

Senior PharmAssist: Less Hospital Use with Enrollment in an Innovative Community-Based Program

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OBJECTIVES: To evaluate changes in acute health services use of Senior PharmAssist participants.

DESIGN: Retrospective analysis.

SETTING: Community-based, nonprofit program in Durham County, North Carolina.

PARTICIPANTS: Adults aged 60 and older with income of 200% of the federal poverty level or less who enrolled in the Senior PharmAssist program (N = 191) between August 1, 2011, and March 15, 2017.

INTERVENTION: Medication therapy management (MTM), customized community referrals, Medicare insurance counseling, and medication copayment assistance provided by Senior PharmAssist.

MEASUREMENTS: Primary outcomes were self-reported emergency department (ED) visits and hospital admissions in the previous year, assessed at baseline and every 6 months for up to 2 years.

RESULTS: Mean number of ED visits declined over time (0.83 visits per year at baseline to 0.53 visits per year at 24 months, $P = .002$), as did the percentage of participants reporting an ED visit in the past year (49% at baseline to 31% at 24 months, $P = .003$). Mean hospital admissions also decreased (0.56 admissions per year at baseline to 0.4 admissions per year at 24 months, $P = .02$). There was no significant change in percentage of participants reporting a

hospital admission in the past year (33% at baseline to 25% at 24 months, $P = .23$).

CONCLUSION: Older adults who enrolled in a community-based program that helps them manage medications, connect with community resources, and overcome barriers to medication access experienced reductions in acute health services use. *J Am Geriatr Soc* 66:2394–2400, 2018.

Key words: aged; community health services; community health planning; medication therapy management; pharmaceutical services

Prescription medications are an essential component of health care in the United States, yet safe use in older adults is an area of concern. More than 42% of American adults aged 65 and older reported taking at least 5 prescription medications during the previous month, a percentage nearly triple what was reported in the early 1990s.¹ Community-dwelling older adults who have difficulty managing medications may be at greater risk of hospitalization.² Studies have shown that use of multiple prescription medications increases the risk of poor health outcomes in older adults, including adverse drug reactions and hospitalization.^{3–5} In addition to reducing inappropriate medication use, avoiding underuse of necessary medications and limiting nonadherence are essential to optimize medication management.^{6,7}

The potential for older adults to underuse necessary medications grows as medication costs and coinsurance amounts increase. Rising out-of-pocket costs for individuals, as a result of higher cost-sharing requirements or capped prescription drug benefits, have been associated with medication nonadherence.^{8–12} This finding is particularly pronounced in individuals living in lower-income areas.¹³ Furthermore, cost-related medication underuse can

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result in more hospital admissions^{9,14} and emergency department (ED) visits^{9,15,16} and in death.⁹ Serious adverse events and hospital admissions due to medication underuse have been linked specifically to nonadherence to cardiovascular medications and other essential drugs such as insulin.^{7,15} Medication underuse in older adults may indicate that they face barriers to accessing other basic necessities. Individuals who report cost-related medication underuse are more likely to experience food insecurity^{17–20} and report limitations in activities of daily living (ADLs) and instrumental activities of daily living (IADLs).²¹ These findings suggest that older adults who have difficulty affording medications may benefit from interventions linking them with relevant community resources.

One approach to addressing concerns associated with prescription medication use in older adults is medication therapy management (MTM), the overall purpose of which is to optimize therapeutic outcomes while minimizing risks.²² This can be achieved through a wide variety of services, including comprehensive medication review, collaboration between pharmacists and primary care providers, and development of a personalized action plan to promote the individual's engagement in medication management.^{22,23} Previous studies suggest that MTM provided to community-dwelling older adults reduces inappropriate prescribing and promotes resolution of medication-related problems,^{24–26} but MTM alone may not adequately address cost-related medication underuse and the ability of older adults to connect with community resources.

Senior PharmAssist is a program for older adults with limited income that combines MTM with prescription copayment assistance, Medicare insurance counseling, and customized community referrals. A previous evaluation of the program, from 1994 to 2001, found that individuals who enrolled in Senior PharmAssist decreased their use of acute health services.²⁷ Senior PharmAssist and its participant demographic characteristics have changed substantially since the program's inception. In this article, we describe the current Senior PharmAssist program and reassess program outcomes to reflect changes to services offered since the time of the original evaluation.

SENIOR PHARMASSIST PROGRAM

Setting

Senior PharmAssist is an independent, community-based nonprofit organization located in Durham, North Carolina. Durham County has a population of roughly 306,000, with 11.9% aged 65 and older.²⁸ The median household income for older adults is \$47,053, with 8% living below the poverty level. Of adults aged 65 or older, approximately 61% are non-Hispanic white, 32% are black, and 2% report Hispanic origin.²⁹

Program Description

Senior PharmAssist exists to help older adults living in the community remain as healthy and independent as possible. Services are offered to Durham County residents aged 60 and older. Senior PharmAssist is open for appointments

40 hours per week. Home visits, transportation, and translation services are available at no charge.

Staff

During the period of this evaluation, Senior PharmAssist had the following full-time employees: executive director, clinical pharmacist, development and communications director, community services director, health resources coordinator, and associate director. The program also employed part-time staff including a clinical pharmacist, administrative assistant, and development associate. The roles of staff members are described elsewhere.³⁰

Customized Community Referrals

Before participants have appointments for MTM, a staff member contacts them to document residency, income, and specific needs. During the appointment, additional demographic and financial information is collected to determine eligibility for financial assistance from Senior PharmAssist or other community-based or governmental programs. Staff also gather information on participants' abilities to perform ADLs and IADLs and document their insurance coverage. This information helps determine which referrals are offered. Common referrals include Medicaid, income-based Medicare Part B and D assistance programs, emergency food, help with utility or unpaid medical bills, transportation, and recreational activities.

MTM

Clinical pharmacists meet with program participants every 6 months to provide MTM. The caregivers of participants with dementia or memory impairment who require assistance in managing their medications also attend MTM sessions or are present during home visits. MTM is free of charge to Durham County adults aged 60 and older who are Medicare-eligible and have an income of 200% of the federal poverty level (FPL) or less. Participants must bring their prescription and over-the-counter (OTC) medications to each appointment. The MTM session begins with a brief interview to document chronic conditions, medication allergies, perceived health, and acute health services use.

The pharmacist reviews participants' prescription and OTC medications, providing education on purpose and appropriate administration when needed. Medication adherence is assessed through inspection of fill dates and the open-ended question, "How are you taking this medication?" Reasons for nonadherence are addressed when necessary. In reviewing participants' medications, the pharmacist identifies drug-related problems such as drug-drug interactions, use of medications known to be harmful in older adults, and intolerable side effects. Data collected during MTM, including pharmacist recommendations and medication review findings, are stored in a database (FileMaker Pro, FileMaker Inc., Santa Clara, CA).

For items that need participant follow-up, the pharmacist generates a written medication action plan, which may include medication reminders, health education tips, and items the pharmacist will pursue, such as contacting the participant's primary care provider to suggest medication changes or address affordability concerns. The pharmacist

also provides the participant with an up-to-date medication list at the end of each visit. In 2017, Senior PharmAssist conducted 836 MTM sessions.

Medication Copayment Assistance

Senior PharmAssist facilitates enrollment in Medicaid and the Medicare Part D Low Income Subsidy (LIS, also known as “Extra Help”) for eligible participants. In North Carolina, community-dwelling adults aged 65 and older must have income of 100% of the FPL or less and assets of no more than \$2,000 per individual to be categorically eligible for Medicaid.³¹ For participants with Medicare Part D and income above the Medicaid and full Medicare LIS assistance levels but below 200% of the FPL, Senior PharmAssist provides direct financial assistance in the form of a copayment assistance card that can be used at community pharmacies as a secondary prescription drug plan. Community pharmacies bill Medicare prescription coverage as primary insurance and bill the remaining amount to Senior PharmAssist. In 2017, Senior PharmAssist paid \$98,609 to cover 6,229 secondary prescription claims. Claims are adjudicated according to Senior PharmAssist’s formulary, which local clinicians create based on safety, effectiveness, and cost-effectiveness of medications in older adults. Participants pay up to \$2 per month for generic medications, \$5 for brand medications, and \$15 for insulin. Program pharmacists work with participants, community pharmacists, and prescribers to ensure that Medicare Part D plans provide primary coverage, and Senior PharmAssist lowers the portion that the participant pays even further. Participants must return every 6 months for community referrals and MTM to have their eligibility for copayment assistance extended.

Medicare Insurance Counseling

Senior PharmAssist is the State Health Insurance Assistance Program coordinating site for Durham County. Medicare-eligible residents of the county receive this service at no charge. Medicare insurance counseling involves discussions that compare coverage options based on an individual’s healthcare use, medication needs, financial situation, and personal preferences. Senior PharmAssist staff also screen participants for eligibility for governmental programs. In 2017, Senior PharmAssist provided Medicare insurance counseling to 1,760 individuals. There were 113 Medicare LIS applications completed for participants, 46 referrals made to Medicaid or Medicare Savings Programs, and 500 participants who switched stand-alone Part D plans. Over the last 5 Medicare open enrollment periods, 55% to 68% of individuals enrolled in stand-alone Part D plans switched plans for an average projected annual savings of \$806.³²

Sustainability

Senior PharmAssist relies on grants, donations, and contracts to sustain its work. It does not bill Medicare Part D for MTM, although this is a possible source of income. As healthcare delivery shifts from fee-for-service models to value-based care, more funding options seem possible.

EVALUATION

Evaluation Study Design

The purpose of this evaluation is to understand participant demographic characteristics and describe changes in acute health services use after enrollment in Senior PharmAssist. Perceived health, number of prescription medications, and medication adherence were also assessed. The evaluation included participants who were newly enrolled in Senior PharmAssist between August 1, 2011, and March 15, 2017, and who had Medicare Part D coverage in addition to Senior PharmAssist secondary prescription coverage. Participants were excluded if they did not have at least 1 follow-up visit. Individuals were followed from their initial visit until their most recent follow-up visit occurring before March 15, 2017, up to a maximum of 2 years. The follow-up timeframe of 2 years was selected to maintain consistency with the follow-up period used in the previous evaluation of Senior PharmAssist.²⁷

De-identified data were extracted from the Senior PharmAssist database. Information on self-reported hospital admissions and ED visits during the previous 12 months was used to analyze acute health services use. Accuracy of self-reported hospital admissions using a recall period of 12 months has been shown to range from 76% to 98% in older adults.^{33–36} Perceived health was assessed based on participant categorization of their health as poor, fair, good, very good, or excellent. Adherence was defined as participants taking at least 80% of their medications in accordance with the prescription label. Outcomes were assessed at baseline and every 6 months. The University of North Carolina – Chapel Hill institutional review board determined that this evaluation did not require approval.

Statistical Analysis

Regression analysis was used to assess relationships between length of follow-up and demographic characteristics. Changes in outcome variables were characterized using generalized linear mixed-effects modeling. The model incorporated random effects at the level of the grouping variable: participant identification number. A logit function and Bernoulli distribution were used for binary variables. A two-sided alpha error of less than .05 was considered statistically significant. Analyses were performed in Stata SE version 15 (Stata Corp., College Station, TX).

Evaluation Results

Three hundred five individuals enrolled in copayment assistance at Senior PharmAssist between August 1, 2011, and March 15, 2017. Of these, 114 were excluded for attending only an initial baseline visit without subsequent follow-up. Reasons for having attended only a baseline visit included insufficient time for a 6-month follow-up visit before study end date (32.5%), loss to follow-up (24.6%), copayment assistance no longer needed (21.9%), became ineligible for copayment assistance (13.2%), left by choice (4.4%), or death (3.5%). One hundred ninety-one participants contributing a total of 3,042 person-months of follow-up were included in the analysis (Table 1). Median length of follow-

Table 1. Baseline Participant Characteristics (N = 191)

Characteristic	Value
Age, mean±SD	69.8±7.5
Female, n (%)	135 (70.7)
Race/ethnicity, n (%)	
African American	114 (59.7)
White	69 (36.1)
Asian or Pacific Islander	3 (1.6)
Hispanic	2 (1)
Native American	1 (0.5)
Other	2 (1)
Education, n (%)	
<High school	50 (26.2)
High school	63 (33)
>High school	75 (39.3)
Unknown	3 (1.6)
Living situation, n (%)	
Alone	93 (48.7)
With spouse	53 (27.8)
With relatives	36 (18.8)
Other	7 (3.7)
Unknown	2 (1)
Length of follow-up, months, n (%)	
6	51 (26.7)
12	39 (20.4)
18	26 (13.6)
24	75 (39.3)
Prescription medications, mean±SD	8.1±3.6
Total chronic conditions, mean±SD	6.8±2.5
Chronic conditions, n (%)	
Hypertension	159 (83.2)
Arthritis	142 (74.3)
Hyperlipidemia	135 (70.7)
Glaucoma, cataracts, macular degeneration	116 (60.7)
Diabetes mellitus	99 (51.8)
Depression or anxiety	89 (46.6)
Gastroesophageal reflux disease, ulcers, hiatal hernia	89 (46.6)
Respiratory disease	80 (41.9)
Heart disease	79 (41.4)
Kidney disease	37 (19.4)
Osteoporosis	23 (12)

SD = standard deviation.

up was 18 months. Included and excluded participants did not differ significantly in age, number of chronic conditions, or baseline frequency of ED visits or hospital admissions. Length of follow-up was not significantly associated with baseline age, sex, race and ethnicity, education, number of medications, or number of chronic conditions.

The mean numbers of ED visits and hospital admissions in the previous year declined significantly over time for

program participants (Table 2). When considering the percentage of participants experiencing at least one ED visit or hospital admission (Figure 1), at baseline, 93 participants (49%) had experienced an ED visit in the previous year, and 63 participants (33%) had experienced a hospital admission. The percentage of participants reporting an ED visit in the previous year declined significantly over time ($P = .003$). The percentage of participants reporting a hospital admission also decreased, but this difference was not significant ($P = .23$). An analysis of acute health services use including only participants who completed 24 months of follow-up produced results consistent with those from the entire sample (Figure 2). The percentage of participants reporting good to excellent health increased over time, as did the number of prescription medications. Adherence did not change significantly during the evaluation period (Table 3).

DISCUSSION

Senior PharmAssist uses a unique model of care to optimize medication management while addressing social determinants of health by linking participants with community resources to meet basic needs. Older adults who enrolled in Senior PharmAssist experienced a decline in acute health services use and improvement in perceived health, without a significant change in medication adherence. Although a cause-and-effect relationship between program enrollment and less hospital use cannot be determined from this study, we believe the potential to prevent hospitalizations and enhance perceived health through community-based services is clinically meaningful for older adults. Through improvements in these measures, Senior PharmAssist attempts to keep older adults as healthy and independent as possible.

These findings reinforce the original outcome evaluation of Senior PharmAssist performed from 1994 to 2001, which found that enrollment in the program was associated with a decrease in percentage of participants reporting an ED visit (56% at baseline to 41% at 24 months, $P < .001$) and hospital admission (47% at baseline to 23% at 24 months, $P < .001$) in the previous year.²⁷ Since the time of the original evaluation, the program has evolved to include a more robust community referral process and Medicare counseling. The copayment assistance card originally acted as a primary prescription insurance but was changed to secondary coverage when Medicare Part D became available in 2006. Participant demographic characteristics have also changed over time, most notably as a result of the program raising its income threshold from 150% of the FPL to 200% of the FPL and from levels of formal education increasing among participants.²⁷

Table 2. Emergency Department (ED) Visits and Hospital Admissions in the Previous Year among Senior PharmAssist Participants

Event	Baseline, N = 190	6 Months, ¹ N = 190	12 Months, N = 139	18 Months, N = 101	24 Months, N = 74	Regression Coefficient	P-value
ED visit, mean±SD	0.83±1.2	0.60±1.1	0.54±1.1	0.59±1	0.53±1.1	-0.01	.002
Hospital admission, mean±SD	0.56±1	0.42±0.9	0.38±0.7	0.44±0.9	0.4±1.1	-0.01	.02

¹Because a recall period of 12 months was used, mean numbers of events at the 6-month time point represent a combination of events occurring before and after program enrollment. Beginning at the 12-month time point, mean numbers include only events reported after program enrollment.

Table 3. Changes in Perceived Health and Medication-Related Outcomes in Senior PharmAssist Participants

Health domain	Baseline, N = 191	6 Months, N = 191	12 Months, N = 139	18 Months, N = 101	24 Months, N = 75	Regression Coefficient	P-Value
Perceived health status good to excellent, n (%)	106 (55.5)	114 (59.7)	88 (63.3)	70 (69.3)	51 (68)	0.03	.03
Medication outcomes							
Number of prescription drugs, mean±standard deviation	8.1±3.6	8±3.4	8.4±3.5	8.3±3.8	8.5±3.7	0.02	<.001
Adherent to prescribed drugs, n (%)	124 (66)	125 (66.5)	96 (70.6)	71 (72.4)	55 (76.4)	0.03	.06

Medication outcomes were available for 3 fewer participants at each time point.

The results of this evaluation are in agreement with those of previous studies, suggesting that enrollment in community-based MTM programs reduces hospital use in older adults,³⁷⁻³⁹ although some studies have produced conflicting results regarding the effect of MTM on hospital admissions and ED visits. Two large studies evaluating telephonic MTM found increases in the use of some acute health services but decreases in overall mortality.^{40,41} Recent systematic reviews have also failed to identify a conclusive association between MTM and fewer hospitalizations.^{42,43} It is likely that wide variability in the composition and frequency of MTM between studies contributes to these inconsistent results.^{42,43} These studies differ from the current evaluation in that Senior PharmAssist provides multiple services in addition to MTM. This evaluation does not reveal which services at Senior PharmAssist may have been associated with less acute health services use, but the lack of significant change in medication adherence indicates that this measure may not have been a major factor influencing hospital use. We did not study if adherence was different for essential and nonessential medications.

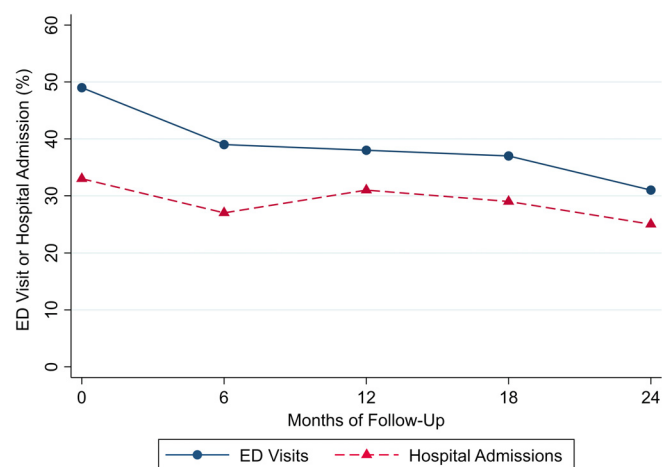


Figure 1. Percentage of all participants (n = 190) who experienced at least 1 emergency department (ED) visit or hospital admission in the previous year. There was a significant decline in ED visits (regression coefficient – 0.04, P = .003) but not hospital admissions (regression coefficient – 0.02, P = .23). Because a recall period of 12 months was used, acute health services use at 6 months represents a combination of events occurring before and after program enrollment. Beginning at 12 months, percentages include only events reported after program enrollment.

It is likely that the Senior PharmAssist model of care is most generalizable to populations of older adults for whom limited income and other community factors create barriers to medication access and basic necessities. A community needs assessment and asset mapping should be performed before implementation of a similar program because certain functions of Senior PharmAssist may be available in some communities but not well coordinated or adequately supported.

LIMITATIONS

Its observational design limits evaluation of Senior PharmAssist. Because there was no control group, the possibility cannot be excluded that the observed decline in acute health services use was due to an outside factor. Based on a large sample, nationwide data indicate that the percentage of adults aged 65 and older experiencing a hospital admission in the previous year remained fairly constant during the study period, dropping from 16.2% in 2010 to 15.6% in 2015. These data further suggest that this percentage

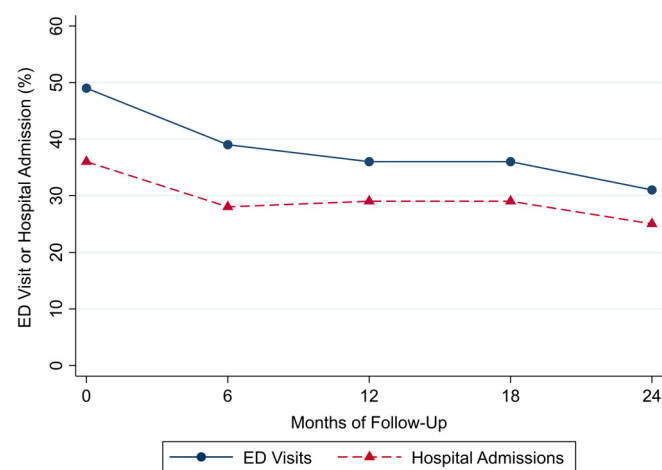


Figure 2. Percentage of participants completing 24 months of follow-up (n = 74) who experienced at least 1 emergency department (ED) visit or hospital admission in the previous year. There was a significant decline in ED visits (regression coefficient – 0.04, P = .01) but not hospital admissions (regression coefficient – 0.02, P = .14). Because a recall period of 12 months was used, acute health services use at 6 months represents a combination of events occurring before and after program enrollment. Beginning at 12 months, percentages include only events reported after program enrollment. [Color figure can be viewed at wileyonlinelibrary.com]

increases as individuals age, rising from 12.8% in adults aged 65 to 74 to 18.8% in adults aged 75 or older.¹

Only 39% of participants had complete 24-month follow-up data. This creates the potential for healthier participants tending to remain enrolled in the program longer to generate a relationship between time and hospital use. We did not identify significant differences in the number of chronic conditions between included and excluded participants and did not find an association between number of chronic conditions and length of follow-up, but small sample size limited the ability to detect these differences. In addition, the subanalysis including only participants completing 24 months of follow-up produced results consistent with those of the entire sample (Figure 2).

Measurement of acute health services use was susceptible to reporting bias. Participants may have forgotten to report events or reported fewer events out of a desire to give a favorable answer. Studies evaluating the accuracy of self-reported hospitalizations in older adults using a 12-month recall period report mixed results, with sensitivities ranging from 76% to 94% and specificities from 92% to 99%.^{33–36} In a study assessing the effect of recall period on accuracy of self-reported hospitalizations in older adults, recall periods of 3 and 12 months resulted in accuracies greater than 96%.³³ In the time after this evaluation was conducted, Senior PharmAssist gained access to shared electronic health records with Duke Health. Future evaluations may use data from this electronic health record to assess program outcomes.

CONCLUSION

The Senior PharmAssist model of care combines MTM with copayment assistance, community referrals, and Medicare insurance counseling. Participants enrolled in these services experienced significant reductions in mean number of reported hospital admissions and ED visits. Our findings suggest that community-based programs that combine medication access and management with services to address basic needs should be further explored for their potential role in reducing hospital use of older adults. As the population of older adults in the US continues to grow, so too will concerns about appropriate medication use, medication affordability, and access to services to support independence. Keeping community-based older adults from unnecessary hospital use is an urgent need with quality-of-life and financial implications.

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For readers interested in implementing a similar program, an implementation guide is available upon request from info@seniorpharmassist.org.

A poster summarizing the results of the evaluation section of this manuscript was presented during a student poster session at the American Society of Health-System Pharmacists Midyear Clinical Meeting, December 4, 2017, Held in Orlando, Florida.

Conflict of Interest: Gina Upchurch is the founding executive director of Senior PharmAssist and is a nonvoting member of the nonprofit organization's board of directors.

Author Contributions: Study concept and design, revision of manuscript: Herity, Schenck, Upchurch. Acquisition of data: Herity, Upchurch. Analysis and interpretation of data, drafting of manuscript: Herity.

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