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## AGING &amp; HEALTH

# Medicare Beneficiaries Living In Housing With Supportive Services Experienced Lower Hospital Use Than Others

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**ABSTRACT** There is strong evidence that housing conditions affect population health, but evidence is limited on the extent to which housing with supportive social services can maintain population health and reduce the use of expensive hospital services. We examined a nonprofit, community-based program in Queens, New York, that supplied affordable housing with supportive social services to elderly Medicare beneficiaries. We evaluated whether this program reduced hospital use, including hospital discharges for ambulatory care–sensitive conditions (ACSCs). We compared hospital use among an intervention group residing in six high-rise buildings in two neighborhoods to that among their Medicare counterparts living in the same neighborhoods but in different buildings. We found that hospital discharge rates were 32 percent lower, hospital lengths-of-stay one day shorter, and ACSC rates 30 percent lower among residents in the intervention group than among people in the comparison group. This suggests that investments in housing with supportive social services have the potential to reduce hospital use and thereby decrease spending for vulnerable older patients.

Federal and state governments in the US are pursuing several strategies to improve access to primary care and coordination of health services. An important metric of progress in meeting these objectives is the extent to which service providers can reduce hospital discharge rates for ambulatory care–sensitive conditions (ACSCs) among beneficiaries of Medicare and Medicaid. Programs designed to achieve that goal include the Hospital Readmissions Reduction Program;<sup>1,2</sup> accountable care organizations;<sup>3,4</sup> the Support and Services at Home (SASH) program;<sup>5</sup> and many Medicaid waiver programs, including New York State’s Delivery System Reform Incentive Payment waiver.<sup>6</sup> All of these programs seek to reduce rates of ACSC

hospitalizations and other avoidable hospitalizations by coordinating health and social services. The use of housing with supportive social services is one component of these efforts. We use the term *housing with supportive social services* to distinguish the housing program we examine here from supportive housing, which is provided specifically for the formerly homeless population.<sup>7</sup>

These strategies—translated into specific policies and demonstration projects—assume that programs designed to provide social support, care management, and referral services can improve health status and reduce hospital use among people ages sixty-five and older. For example, Taressa Frazee and colleagues found that accountable care organizations often assist pa-

tients with transportation, housing, and food in an effort to address their needs and reduce hospital use.<sup>8</sup> Along with the development of these organizations, leaders in population health departments of academic medical centers typically call for hospitals to look “upstream” at the social determinants of health.<sup>9</sup>

Recent studies provide further evidence that social services matter. Medicare beneficiaries enrolled in the Supplemental Nutrition Assistance Program are less likely than beneficiaries who were eligible for but not enrolled in the program to be hospitalized and less likely to enter a nursing home in the following year.<sup>10–12</sup> Elizabeth Bradley and colleagues note that people in countries where spending on social services, as a share of gross domestic product, exceeds that on health care enjoy longer life expectancy at birth.<sup>13</sup> Likewise, in comparisons of US states, superior population health status is strongly correlated with a higher ratio of spending on social to health care services.<sup>14</sup>

In this article we compare hospital use among Medicare beneficiaries ages sixty-five and older who lived in six buildings of affordable housing with supportive social services to that of their Medicare counterparts who lived in the same neighborhoods but not in one of these buildings. (According to the Department of Housing and Urban Development, housing is considered affordable when a household spends no more than one-third of its income on rent.)<sup>15</sup> Our examination of the relationship between housing with supportive social services for older people and their use of hospital services contributes to the growing literature on how social factors and a “culture of health” affect the use of hospitals.

## Impact Of Housing With Supportive Social Services

Housing can have an important effect on health status and the use of health care services.<sup>16</sup> Under President Barack Obama, the Department of Housing and Urban Development sought to implement “health in all policies.” As part of this effort, the department set out to consider the health effects of any decisions or policies regarding public housing.<sup>17</sup> Poor-quality housing has a deleterious effect on the health of children, and improvements in housing quality can improve their health status and reduce their use of hospital services.<sup>18</sup>

Studies suggest that affordable housing may provide older people and others living with chronic illnesses and disabilities with “a stable and efficient platform for the ongoing delivery of health care and other necessary services.”<sup>19</sup> Linking affordable housing to supportive services

allows older people to remain in their homes as they age and may improve their ability to access health and social services.<sup>20–22</sup>

For example, there is evidence that housing with supportive social services can result in “health activation”—that is, knowledge, confidence, and skills related to health and the ability to seek health care.<sup>23–26</sup> Activated patients are more likely than others to seek disease prevention and health promotion services, participate in health care decision making, and adhere to treatment regimens.<sup>23</sup>

To date, few studies have explored whether social services for older residents, provided as part of supportive housing, can alter patterns of hospital use. The SASH program, implemented in Vermont in 2011, connects residents of affordable housing with community-based services and attempts to coordinate their health care services.<sup>5</sup> An evaluation by the Office of the Assistant Secretary for Planning and Evaluation in the Department of Health and Human Services found that participants in this program had better self-reported health, lower rates of hospitalization, and slower rates of growth for hospital and specialty physician costs than a comparison group did. Similarly, a recent study found that a service-enriched housing program in Denver, Colorado, improved access to health insurance and resulted in a decline of emergency department visits and hospitalizations.<sup>27</sup> However, the Denver study, based on self-reported survey data, had no control group. Nor did it examine indicators that could plausibly be linked to evidence on the appropriate use of ambulatory health care and social services.

Our analysis builds on initial findings in the literature and identifies opportunities for federal and state governments to reduce hospital use by providing affordable housing with supportive social services for older people. We examined hospital use among Medicare beneficiaries ages sixty-five and older who lived in affordable housing with supportive social services (our intervention group) and all of their Medicare counterparts who lived in the same neighborhoods but in different housing arrangements (our comparison group).

This design allowed us to hold constant well-known differences in the health care delivery system among different neighborhoods. Moreover, we held constant the definition of *supportive social services*, which also varies among geographic areas and programs. Finally, we held constant differences in neighborhood characteristics (for example, walkability and crime rate) that could explain the differences in hospital use.

## The Selfhelp Active Services For Aging Model Program

The housing program we studied is operated by Selfhelp Community Services in the New York City region. Currently, Selfhelp operates programs for older people in twenty-seven sites across Manhattan, Brooklyn, Queens, and the Bronx and Nassau Counties. Programs include senior centers; naturally occurring retirement communities; case management programs; programs for Holocaust survivors; home health aide training; and nine affordable apartment buildings, most of which are high rises of twelve to fifteen stories.

During 2014, the year for which we examined Medicare data on hospital use, Selfhelp operated six affordable apartment buildings for people ages sixty-five and older in two ZIP codes in Queens (11355 and 11360). All residents of these buildings (the intervention group), had access to Selfhelp's affordable housing program with supportive social services, called the Selfhelp Active Services for Aging Model (SHASAM). Candidates for residency in these buildings are assessed based on age and income. For eligible candidates, there is a waiting list. Apartments are made available on a first-come, first-served basis. Just over 98 percent of residents in the six buildings were eligible for Medicare. We excluded the remaining residents because they were recent immigrants not eligible for Medicare.

The SHASAM program is designed to strengthen the ties among residents and between residents and on-site social workers. At residents' request, services are delivered by community-based providers, including SHASAM staff members. Requests for assistance from residents are never denied. All of the programs and services provided directly through SHASAM, including referral services by its social work staff, are available to all building residents. Additional public services—including Medicaid-funded home care services and supports, the Supplemental Nutrition Assistance Program, and other federal- and state-funded programs—are available to those who are eligible for them.

Services provided by Selfhelp staff members are, as noted above, available to all residents of the six buildings. However, they are not available to Medicare beneficiaries living in the same two ZIP codes but in different buildings. The services include personal, functional status, and psychological assessments; counseling and advocacy; health education; wellness programs; physical activity programs; socialization; evaluation for and referral to public benefits and entitlements; evaluation and referral for mental health concerns; and educational programs to control chronic disease. In addition, at residents'

request, Selfhelp provides several cutting-edge technologies for in-home safety. They include motion detectors that identify aberrations in usual activity patterns and can trigger calls from social work staff members to check on residents, in-home telehealth systems that allow residents to check their vital signs, and a virtual senior center. The latter is an innovation that provides each homebound participant with a touch-screen device that allows them to attend interactive, video-based classes and offers face-to-face connection with peers. It also allows them to remain connected to family members by offering simplified access to Skype and helps users access the Internet, email, and online games.

All of these services and programs provided by SHASAM staff members are financed by a combination of excess revenue after the payment of all expenses and grants from foundations and corporate sponsors. There are no additional charges for these services, none of which is financed by Medicare, Medicaid, or any other government insurance program.

Residents also have access to lists of service providers in the surrounding community from which they can choose transportation, home care, pharmacy, or physician services. Residents living in five of the six buildings are in close proximity to a federally qualified health center in Flushing—which is next to one of the buildings, across the street from a second, one block from a third, and approximately three blocks from the other two. This facility provides disease prevention and primary care services designed to help its patients age at home, remaining independent and enjoying a higher quality of life. It is open to all residents of the neighborhood.

SHASAM staff inform building residents about available services in three ways. First, when a person moves into one of the six buildings, a SHASAM social worker meets with the new resident and informs them about available services. Second, social work offices are located on the ground floor of each building, and residents are encouraged to contact staff members to address their needs and questions. Third, the social work staff make regular presentations at tenant meetings and post fliers with information about activities and events.

To summarize, although the SHASAM program does not track the use of its wide range of specific services available to building residents, the program's social work staff is confident that most residents rely on at least some of these services. Moreover, most residents start using publicly financed social services they may have been unaware of before moving to the Selfhelp buildings.

## Study Data And Methods

**HYPOTHESES** We expected hospital use (measured as total discharge rates), hospital lengths-of-stay, and rates of discharge for ACSCs to be lower among the intervention group than among our comparison group. We also expected to see lower odds of ACSC rates among the intervention group, after we controlled for age, race, sex, and ZIP code of residence.

**STUDY POPULATION** To assess whether SHASAM succeeded in reducing hospital use and discharges for ACSCs in the intervention group, we compared the outcomes of that group (1,248 Medicare beneficiaries ages sixty-five and older who resided in the six Selfhelp affordable housing buildings that offer the SHASAM program) and those of our comparison group (15,947 other Medicare beneficiaries ages sixty-five and older who lived in other buildings in the same ZIP codes). All of the residents in the six Selfhelp buildings—98 percent of whom were Medicare beneficiaries—were served by the SHASAM program. Compared to their Medicare counterparts in the same ZIP codes, they were slightly older (median age: eighty versus seventy-four) and less likely to identify as non-Hispanic Asian (54 percent versus 56 percent).

**DATA AND OUTCOME MEASURES** We relied on a retrospective analysis of Medicare claims data from 2014. Specifically, we used Medicare Inpatient, Carrier, and Vital Status Files from the Centers for Medicare and Medicaid Services. The Vital Status File includes the address for each beneficiary. Using this file, we created a dummy variable that identified every Medicare beneficiary living in one of the six Selfhelp buildings in the two ZIP codes, all of whom were served by the SHASAM program. This method allowed us to create two mutually exclusive groups of Medicare beneficiaries ages sixty-five and older living in the two ZIP codes. Our three outcome measures were total hospital discharge rates, lengths-of-stay, and rates of discharges for ACSCs.

ACSC discharge rates are a widely used measure of access to timely and effective ambulatory care services that are known to control the exacerbations of chronic conditions that often result in acute hospital admissions if left uncontrolled—for example, hypertension and complications of diabetes and congestive heart failure. To calculate these rates, we used the definition proposed by the Agency for Healthcare Research and Quality, which has been validated by previous studies.<sup>28–31</sup> In calculating total hospital discharge rates and discharge rates for ACSCs, we relied on census data for our population denominators.

**ANALYTIC STRATEGY** We calculated total hospi-

tal discharge rates per 1,000 Medicare beneficiaries in the zip code for the intervention and comparison groups. In addition, we used a binary logistic regression model in which the dependent variable was an ACSC discharge and the independent variables were age, sex, race/ethnicity, and a dummy variable for ZIP code of residence (ZIP code 11360 was the omitted category).<sup>32</sup>

**LIMITATIONS** Our study had several limitations. First, we were unable to account directly for any effect of different disease prevalence rates between the intervention and comparison groups on hospital use, length-of-stay, and ACSC rates, but previous research suggests that this is unlikely to explain the differences we observed.<sup>28–31,32</sup>

Second, because residents of Selfhelp buildings were older than their counterparts and less likely to identify as non-Hispanic Asian, we would expect ACSC rates to be higher in the intervention group: Previous research has found that ACSC rates are correlated with age, and people who self-identify as non-Hispanic Asian have lower ACSC rates than other groups do. Similarly, the race/ethnicity and sex effects we observed may be the result of patients' adherence to clinical recommendations or care-seeking behavior. It is also possible that physicians may influence these rates.

Third, it is possible that unobserved differences between those who self-select into Selfhelp affordable housing and those who do not, rather than the SHASAM program, which offers supportive services, may explain the differences in hospital use. One reason why it is difficult to determine whether participation in the program was responsible for lower rates of hospitalization is that many of the same publicly available services, including a senior center and the nearby federally qualified health center, are available to residents of the Selfhelp buildings and their counterparts in the community.

Fourth, we had no information about whether members of the comparison group participated, through other organizations, in programs that were comparable to those offered by SHASAM social work staff members—including the assessments, counseling services, health and wellness classes, virtual senior center, and telehelp program, which provides building references with information about available programs. The availability of these services and access to social work staff in the Selfhelp buildings make it more likely that their residents used such services than do members of the comparison group. Nevertheless, because we did not have information on use rates of these supportive services by Selfhelp residents, we could only loosely tie the lower

rates of hospitalization in the intervention group to the availability of those services.

Fifth, even if lower hospital use among residents of the Selfhelp buildings could be attributed to SHASAM, we could not disentangle the effects of access to affordable housing from those associated with the supportive services.

Sixth, our study focused on the only two New York City neighborhoods in which Selfhelp operated the SHASAM program. Neither Selfhelp site is representative of national housing programs with supportive social services, nor of beneficiaries of such programs nationwide. Nevertheless, by comparing hospital use among two groups of Medicare beneficiaries living in the same neighborhoods, we were able to hold constant differences in the local health care delivery system, including the numbers and types of ambulatory care facilities and providers, and other neighborhood-level physical and social characteristics (for example, access to transportation, walkability, and crime rate)—all of which might affect access to services.

Seventh, the SHASAM program does not compile data about the use of individual supportive social services by residents. We know that the supportive social services offered directly by SHASAM are available only to the residents of the six buildings we identified and could not be accessed by other residents of these ZIP codes. In

addition, because Selfhelp building residents have access to social work staff on the ground floor of each building, it is reasonable to assume that the staff's presence encourages residents to use publicly available services more than would be the case among residents in the surrounding community.

## Study Results

**HOSPITAL DISCHARGE RATES** We found that in 2014, among the 1,248 Medicare beneficiaries in our intervention group, the total hospital discharge rate was 88.1 per 1,000 beneficiaries in the ZIP code, 32 percent lower than the rate among the 15,947 beneficiaries in our comparison group (129.4 per 1,000) (exhibit 1).

**HOSPITAL LENGTH-OF-STAY** Among hospitalized Medicare beneficiaries, the mean length-of-stay among residents in our intervention group was 6.38 days, one day shorter than that among our comparison group. Despite high standard deviations (5.00 days for the intervention group and 9.23 days for the comparison group), these differences were significant ( $p < 0.05$ ) (data not shown).

**AMBULATORY CARE-SENSITIVE CONDITION RATES** We found that the rate of hospital discharge for ACSCs among the intervention group was 15.2 per 1,000 people, 30 percent lower than that among our comparison group (21.6 per 1,000) (exhibit 1).

**MULTIPLE LOGISTIC REGRESSION ANALYSIS** We conducted a multivariate logistic regression using ACSC discharge as the dependent variable and controlling for age, sex, and ZIP code of residence. The odds of being discharged for an ACSC were more than 43 percent lower among the intervention group than among the comparison group, a significant difference (exhibit 2).

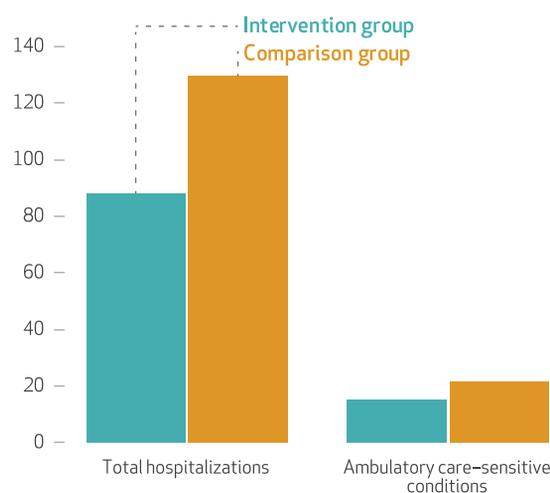
As previous studies of ACSCs in New York City have found, non-Hispanic blacks and Hispanics were more likely to be hospitalized for these conditions than non-Hispanic whites were.<sup>31,33,34</sup> Similarly, older residents were slightly more likely to be hospitalized than younger residents, while women were less likely to be hospitalized than men. ZIP code of residence had no significant effect.

## Discussion

Medicare beneficiaries who resided in the six Selfhelp buildings with the SHASAM program had lower rates of hospital discharges overall and discharges for ambulatory care-sensitive conditions, as well as shorter hospital lengths-of-stay, compared to their counterparts who lived in the same ZIP codes of Queens but in

### EXHIBIT 1

**Total hospital discharges and discharges for ambulatory care-sensitive conditions among Medicare beneficiaries ages 65 and older, by study group, 2014**



**SOURCE** Authors' analysis of data for 2014 from the Centers for Medicare and Medicaid Services. **NOTES** Total hospital discharge and hospitalization for ambulatory care-sensitive condition rates were per 1,000 Medicare beneficiaries in the ZIP codes. Members of the intervention and comparison groups lived in ZIP codes 11355 and 11360 in Queens, New York. Differences between the groups were significant ( $p < 0.01$ ).

**EXHIBIT 2****Characteristics associated with hospital discharge for ambulatory care-sensitive conditions among all Medicare beneficiaries ages 65 and older in the study area**

Independent variable	Coefficient	SE	p value	Odds ratio
Selfhelp resident (omitted: non-Selfhelp resident)	-0.574		0.019	0.564
Age (continuous)	0.050	(0.0006)	0.000	1.051
Female (omitted: male)	-0.194	(0.108)	0.074	0.824
Race/ethnicity (omitted: white)				
Non-Hispanic Black	0.737	(0.214)	0.001	2.090
Hispanic	0.697	(0.221)	0.002	2.007
Other	0.115	(0.014)	0.000	1.1215
Non-Hispanic Asian	0.471	(0.145)	0.001	0.625
ZIP code of residence (omitted: ZIP code 11360)	-0.000	(0.000)	0.206	1.051
Constant	-10.801	(0.552)	0.000	0.000

**SOURCE** Authors' analysis of data for 2014 from the Centers for Medicare and Medicaid Services. **NOTES** The exhibit shows logistic regression results. The dependent variable was discharges for ambulatory care-sensitive conditions. The study area is ZIP codes 11355 and 11360 in Queens, New York. Selfhelp is the name of an organization offering housing with supportive services to eligible residents ages sixty-five and older. SE is standard error.

### non-Selfhelp buildings.

The results of our multiple logistic regression analysis of factors associated with ACSC rates were striking. Even after we controlled for age, sex, race/ethnicity, and ZIP code of residence, the odds of being hospitalized for an ACSC were about 43 percent lower among Medicare beneficiaries residing in the Selfhelp buildings with the SHASAM program than among their counterparts in the comparison group.

The strength of our study lies in its comparing hospital use among Medicare beneficiaries living in affordable housing with supportive services, managed by Selfhelp's SHASAM program, with that among their counterparts living in different housing arrangements within the same neighborhoods. The study design limited, but did not exclude, the possibility that differences in the quality of the housing with supportive social services, the health care delivery system, or other neighborhood characteristics contributed to the disparities in hospital use.

Given the emphasis placed by the Centers for Medicare and Medicaid Services and New York State on reducing ACSC hospitalization rates,<sup>1-6</sup> this finding has important implications. As with other recent studies noted above, it suggests that increased investment in upstream social determinants of health can reduce rates of hospital use for conditions that could be managed in an ambulatory setting so as to reduce the likelihood of exacerbations that require hospitalization.

## Conclusion

There is substantial evidence that social factors, including housing, influence health status,

health services use, and health care spending. There is growing evidence that linking affordable housing to supportive services may improve the ability of older people to age in place and lead to more appropriate use of health and social services. Our study contributes to this literature by comparing hospital use among Medicare beneficiaries ages sixty-five and older who lived in six affordable housing buildings with supportive social services to that among their Medicare counterparts living in the same neighborhoods but in buildings without those services. We found that Medicare residents in the affordable housing with supportive services experienced significantly lower hospital use than their counterparts did.

These findings offer further evidence that providing affordable housing and social services may improve health and the use of health care services among older people. Yet we recognize that our evidence is limited. Future research should more directly compare the use of specific social services by older people living in housing with supportive services to the use of such services by older people living in other housing arrangements. Also, studies should continue to examine the use of health services among older residents in affordable housing without supportive services to that use among their counterparts in housing that includes supportive services. The growing body of evidence to which our study contributes and efforts by policy makers to encourage health system investments in the social and economic determinants of health support the case for funding more research to improve understanding of these issues. ■

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