on healthcare use, spending, and days in the community in subgroups was estimated using generalized least squares regression with cluster-robust standard errors and control for any observed differences in the characteristics of residents of treatment and control properties. Percentage Difference represents the percentage difference between the risk-adjusted average rate of use by IWISH residents of a given tenancy group versus the risk-adjusted average rate of use by control group residents of the same tenancy group. The overall data included 2,031 IWISH residents (126 less than 1 year, 493 1–3 years, 515 3–7 years, 446 7–12 years, 451 12 or more years) and 4,776 control residents (386 less than 1 year, 1,060 1–3 years, 1,200 3–7 years, 969 7–12 years, 1,161 12 or more years) enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The overall data for Medicare spending included 1,940 IWISH residents and 4,564 control group residents. The data for days in the community excluded South Carolina residents and included 1,931 IWISH residents and 4,705 control group residents. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit E-4. Impact of the IWISH Model on Healthcare Use, Medicare Fee-for-Service Spending, and Days in the Community, by Residents Who Do and Do Not Live Alone and by Low Versus High Utilizers of Healthcare Services in the 12 Months Preceding the Demonstration

Outcomes		Lives Alone	Does Not Live Alone	Not High Healthcare Utilizers ^a	High Healthcare Utilizers ^a
Days with a Primary Care Visit	Percentage Difference	- 4.5%	1.0%	- 4.7%	- 0.4%
	p-Value	.427	.939	.477	.957
Total Days of Unplanned Hospitalization	Percentage Difference	- 3.4%	- 13.3%	3.5%	- 4.6%
	p-Value	.744	.557	.782	.721
Unplanned Hospital Admissions	Percentage Difference	- 15.1%	4.3%	- 11.3%	- 3.4%
	p-Value	.129	.867	.288	.779
Emergency Department Visits Not Resulting in Hospitalization	Percentage Difference	- 2.7%	36.7%	2.1%	6.8%
	p-Value	.816	.051*	.830	.670
Ambulance Events	Percentage Difference	- 14.0%	13.1%	- 7.3%	- 8.9%
	p-Value	.375	.608	.460	.590
Total Medicare Fee-For-Service Spending	Percentage Difference	- 9.5%	13.7%	- 4.6%	- 6.3%
	p-Value	.111	.397	.452	.375
Days in Long-Term Care	Percentage Difference	- 26.2%	23.6%	- 33.5%	- 2.5%
	p-Value	.057*	.519	.044**	.891
Days in the Community	Percentage Difference	3.1%	0.9%	2.2%	4.5%
	p-Value	.082*	.709	.141	.231

* p-value < .10. ** p-value < .05.

^a High utilizers of health care were defined as IWISH and control residents who were enrolled in Medicare Parts A and B from October 1, 2016, through September 30, 2017, and were in the 75th percentile of Medicare fee-for-service spending during that period (the 75th percentile included residents with Medicare fee-for-service spending greater than \$10,980 per quarter; the median was \$3,153 per quarter). “Not high healthcare utilizers” include all other IWISH and control residents who were in enrolled in Medicare Parts A and B from October 1, 2016, through September 30, 2017.

Notes: IWISH’s effect on healthcare use, spending, and days in the community in subgroups was estimated using generalized least squares regression with cluster-robust standard errors and control for any observed differences in the characteristics of residents of treatment and control properties. Percentage Difference represents the percentage difference between the risk-adjusted average rate of use by IWISH residents of a given group versus the risk-adjusted average rate of use by control group residents of the same group. The data comparing those who lived alone to those who did not live alone included 2,031 IWISH residents (1,703 lived alone, 328 did not) and 4,776 control residents (3,796 lived alone, 980 did not) enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The data comparing high healthcare utilizers to all others included 1,864 IWISH residents (514 were high utilizers, 1,350 were not) and 4,407 control residents (1,205 were high utilizers, 3,202 were not) enrolled in Medicare Parts A and B from October 1, 2016, through September 30, 2017, then enrolled in Medicare Parts A and B or Medicaid with full coverage for at least 6 consecutive months after baseline. The overall data for Medicare spending included 1,940 IWISH residents and 4,564 control group residents. The data for days in the community excluded South Carolina residents and included 1,931 IWISH residents and 4,705 control group residents. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit E-5. Likelihood of IWISH and Control Group Residents to Exit Their Home for Any Reason Relative to Control Group Residents Who Identify as White and Non-Hispanic

Outcomes	Group		African-American or Black, Non-Hispanic	Asian, Non-Hispanic	White, Non-Hispanic	Hispanic	Other, Non-Hispanic	Unknown
Exits Home for Any Reason	Control	Hazard Ratio ^a	1.02	0.56***	1.00 ^b	0.72***	0.84	1.00
	IWISH		1.02	0.63***	0.97	0.77**	0.87	0.66*
	Test of Difference Between IWISH and Control, <i>p</i> -Value		.934	.381	.781	.664	.877	.999

* *p*-value < .10. ** *p*-value < .05. *** *p*-value < .01. (Asterisks are tests of difference between the hazard ratio and the reference group, White non-Hispanic in control group.)

^a The study team tested the assumption of proportional hazards between IWISH and control residents within subgroups: the assumption often held within larger subgroups but could not be confirmed within small subgroups. However, these are exploratory analyses, and the estimated hazard ratios still provide insight into how often residents in the given group exited their home, on average, throughout the demonstration, compared with how often residents in the reference group exited their home.

^b Reference group (the likelihood that all other groups exited their homes is compared to the likelihood that this group left their homes).

Notes: IWISH’s effect on the likelihood of housing exits, for any reason, among subgroups of residents was estimated using Cox proportional hazards models with cluster-robust standard errors. The covariates examined in the table were interacted with the treatment indicator to measure differential effects of IWISH between subgroups. Overall, the proportional hazards models controlled for whether the residents were aged 65–74, 85 or older, Black (non-Hispanic), Hispanic, Asian (non-Hispanic), or living alone, as well as length of residency. The overall data included 4,003 IWISH residents (1,032 Black/African-American, 691 Asian, 1,598 White, 503 Hispanic, 77 other race, 102 unknown) and 9,354 control residents (1,981 Black/African-American, 2,033 Asian, 3,872 White, 1,065 Hispanic, 179 other race, 224 unknown).

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit E-6. Likelihood of IWISH and Control Group Residents to Exit Their Home for Any Reason Relative to Control Group Residents Age 62–64

Outcomes	Group		Aged 62–64	Aged 65–74	Aged 75–84	Aged 85 or Older
Exits Property for Any Reason	Control	Hazard Ratio ^a	1.00 ^b	0.83*	0.95	1.88***
	IWISH		1.00	0.85	1.04	1.94***
	Test of Difference Between IWISH and Control, <i>p</i> -Value		.987	.815	.414	.681

* *p*-value < .10. ** *p*-value < .05. *** *p*-value < .01. (Asterisks are tests of difference between the hazard ratio and the reference group, age 62–64 in control group.)

^a The study team tested the assumption of proportional hazards between IWISH and control residents within subgroups: the assumption often held within larger subgroups but could not be confirmed within small subgroups. However, these are exploratory analyses, and the estimated hazard ratios still provide insight into how often residents in the given group exited their home, on average, throughout the demonstration, compared with how often residents in the reference group exited their home.

^b Reference group (the likelihood that all other groups exited their homes is compared with the likelihood that this group left their home).

Notes: IWISH’s effect on the likelihood of housing exits, for any reason, among subgroups of residents was estimated using Cox proportional hazards models with cluster-robust standard errors. The covariates examined in the table were interacted with the treatment indicator to measure differential effects of IWISH between subgroups. Overall, the proportional hazards models controlled for any observed differences in the characteristics of residents of treatment and control properties. The overall data included 4,003 IWISH residents (224 aged 62–64, 1,680 aged 65–74, 1,490 aged 75–84, 609 aged 85 or older) and 9,354 control residents (535 aged 62–64, 3,550 aged 65–74, 3,500 aged 75–84, 1,769 aged 85 or older).

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit E-7. Likelihood of IWISH and Control Group Residents to Exit Their Home for Any Reason Relative to Control Group Residents Who Resided in Their Home for Less Than One Year When the Demonstration Started

Outcomes	Group		< 1 Year	1–3 Years	3–7 Years	7–12 Years	12 or More Years
Exits Home for Any Reason	Control	Hazard Ratio ^a	1.00 ^b	1.31***	1.22*	1.33***	1.67***
	IWISH		1.36	1.46**	1.08	1.31*	1.72***
	Test of Difference Between IWISH and Control, <i>p</i> -Value		.180	.410	.291	.880	.765

* *p*-value < .10. ** *p*-value < .05. *** *p*-value < .01. (Asterisks are tests of difference between the hazard ratio and the reference group, <1 year in control group.)

^a The study team tested the assumption of proportional hazards between IWISH and control residents within subgroups: the assumption often held within larger subgroups but could not be confirmed within small subgroups. However, these are exploratory analyses, and the estimated hazard ratios still provide insight into how often residents in the given group exited their home, on average, throughout the demonstration, compared with how often residents in the reference group exited their home.

^b Reference group (the likelihood that all other groups exited their homes is compared with the likelihood that this group left their homes).

Notes: IWISH’s effect on the likelihood of housing exits, for any reason, among subgroups of residents was estimated using Cox proportional hazards models with cluster-robust standard errors. The covariates examined in the table were interacted with the treatment indicator to measure differential effects of IWISH between subgroups. Overall, the proportional hazards models controlled for any observed differences in the characteristics of residents of treatment and control properties. The overall data included 4,003 IWISH residents (296 less than 1 year, 1,058 1–3 years, 1,097 3–7 years, 794 7–12 years, 758 12 or more years) and 9,354 control residents (826 less than 1 year, 2,303 1–3 years, 2,427 3–7 years, 1,825 7–12 years, 1,973 12 or more years).

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Exhibit E-8. Likelihood of IWISH and Control Group Residents to Exit Their Home for Any Reason Relative to Control Group Residents Who Do Not Live Alone

Outcomes	Group		Does Not Live Alone	Lives Alone
Exits Home for Any Reason	Control	Hazard Ratio ^a	1.00 ^b	1.49***
	IWISH		1.17	1.45***
	Test of Difference Between IWISH and Control, <i>p</i> -Value		.225	.761

* *p*-value <.10. ** *p*-value <.05. *** *p*-value<.01. (Asterisks are tests of difference between the hazard ratio and the reference group, Does Not Live Alone in control group.)

^a The study team tested the assumption of proportional hazards between IWISH and control residents within subgroups: the assumption often held within larger subgroups but could not be confirmed within small subgroups. However, these are exploratory analyses, and the estimated hazard ratios still provide insight into how often residents in the given group exited their home, on average, throughout the demonstration, compared with how often residents in the reference group exited their home.

^b Reference group (the likelihood that all other groups exited their homes is compared with the likelihood that this group left their home).

Notes: IWISH's effect on the likelihood of housing exits, for any reason, among subgroups of residents was estimated using Cox proportional hazards models with cluster-robust standard errors. The covariates examined in the table were interacted with the treatment indicator to measure differential effects of IWISH between subgroups. Overall, the proportional hazards models controlled for any observed differences in the characteristics of residents of treatment and control properties. The overall data included 3,996 IWISH residents (3,440 lived alone, 656 did not) and 9,329 control residents (7,251 lived alone, 2,078 did not).

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020

Appendix F: Property and Neighborhood Characteristics Used in Nonexperimental Analysis

Exhibit F-1. Definitions of Property and Neighborhood Characteristics Potentially Associated with IWISH Implementation and Resident Outcomes

Characteristic	Variable Definition	Data Source
Area Is Isolated	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood was in an isolated location (e.g., not close to churches, shopping, etc.), and this was a challenge to aging in place.	RWD telephone questionnaire
Lack of Access to Nutritious Food	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood lacked access to nutritious food, and this was a challenge to aging in place.	RWD telephone questionnaire
Lack of Public Transportation Options	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood or community lacked public transportation options, and this was a challenge to aging in place.	RWD telephone questionnaire
No Sidewalks or Poorly Maintained Sidewalks	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood lacked sidewalks or had poorly maintained sidewalks, and this was a challenge to aging in place.	RWD telephone questionnaire
Lack of Safe Walking Routes	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood lacked safe walking routes, and this was a challenge to aging in place.	RWD telephone questionnaire
Area Difficult for Family/Friends to Visit	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood was difficult for family or friends to get to for visits, and this was a challenge to aging in place.	RWD telephone questionnaire
Lack of Quality Medical Facilities in the Community	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood or community lacked quality medical facilities, and this was a challenge to aging in place.	RWD telephone questionnaire
Lack of Social Services in the Community	IWISH staff indicated (Yes/No or Don't Know) that the property's neighborhood or community lacked social services, and this was a challenge to aging in place.	RWD telephone questionnaire
Service Coordinator Not Present at the Property Before IWISH	IWISH staff indicated (Yes/No) that the property did not have a Service Coordinator before the IWISH program started (September 2017).	RWD telephone questionnaire
Metropolitan Versus Nonmetropolitan Location	Whether the property is in a metropolitan area with a population of 1 million or more or in a metropolitan area with a population less than 1 million.	USDA ERS Rural-Urban Continuum Codes
Property Physical Inspection Scores	Scores (0–100) from HUD's REAC inspections of all multifamily properties to ensure decent, safe, and sanitary housing for residents. Higher scores mean better property conditions.	HUD REAC
Percentage of Population Above the Federal Poverty Level	Percentage of population in the property's U.S. census tract with household incomes above the federal poverty level.	U.S. Census Bureau American Community Survey

HUD REAC = U.S. Department of Housing and Urban Development Real Estate Assessment Center. RWD = Resident Wellness Director. USDA ERS = United States Department of Agriculture Economic Research Services.

Exhibit F-2. Associations Between Healthcare Use Outcomes and Isolated Communities or Neighborhoods Lacking Access to Nutritious Food

Outcome ^a	Isolated Community					Lacks Access to Nutritious Food				
	No		Yes		Subgroup Difference ^c	No		Yes		Subgroup Difference
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value		Percentage Difference	p-Value	Percentage Difference	p-Value	
Days With a Primary Care Visit	9.5	<.001***	- 12.5	.033**	Yes**	8.4	.003***	- 2.5	0.579	Yes**
Days of Unplanned Hospitalization	- 10.0	0.163	- 7.1	0.647	No	- 13.9	.073*	0.0	0.999	Yes*
Unplanned Hospital Admissions	- 15.1	.019**	- 1.4	0.921	No	- 16.8	.016**	- 7.5	0.486	No
Outpatient Emergency Department Visits	- 5.6	.194	25.7	.002***	Yes**	- 6.0	.191	0.1	.059*	Yes**
Ambulance Events	- 11.2	.034**	18.8	.064*	Yes**	- 15.6	.006***	13.7	.098*	Yes**
Total Medicare Fee-for-Service Spending	8.0	.055*	1.2	0.849	No	7.5	.093*	6.9	0.228	No
Days in Long-Term Care	3.9	0.766	69.3	.002***	Yes**	3.3	0.812	0.5	.010**	Yes**
Days in Community	2.7	.015**	- 5.5	.016**	Yes**	2.4	.040**	- 2.0	0.396	Yes*

* p-value <.10. ** p-value <.05. *** p-value <0.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

^b Percentage Difference is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents.

^c Subgroup Difference indicates whether there is a statistically significant difference in the estimated Percentage Difference between IWISH residents at properties in the “No” and “Yes” columns. Asterisks indicate that the estimates of the Percentage Differences in the IWISH and control group averages between IWISH properties in the “No” and “Yes” columns are statistically significantly different at the 5- or 10-percent level.

Notes: Associations between property or community characteristics and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Exhibit F-3. Association Between Healthcare Use Outcomes and Neighborhood Lacking Public Transportation Options, Lacking Sidewalks, or Having Poorly Maintained Sidewalks

Outcome ^a	Lacks Public Transportation Options					Lacks Sidewalks or Sidewalks are Poorly Maintained				
	No		Yes		Subgroup Difference ^c	No		Yes		Subgroup Difference
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value		Percentage Difference	p-Value	Percentage Difference	p-Value	
Days With a Primary Care Visit	2.7	0.348	12.3	.003***	Yes**	8.6	.001***	- 13.0	.037**	Yes**
Days of Unplanned Hospitalization	- 10.8	0.168	- 7.1	0.526	No	8.8	0.219	- 15.0	0.352	No
Unplanned Hospital Admissions	- 12.3	.079*	- 14.5	0.151	No	- 13.3	.038**	- 10.4	0.469	No
Outpatient Emergency Department Visits	2.0	0.662	- 5.9	0.382	No	- 2.6	0.55	14.1	0.131	No
Ambulance Events	- 2.9	0.614	- 13.3	.095*	No	- 9.7	.064*	15.3	0.16	Yes**
Total Medicare Fee-for-Service Spending	7.2	0.126	6.5	0.19	No	7.5	.070*	3.0	0.614	No
Days in Long-Term Care	14.7	0.285	22.3	0.249	No	9.2	0.473	55.9	.027**	No
Days in Community	1.7	0.271	0.5	0.71	No	2.0	.065*	- 2.8	0.529	No

* p-value <.10. ** p-value <.05. *** p-value <0.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

^b Percentage Difference is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents.

^c Subgroup Difference indicates whether there is a statistically significant difference in the estimated Percentage Difference between IWISH residents at properties in the “No” and “Yes” columns. Asterisks indicate that the estimates of the Percentage Differences in the IWISH and control group averages between IWISH properties in the “No” and “Yes” columns are statistically significantly different at the 5- or 10-percent level.

Notes: Associations between property or community characteristics and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Exhibit F-4. Association Between Healthcare Use Outcomes and Neighborhoods Lacking Safe Walking Routes or in Areas Difficult for Family or Friends to Visit

Outcome ^a	Lacks Safe Walking Routes					Area Difficult for Family or Friends to Visit				
	No		Yes		Subgroup Difference ^c	No		Yes		Subgroup Difference
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value		Percentage Difference	p-Value	Percentage Difference	p-Value	
Days With a Primary Care Visit	9.3	.001***	- 11.2	.056*	Yes**	6.7	.018**	2.6	0.588	No
Days of Unplanned Hospitalization	- 5.8	0.428	- 31.7	.037**	No	- 4.3	0.561	- 28.6	.029**	No
Unplanned Hospital Admissions	- 10.9	.097*	- 21.6	0.111	No	- 9.8	0.143	- 23.8	.041**	No
Outpatient Emergency Department Visits	- 0.1	0.989	- 4.6	0.616	No	1.5	0.731	- 7.1	0.366	No
Ambulance Events	- 4.5	0.398	- 13.4	0.2	No	- 5.8	0.28	- 7.3	0.434	No
Total Medicare Fee-for-Service Spending	6.2	.083*	9.3	0.401	No	6.6	.061*	8.2	0.394	No
Days in Long-Term Care	22.1	.090*	1.4	0.955	No	9.2	0.502	37.1	.061*	No
Days in Community	1.2	0.397	1.2	0.462	No	2.3	.037**	- 1.6	0.604	No

* p-value <.10. ** p-value <.05. *** p-value <0.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

^b Percentage Difference is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents.

^c Subgroup Difference indicates whether there is a statistically significant difference in the estimated Percentage Difference between IWISH residents at properties in the “No” and “Yes” columns. Asterisks indicate that the estimates of the Percentage Differences in the IWISH and control group averages between IWISH properties in the “No” and “Yes” columns are statistically significantly different at the 5- or 10-percent level.

Notes: Associations between property or community characteristics and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Exhibit F-5. Association Between Healthcare Use Outcomes and Neighborhoods Lacking Quality Medical Facilities in the Community, Neighborhoods Lacking Social Services in the Community, or Service Coordinators Not Present at the Property Before IWISH

Outcome ^a	Lacks Quality Medical Facilities in the Community					Lacks Social Services in the Community					Service Coordinator Not Present at the Property Before IWISH				
	No		Yes		Sub-group Difference ^c	No		Yes		Sub-group Difference	No		Yes		Sub-group Difference
	Percent Difference ^b	p-Value	Percent Difference	p-Value		Percent Difference	p-Value	Percent Difference	p-Value		Percent Difference	p-Value	Percent Difference	p-Value	
Days with a Primary Care Visit	7.8	.004** *	-9.9	0.173	Yes**	7.9	.004***	4.2	0.384	No	23.3	<.001***	2.8	0.296	Yes**
Days of Unplanned Hospitalization	-9.4	0.182	-11.2	0.566	No	-9.4	0.204	-6.2	0.649	No	-38.7	.037**	-5.8	0.414	Yes*
Unplanned Hospital Admissions	-11.9	.058*	-21.7	0.226	No	-10.8	0.104	-17.8	0.151	No	-42.8	.011**	-9.0	0.155	Yes*
Outpatient Emergency Department Visits	-2.2	0.601	15.4	0.168	No	-2.2	0.618	7.9	0.334	No	4.8	0.6	-1.2	0.782	No
Ambulance Events	-7.1	0.162	4.5	0.748	No	-10.0	.063*	9.7	0.32	Yes*	-14.5	0.25	-4.9	0.339	No
Total Medicare Fee-for-Service Spending	7.3	.068*	4.0	0.677	No	7.8	.068*	5.8	0.335	No	2.7	0.653	7.6	.064*	No
Days in Long-Term Care	17.5	0.161	11.7	0.71	No	6.0	0.652	51.7	.016**	Yes*	-0.1	0.997	6.1	0.843	No
Days in Community	1.3	0.322	1.4	0.525	No	2.1	.059*	-1.3	0.724	No	2.7	.062*	1.1	0.42	No

* p-value <.10. ** p-value <.05. *** p-value <.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

APPENDIX F: PROPERTY AND NEIGHBORHOOD CHARACTERISTICS

^b Percent Difference is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents.

^c Subgroup Difference indicates whether there is a statistically significant difference in the estimated Percent Difference between IWISH residents at properties in the “No” and “Yes” columns. Asterisks indicate that the estimates of the Percent Differences in the IWISH and control group averages between IWISH properties in the “No” and “Yes” columns are statistically significantly different at the 5- or 10-percent level.

Notes: Associations between property or community characteristics and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Exhibit F-6. Association Between Healthcare Use Outcomes and Metropolitan Location, Property Physical Inspection Scores, and Percentage of Census Tract Population Above the Federal Poverty Level

Outcome ^a	In Metropolitan Area with Population of 1 Million or More					Property Physical Inspection Scores		Percentage of Census Tract Population Above Federal Poverty Line	
	No		Yes		Subgroup Difference ^c	Percentage Difference (Continuous)	p-Value	Percentage Difference (Continuous)	p-Value
	Percentage Difference (Categorical) ^b	p-Value	Percentage Difference (Categorical)	p-Value					
Days With a Primary Care Visit	2.2	.789	6.9	.245	No	- 1.0	<.001***	2.0	.467
Days of Unplanned Hospitalization	22.1	.140	- 7.4	.477	No	- 0.5	.162	- 8.1	.294
Unplanned Hospital Admissions	- 16.0	.252	- 12.2	.105	No	- 0.4	.224	- 8.2	.235
Outpatient Emergency Department Visits	3.0	.766	- 1.7	.778	No	0.3	.112	1.7	.699
Ambulance Events	11.8	.349	- 11.1	.112	No	0.2	.442	6.9	.203
Total Medicare Fee-for-Service Spending	9.5	.094*	7.0	.120	No	- 0.1	.377	12.0	.009***
Days in Long-Term Care	25.7	.407	10.8	.429	No	- 0.3	.563	11.5	.357
Days in Community	- 3.4	.379	2.1	.083*	No	- 0.1	.332	- 1.0	.342

* p-value <.10. ** p-value <.05. *** p-value <.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

^b Percentage Difference (Categorical) is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents. Percentage Difference (Continuous) is the percentage increase in the average outcome among IWISH residents versus the average outcome among all control group residents for every 1 percentage-point increase in residents at the IWISH properties who participated in the interviews, assessments, or Individual Healthy Aging Plans.

^c Subgroup Difference indicates whether there is a statistically significant difference in the estimated Percentage Difference between IWISH residents at properties in the “No” and “Yes” columns.

Notes: Associations between property or community characteristics and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Appendix G: Associations Between Resident Outcomes and Fidelity to the IWISH Model

Exhibit G-1. Associations Between Healthcare Use Outcomes and the Percentage of Residents at IWISH Properties Who Participated in Person-Centered Interviews, Participated in Health and Wellness Assessments, or Recorded Goals in Individual Healthy Aging Plans

Outcome ^a	Residents Who Participated in Person-Centered Interviews		Residents Who Participated in Health and Wellness Assessments		Residents With Individual Healthy Aging Plans	
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value	Percentage Difference	p-Value
Days With a Primary Care Visit	1.8	.202	2.0	.134	1.8	.138
Days of Unplanned Hospitalization	-2.3	.300	-3.2	.156	-3.1	.204
Unplanned Hospital Admissions	-2.7	.174	-3.0	.125	-3.3	.133
Outpatient Emergency Department Visits	-0.2	.880	-0.8	.614	-1.4	.329
Ambulance Events	-1.4	.468	-0.2	.287	-3.4	.047**
Total Medicare Fee-for-Service Spending	2.2	.061*	1.9	.098*	1.9	.070*
Days in Long-Term Care	6.1	.101	4.8	.194	2.4	.406
Days in Community	0.4	.253	0.3	.362	0.5	.019**

* p-value <.10. ** p-value <.05. *** p-value <.01.

Percentage Difference is the percentage increase in the average outcome among IWISH residents versus the average outcome among all control group residents for every 1 percentage-point increase in residents at the IWISH properties who participated in the interviews, assessments, or Individual Healthy Aging Plans.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration period in the community was not unusual for residents.

^b Negative percentage differences represent a negative correlation between the percentage of residents at IWISH properties who participated in these core components of the IWISH model and the healthcare use rates among the residents residing at those properties.

Notes: Associations between resident participation in these core components of the IWISH model and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: Abt Associates analysis of program data from the Population Health Logistics system; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; analysis of monthly implementation team reports; HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Exhibit G-2. Associations Between Healthcare Use Outcomes and IWISH Property Ratings for Level of Project Management Involvement and Medication Self-Management Assistance

Outcome ^a	Level of Project Manager Involvement				Medication Self-Management Assistance Rating			
	Not High		High		Not High		High	
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value	Percentage Difference	p-Value	Percentage Difference	p-Value
Days With a Primary Care Visit	8.3	.003***	18.3	.007***	4.5	.155	9.4	.016**
Days of Unplanned Hospitalization	- 9.0	.220	11.3	.588	- 12.2	.163	- 2.9	.775
Unplanned Hospital Admissions	- 10.4	.114	- 10.5	.589	- 20.1	.011**	- 2.5	.781
Outpatient Emergency Department Visits	- 1.5	.740	- 2.5	.854	- 5.8	.254	- 1.7	.792
Ambulance Events	- 5.3	.321	- 5.9	.700	- 11.3	.070*	1.8	.814
Total Medicare Fee-for-Service Spending	8.0	.064*	10.0	.340	10.1	.052*	3.7	.450
Days in Long-Term Care	20.9	.104	1.9	.960	9.9	.501	29.9	.104
Days in Community	2.1	.127	0.5	.736	1.4	.397	2.1	.146

* p-value <.10. ** p-value <.05. *** p-value <0.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

^b Percentage Difference is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents. There were no statistically significant differences in the Percentage Difference estimates, for any outcome, between IWISH properties in the “Not High” and “High” groups.

Notes: Associations between resident participation in these core components of the IWISH model and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: Abt Associates analysis of program data from the Population Health Logistics system; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; analysis of monthly implementation team reports; HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Exhibit G-3. Associations Between Healthcare Use Outcomes and IWISH Property Ratings for Standardized Transitional Care Coordination and Family and Caregiver Interaction

Outcome ^a	Standardized Transitional Care Coordination Rating					Family and Caregiver Interaction Rating				
	Not High		High		Subgroup Difference ^c	Not High		High		Subgroup Difference
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value		Percentage Difference	p-Value	Percentage Difference	p-Value	
Days With a Primary Care Visit	2.1	0.518	12.7	<.001***	Yes**	10.7	.002***	5.2	0.119	No
Days of Unplanned Hospitalization	- 1.8	0.826	- 17.4	.083*	No	- 11.6	0.225	- 5.4	0.538	No
Unplanned Hospital Admissions	- 6.8	0.364	- 20.9	.020**	No	- 15.3	.074*	- 10.0	0.206	No
Outpatient Emergency Department Visits	7.2	0.152	- 12.8	.030**	Yes**	- 0.9	0.87	- 5.2	0.334	No
Ambulance Events	0.4	0.948	- 14.4	.044**	Yes*	1.2	0.858	- 15.5	.017**	Yes*
Total Medicare Fee-for-Service Spending	5.1	0.201	10.0	0.11	No	10.0	0.074	4.4	0.338	No
Days in Long-Term Care	8.5	0.569	26.8	0.122	No	25.3	0.104	13.5	0.401	No
Days in Community	1.2	0.495	1.8	0.232	No	0.6	0.792	1.6	0.185	No

* p-value <.10. ** p-value <.05. *** p-value <0.01.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration in the community was not unusual for residents.

^b Percentage Difference is the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents.

^c Subgroup Difference indicates whether there is a statistically significant difference in the estimated Percentage Difference between IWISH residents at properties in the “Not High” and “High” groups. Asterisks indicate a statistically significant difference between the two estimates at the 5- or 10-percent level.

Notes: Associations between resident participation in these core components of the IWISH model and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents’ healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: Abt Associates analysis of program data from the Population Health Logistics system; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; analysis of monthly implementation team reports; HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Exhibit G-4. Associations Between Healthcare Use Outcomes and the Number of Demonstration Months IWISH Properties Did Not Have a Resident Wellness Director or Wellness Nurse, the Average Number of Visits by All Residents at the IWISH Property, and the Percentage of All Residents at the IWISH Property Who Enrolled in IWISH

Outcome ^a	Number of Months Without a Resident Wellness Director		Number of Months Without a Wellness Nurse		Average Number of Visits by All Residents at the IWISH Property		Percentage of All Residents at the IWISH Property Who Enrolled in IWISH	
	Percentage Difference ^b	p-Value	Percentage Difference	p-Value	Percentage Difference	p-Value	Percentage Difference	p-Value
Days With a Primary Care Visit	1.5	.295	- 0.1	.950	2.2	.018**	- 3.4	.104
Days of Unplanned Hospitalization	- 3.2	.174	- 3.0	.173	- 1.6	.341	- 3.9	.035**
Unplanned Hospital Admissions	- 3.8	.068*	- 4.6	.016**	- 1.7	.266	1.0	.530
Outpatient Emergency Department Visits	- 0.2	.911	0.2	.848	- 0.6	.591	- 1.1	.559
Ambulance Events	- 2.1	.283	- 3.5	.027**	- 0.03	.815	- 1.0	.778
Total Medicare Fee-for-Service Spending	2.1	.068*	1.3	.152	1.0	.228	1.7	.158
Days in Long-Term Care	5.2	.170	- 1.9	.556	3.9	.233	5.0	.213
Days in Community	0.4	.264	0.4	.109	0.2	.299	0.4	.296

* p-value <.10. ** p-value <.05. *** p-value <0.01.

Percentage Difference is the percentage increase in the average outcome among IWISH residents versus the average outcome among all control group residents for every 1 percentage-point increase in the Fidelity Measure.

^a For each outcome except Days in Community, the study team excluded outlier residents whose average outcome during the demonstration was more than 1.5 times the 75th percentile across both the IWISH and control groups. The team did not drop outliers for Days in the Community because spending every day during the demonstration period in the community was not unusual for residents.

^b Negative percentage differences represent a negative correlation between the percentage of residents at IWISH properties who participated in these core components of the IWISH model and the healthcare use rates among the residents residing at those properties.

Notes: Associations between resident participation in these core components of the IWISH model and resident outcomes were estimated using generalized least squares regression with cluster-robust standard errors, interacting the IWISH indicator variable with the selected property or community characteristic and controlling for any observed differences in the characteristics of residents of treatment and control properties. Residents' healthcare use data were censored if the resident exited the property for any reason or when they enrolled in Medicare managed care.

Sources: Abt Associates analysis of program data from the Population Health Logistics system; IWISH staffing data from implementation team monthly reports; responses of interviews with IWISH staff in 2019 and 2020; analysis of monthly implementation team reports; HUD TRACS data, September 2017–December 2020; Centers for Medicare & Medicaid Services, Medicare fee-for-service

APPENDIX G: RESIDENT OUTCOMES AND FIDELITY TO IWISH

claims, October 2017–September 2020; Medicaid fee-for-service claims and managed care encounter records from California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina, October 2017–September 2020; telephone surveys and interviews with Resident Wellness Directors at IWISH properties conducted during the implementation study

Appendix H: Data Sources and Statistical Approach

Administrative Data Sources

The study linked individual-level administrative data from HUD, Medicare, and state (California, Illinois, Maryland, Massachusetts, Michigan, New Jersey, and South Carolina) Medicaid databases to examine the effects of IWISH on housing exits and healthcare use. Exhibit H-1 shows the types of data collected and their purpose in the impact study.

Exhibit H-1. Impact Study Data Sources

Data Source	Type of Data	Purpose
HUD Data		
Tenant Rental Assistance Certification System (TRACS)	Demographic data on residents of IWISH properties and control properties; housing assistance dates	To determine dates of housing starts and exits, dates of death, demographics; to link individuals to Medicare, Medicaid, and publicly available data
Real Estate Assessment Center (REAC) Physical Inspection Reports	Physical property inspections of multifamily HUD-assisted housing properties	To explore how outcomes might be related to variation in the physical condition of the properties where treatment and control group members live
Medicare Data		
Medicare Beneficiary Summary Files	Medicare beneficiary enrollment, chronic and potentially disabling conditions, and annual cost & use information	To build the study sample for analyzing healthcare use, characterize residents' Medicare enrollment patterns, and examine the prevalence of chronic or potentially disabling conditions
Medicare Fee-For-Service claims (Parts A and B)	FFS beneficiary identifiers, providers of service identifiers, dates of service, diagnosis codes, procedure codes, and fee-for-service payments	To construct outcome measures related to healthcare service use and Medicare spending
Medicare Prescription Drug Events (Part D)	Part D drug identifiers, quantities dispensed, dispense dates, and reimbursement amounts for all drugs dispensed outside an inpatient or outpatient setting and covered by a beneficiary's prescription drug plan	To construct outcome measures related to healthcare spending
Minimum Data Set 3.0	Nursing home resident assessments	To identify residents who exit properties and transition to institutional long-term care; to calculate days admitted to institutional long-term care
Medicaid Data		
Medicaid Fee-For-Service Claims and Managed Care Encounter Data	Medicaid beneficiary identifiers, providers of service identifiers, dates of service, diagnosis codes, procedure codes, drug identifiers, quantities dispensed, dispense dates, and fee-for-service payments	To construct outcome and intermediate measures related to Medicaid enrollment, chronic conditions, healthcare service use, spending, and transitions and days admitted to institutional long-term care

Experimental Sample

Residents of SSD Properties at Launch of Demonstration

A “clustered” trial randomizes groups of study members (in this instance, by property) rather than randomizing individual study members (residents of a property). Cluster-randomized controlled trial designs provide an unbiased estimate of a program’s impact on individual-level outcomes when randomization of individuals within groups would be impractical, unethical, or impossible. Unbiased impact estimates are assured if the impact study is based on all residents of the properties at the time they were randomized or a random sample of them. To ensure that the sample of residents is not contaminated by non-random entry of new residents across properties, the experimental method would restrict the study sample to individuals residing at IWISH and control properties at the start of the demonstration, October 1, 2017. The study team relaxed this sample restriction, however, and expanded the experimental sample to include all individuals who lived at an IWISH or control property between October 1, 2017, and September 30, 2018. The *First Interim Report* showed how the distributions of baseline resident characteristics were still similar between the IWISH and control groups when residents who moved in during the demonstration were included.

(https://www.huduser.gov/portal/publications/IWISH_FirstInterimReport.html).

Medicare Beneficiaries Enrolled in Managed Care

Medicare managed care encounter data were not available for the entire demonstration period at the time the study team requested the data for the impact study. Preliminary data for 2019 were released after the final extract of Medicare administrative data for the impact study had been received. Because the team did not have complete information on the healthcare use spending for Medicare beneficiaries enrolled in Medicare Part C (Medicare Advantage), the analyses of healthcare use were restricted to Medicare beneficiaries residing at IWISH and control properties who were continuously enrolled in Medicare Parts A and B (i.e., a Medicare fee-for-service plan) for at least 6 months after their baseline date. Residents who were not enrolled in Medicare because they were not eligible but who were continuously enrolled in Medicaid, with full coverage, for at least 6 months after baseline were also included.

Experimental and Quasi-Experimental Analysis

IWISH was intended for residents of HUD-assisted properties age 62 or older or individuals in households headed by a person age 62 or older. Outreach activities by IWISH staff were targeted to those residents, but the program was open to any individual willing to enroll. Enrolling in IWISH and participating in any IWISH activity were completely voluntary for residents. Residents who did not enroll in IWISH could not access the annual health and wellness assessment, individualized goal setting through Individual Healthy Aging Plans, and one-on-one assistance from the Wellness Nurse, but they could receive general information, referrals, and assistance from the Resident Wellness Director; participate in group wellness programs and activities; and receive the same level of service coordination they previously received if the property already had a Service Coordinator.

The impact evaluation included two types of analyses to examine the overall impact of the IWISH model: intent to treat (ITT), which estimates the impact of *offering* housing-based supportive services under the IWISH model, and treatment on the treated (TOT), which estimates the impact of choosing to enroll in the IWISH model. Those analyses are described below.

Intent to Treat Analysis

ITT analyses compare outcomes for *all residents* of the treatment and control group properties and are the main set of analyses for the impact study. Specifically, the comparison is between the following two groups:

- Individuals 62 years or older who were living at an IWISH property as of October 1, 2017, or moved in by September 30, 2018, regardless of whether they formally enrolled in the IWISH program or participated in IWISH activities.
- Individuals 62 years or older living at an active or passive control group property as of October 1, 2017, or moved in by September 30, 2018.

Treatment on the Treated Analysis

TOT analyses estimate the effects of choosing to enroll in the IWISH model. The study team defined individuals as always enrolled regardless of the date on which they enrolled. TOT effects were estimated using instrumental variable methods (Luca and Cole, 2017). The instrumental variable estimator uses the variation in participation that is induced by the random assignment of properties (or “clusters”) to the IWISH and control groups to estimate the impacts of participation on outcomes. It is often expressed as a two-stage model: the first stage predicts enrollment based on data collected at the individual level at IWISH sites; the second stage estimates the effect of the TOT using the generalized linear regression models of resident outcomes but replaces the binary treatment variable with each individual’s predicted probability of participating in the IWISH model. The first- and second-stage regressions controlled for the same set of imbalanced variables the study team controlled for in their main generalized linear regression models. The generalized linear regression models and the steps for this two-staged instrumental variable approach are described below.

Multivariate Regressions

The experimental approach will estimate the effect of IWISH on healthcare use and costs using multivariate generalized linear models (GLMs) of the type specified in equation 1 below.

$$E(Y_{ij}|W_{ij}, X_i) = f(\alpha + \delta W_{ij} + \Gamma_1 X_i) \quad (1)$$

Y_{ij} represents the outcome of resident i at property j , and W_{ij} is an indicator for residing at an IWISH property. The estimated coefficient δ captures the impact of IWISH on the outcome. Covariate matrices X_i include baseline resident characteristics, which reduce the variance of δ and control for potential confounding factors that are imbalanced across the IWISH and control groups; Γ_1 is a vector of estimated coefficients on those covariates. The function $f(\cdot)$ is the inverse link function appropriate for the distribution of the outcome. For instance, the identity function, $f(x)=x$, might be appropriate for linear regression of a continuous outcome; the inverse logit function, $f(x)=\exp(x)/[1+\exp(x)]$, appropriate for a binary outcome, or an exponential function; $f(x)=\exp(x)$, with a log link, appropriate for count or nonnegative outcomes.

With a cluster-randomized controlled trial design, outcomes are assumed to be correlated among residents of property j but independent across properties. All estimates in the impact study use cluster-robust standard error estimators to assure valid inferences in the presence of intra-cluster correlation with an unknown distribution (Kezdi, 2004; Nichols and Schaffer, 2007).

To estimate the impact of IWISH on housing exits, mortality, and transfers to an institutional setting for long-term care, the study team used a semi-parametric discrete-time model estimated with logistic regression (Jenkins, 1995), which models outcomes similar to the multivariate model expressed by the generic regression equation above.

Longitudinal Analysis

The main set of analyses for the impact evaluation focuses on the cumulative impact of IWISH on healthcare use over the demonstration period. However, the team also conducted analyses that examine the impact of IWISH over 3 years to see whether there was a multiyear relationship between supportive services provided through IWISH and residents' healthcare use and spending. The cumulative effects of the IWISH program may not have immediately impacted residents' use of healthcare services or may have had a greater impact over time. Equation 1 was modified to test for a nonlinear effect over 3 years. (The first year begins at each resident's baseline date. The baseline for those who moved to the IWISH or control properties after September 30, 2017, was the date they moved to the property.)

Let T_t be a vector of indicators equal to 1 in year t and zero otherwise. The GLM can be modified as in equation 2.

$$E(Y_{ijt}|W_{ij}, T_t, X_i) = f(\alpha + \delta_t(W_{ij} \times T_t) + \Gamma_1 X_i) \quad (2)$$

Here, Y_{ijt} is the outcome of resident i at property j in year t . The estimated vector of coefficients δ_t captures the impact of IWISH in each year t . The cluster-robust standard error estimator still ensures valid inferences in the presence of both intra-cluster correlation and serial correlation of outcomes due to repeated measurements for each resident (Nichols and Schaffer, 2007).

Instrumental Variable Approach to TOT Analysis

The instrumental variable (IV) approach was used to estimate the effect of IWISH on healthcare use and spending by residents who enrolled in the program (i.e., the local average treatment effect). The IV estimator is produced by using multivariate regressions estimated in two stages to control for baseline characteristics of the residents that could influence both their decision to enroll in IWISH and their outcome (Angrist and Imbens, 1995). Luca and Cole (2017) provide an excellent summary of a mathematical derivation of the IV estimator, and the description below borrows heavily from their description of the two-stage approach to estimation.

Using the notation above, W_{ij} is an indicator for whether property j was randomly assigned to the treatment group. Let D_i be an indicator for whether resident i enrolled in IWISH. In an IV framework, the IV is W_{ij} which affects enrollment, D_i , which in turn affects the resident's outcome, Y_{ij} . Let covariate matrices X_i include baseline resident characteristics that could influence enrollment and outcomes, and the vector Γ_1 represents the coefficients on those covariates. The structural equation of interest is

$$E(Y_{ij}|D_i, X_i, Z_j) = f(\alpha_3 + \lambda D_i + \Gamma_1 X_i). \quad (3)$$

Stage 1: Logistic regression is used to model enrollment in IWISH as a function of the instrument (i.e., assignment to the treatment group) and other exogenous covariates. The regression can be written as follows:

$$E(D_i|W_{ij}, X_i, Z_j) = f(\alpha_4 + \gamma W_{ij} + \Pi_1 X_i) \quad (4)$$

The estimated coefficient γ is referred to as the “first-stage effect” of the instrument and will approximately measure the proportion of the sample that enrolled in IWISH. Note that the covariate matrices X_i must be exactly the same as the covariate matrices in equation 3. The vector Π_1 is the set of coefficients on those covariates.

Stage 2: Fitted values from the first stage (the predicted probability that resident i enrolled in IWISH) are plugged directly into equation 3 in place of D_i , the indicator for whether the resident enrolled in IWISH. The estimated coefficient λ is the treatment effect of interest.

To ensure that the correct standard errors are computed, all two-stage estimation procedures were bootstrapped (Boos, 2003) based on 1,000 iterations (i.e., random draws from the sample, with replacement).

Sensitivity Analyses

The study team tested whether their findings differed from the main estimates of IWISH’s cumulative effects on healthcare use when they—

- Did *not* risk-adjust their comparisons to control for small imbalances in certain characteristics of the randomized IWISH and control groups.
- Weighted the treatment and control groups to adjust for potential differences in sample attrition due to mortality (discussed below).
- Weighted the treatment and control groups to adjust for the probability of sample attrition for any reason, including mortality.
- Calculated each resident’s healthcare use over the entire demonstration period to follow patterns in their healthcare use regardless of whether they moved out during the demonstration.

Appendix C, exhibit C-4 presents the results of those sensitivity analyses.

Sample Attrition

IWISH is intended to address the unmet needs of low-income older adults and motivate residents to take steps to improve their health and well-being. So, it was reasonable to hypothesize that a disproportionately smaller share of residents at IWISH properties would exit the study because of death relative to residents at control properties. Estimates of IWISH’s average impact on cumulative healthcare use and spending could be biased if the residents at IWISH properties are less likely than residents at control properties to die before the end of the 3-year observation period, a common concern when estimating treatment effects in a population with a non-negligible mortality rate, such as an elderly population. (The impact study found that IWISH and control residents were equally likely to die at any time during the demonstration).

As part of the sensitivity analysis, the study team conducted an additional set of analyses to examine the extent to which sample attrition due to mortality (i.e., truncation by death) may have biased the estimated impact of IWISH on healthcare use and costs.³⁵ Multiple statistical approaches have been proposed to

³⁵ A change in Medicare coverage is another potential source of attrition from the sample, as some residents might switch from Medicare FFS coverage to managed care plans offered under Medicare Part C. Those residents would be lost to follow up because the study team will not have complete information on their use of healthcare services (i.e., “administrative censoring”). Hazard models inherently address censoring of any kind but

estimate treatment effects when outcomes are truncated by death (Kurland et al., 2009). We chose to use a straightforward approach proposed by Hayden, Pauler, and Schoenfeld (2005), which makes use of baseline characteristics of the residents to weight observations by the likelihood the person would have survived had they been randomized to the other arm of the experiment. Specifically, this approach uses logistic regression to estimate the probability of survival among residents in the treatment group and the control group, respectively. The outcomes of residents in the treatment group are weighted by the fitted probabilities of survival calculated using the model that was estimated for the control group. The outcomes of residents in the control group are weighted by the fitted probabilities of survival calculated using the model that was estimated for the treatment group. The robust variance estimator appropriately adjusted standard errors and confidence intervals.

Subgroup Analysis

Experimental analyses were used to test for heterogeneous treatment effects across subgroups of residents identified at baseline (race and ethnicity, age group, household size, length of tenure, and high versus low use of healthcare services). Equations 1 and 2 were expanded to explore heterogeneity in IWISH's impact across subgroups by estimating coefficients on interactions of W_i and specific baseline covariates in vectors X_i . The study team estimated each outcome and category of subgroups separately, adjusting the estimates for the same set of variables that were adjusted for in the main analysis; then, for each subgroup, the team calculated the percentage difference in the average outcomes between IWISH and control group residents in that subgroup.

Nonexperimental Analysis

Nonexperimental Analysis of the Association Between IWISH's Impacts and Implementation of IWISH Core Components

The study team conducted nonexperimental analyses to examine how outcomes may be associated with different levels of fidelity to the IWISH model across IWISH properties. Measures of fidelity to the IWISH model were identified for IWISH properties during the demonstration using qualitative data collected in the implementation study; therefore, the team did not have the same data for the control properties. The data include some measures that could have been influenced by the outcomes of residents at the properties throughout the demonstration, hence they are potentially endogenous in the models of individual outcomes in this study. The estimated relationships between fidelity to the IWISH model and resident outcomes are only correlations and not evidence of a causal relationship, but they can suggest which aspects of the IWISH model could have greater potential to result in positive changes in residents' health and well-being or in what context the IWISH model has the most effect.

Equation 1, above, was expanded to explore heterogeneity in IWISH's impact across residents at properties with different levels of fidelity to the IWISH model. The study team removed the binary treatment variable from the GLM equations and estimated coefficients on interactions of W_i (the treatment variable) with continuous or categorical variables that measure how certain aspects of the IWISH model were implemented at the IWISH properties during the first 3 years of the demonstration. The team estimated each outcome and implementation measure separately, controlling for baseline

generalized linear models do not. The technical expert panelists discounted concerns over the possibility of administrative censoring because it is likely to be infrequent in this small sample of low-income elderly individuals and is likely to occur randomly. The panelists raised more concern over the more common issue of "truncation by death." Nonetheless, the sensitivity analyses include models that adjust estimates for sample attrition due to mortality and due to any reason.

covariates in vector X_i that were imbalanced across the treatment and control groups. For categorical measures of fidelity, the study team calculated the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents. For continuous measures of fidelity, the team calculated the percentage increase in the average outcome among IWISH residents compared with the average outcome among all control residents for every 1 percentage-point increase in the fidelity measure.

Nonexperimental Analysis of the Association Between IWISH's Impacts and Property and Neighborhood Characteristics

The study team also conducted nonexperimental analyses to examine how outcomes may be associated with property and neighborhood characteristics (listed in appendix F, exhibit F-1) that might influence residents' outcomes, directly or indirectly, by influencing how IWISH was implemented at the property. Most of those potential factors were identified for IWISH properties during the demonstration using qualitative data collected by the implementation study, and the study team did not have the same data for the control properties. The results of those analyses also should be viewed only as associations between the property and neighborhood characteristics and resident outcomes, not a causal relationship, but the analyses will help the team understand under which contexts the IWISH model could be more or less successful in affecting resident tenure or healthcare use.

Equation 1, above, was expanded to explore heterogeneity in IWISH's impact across residents at properties with different characteristics or in different neighborhoods. The study team removed the binary treatment variable from the GLM equations and estimated coefficients on interactions of W_i (the treatment variable) with continuous or categorical variables for the characteristics of the IWISH properties or neighborhoods. The team estimated each outcome and implementation measure separately, controlling for baseline covariates in vector X_i that were imbalanced across the treatment and control group. For categorical characteristics, the team calculated the percentage difference in the average outcome between IWISH residents in each category and the average outcome for all control residents. For continuous characteristics, the study team calculated the percentage increase in the average outcome among IWISH residents compared with the average outcome among all control residents for every 1 percentage-point increase in the characteristic.

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U.S. Department of Housing and Urban Development
Office of Policy Development and Research
Washington, DC 20410-6000



June 2023