



## Short Communication

Aligning social and health care services: The case of Community Care Connections<sup>☆</sup>Elisa M. Fisher<sup>a</sup>, Kelley Akiya<sup>b</sup>, Annie Wells<sup>c</sup>, Yan Li<sup>d</sup>, Christine Peck<sup>c</sup>, José A. Pagán<sup>b,\*</sup><sup>a</sup> *The New York Academy of Medicine, New York, NY, United States of America*<sup>b</sup> *School of Global Public Health, New York University, New York, NY, United States of America*<sup>c</sup> *Lifespan of Greater Rochester, Inc., Rochester, NY, United States of America*<sup>d</sup> *Department of Population Health Science and Policy, Icahn School of Medicine at Mount Sinai, New York, NY, United States of America*

## ARTICLE INFO

## Keywords:

Aging services  
Healthcare utilization  
Population health  
Social services  
Social determinants  
Program evaluation

## ABSTRACT

The Community Care Connections (CCC) program aims to align social and healthcare services to improve health outcomes in older adults with complex medical and social needs. This study assessed changes in healthcare utilization before and after CCC program participation. Between June 2016 and March 2019, 1214 adults with complete data who provided informed consent participated in the CCC program. CCC client data were linked with data on hospitalizations, emergency department (ED) visits, and observation stays 90 days before and after program start. Data analysis examined changes in health care utilization 90 days after program start, compared to 90 days before. Hospitalizations decreased by 30% (Change =  $-0.029$ , 95% Confidence Interval (CI) =  $-0.053$ ,  $-0.005$ ), ED visits decreased by 29% (Change =  $-0.114$ , 95% CI =  $-0.163$ ,  $-0.066$ ), and observation stays decreased by 23% (Change =  $-0.041$ , 95% CI =  $-0.073$ ,  $-0.009$ ) during the post period. ED visits decreased by 37% (Change =  $-0.140$ , 95% CI =  $-0.209$ ,  $-0.070$ ) for those with hypertension and by 30% (Change =  $-0.109$ , 95% CI =  $-0.199$ ,  $-0.020$ ) for those with high cholesterol, while observation stays decreased by 46% (Change =  $-0.118$ , 95% CI =  $-0.185$ ,  $-0.052$ ) for those with diabetes and by 44% (Change =  $-0.082$ , 95% CI =  $-0.150$ ,  $-0.014$ ) for those with high cholesterol during the post period. Connecting older adults with social services through the healthcare delivery system may lead to decreases in hospitalizations, ED visits, and observation stays. Implementation of cross-sector partnerships that address non-clinical factors that impact the health of older adults may reduce the use of costly healthcare services.

## 1. Introduction

The shift from fee-for-service to value-based healthcare is driving an increased focus on the roles of social, economic, and environmental conditions in improving the health and wellbeing of high-risk populations. (Marmot and Bell, 2009) Factors such as food security, housing, and social support directly contribute to the development of chronic health conditions and are particularly relevant for older adults, who face greater risks for chronic health conditions, cognitive decline, and disability as they age. (Centers for Disease Control and Prevention, 2013) Given the fact that the population of older adults is expected to double

by 2050 (American Association of Retired Persons, 2016); addressing the social and economic determinants of health is critical to managing the growing healthcare needs of this population.

Many community-based organizations offer services to address the social needs of older adults; however, fragmented financing structures, poor communication across systems, and misalignment of goals and incentives prevent effective collaboration between social service organizations, public health agencies, and the healthcare system. As a result, clinical and social services are oftentimes poorly coordinated, which is stressful on caregivers, expensive to the healthcare system, and harmful to patient health. (Centers for Medicare and Medicaid Services, 2017)

<sup>☆</sup> Support for this publication was provided by the Robert Wood Johnson Foundation through the Systems for Action National Coordinating Center, ID 75162. The study sponsor did not contribute to the study design; collection, analysis, or interpretation of data; writing the report; or the decision to submit the report for publication.

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<https://doi.org/10.1016/j.ypmed.2020.106350>

Received 23 June 2020; Received in revised form 30 September 2020; Accepted 24 November 2020

Available online 28 November 2020

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New models of collaboration between providers of healthcare and social services have the potential to reduce reliance on high cost healthcare services and increase quality of life.(Vickery et al., 2020) They may also help older adults “age in place,” which is associated with reduced social isolation, increased physical function, higher levels of self-rated health, reduced symptoms of depression and pain, and increased life expectancy.(Marek et al., 2005)

This study assesses changes in healthcare utilization after participation in Community Care Connections (CCC), a program designed to integrate social services into healthcare system workflows in order to help older adults navigate multiple systems and obtain needed clinical and social services.

## 2. Methods

### 2.1. Program description

Lifespan of Greater Rochester (Lifespan) began implementing the CCC demonstration project with funding from the New York State Department of Health in June 2016.(Lifespan of Greater Rochester, 2019) The main objective of the CCC program is to reduce healthcare utilization and costs for older adults with complex medical needs by improving the coordination of social and healthcare services. Clients are connected to the CCC program by physician offices, primary care clinicians, and home healthcare agencies. At intake, social work care managers visit clients in their homes to conduct an intensive geriatric wellness assessment examining health, economic, and social risk factors and develop a personalized care plan. Clients provide permission for CCC to communicate with healthcare providers, who are then regularly updated on progress, changes, and adaptations to the care plan.

Social work care managers can connect clients to over 40 services, including social support programs (ranging from transportation to meal delivery to socialization programs) as well as medical services. When necessary, clients also receive care coordination from licensed practical nurses, who are supervised by a registered nurse. Care coordinators provide support related to accessing healthcare (e.g., coordinating appointments, arranging transportation), navigating the healthcare system (e.g., obtaining preventive care and specialty care, health insurance issues), and adhering to treatment recommendations (e.g., accompaniment to appointments, medication reconciliation). Clients are considered “connected” to a program or resource only after a care manager or care coordinator confirms that the client has received the service.

### 2.2. Data collection

CCC program staff collected information on all CCC participants who enrolled in the program and provided informed consent between June 1, 2016 and March 1, 2019 through Peer Place, a data management system. A total of 1928 clients enrolled in the CCC program during the selected period. Of those, 1316 provided informed consent and 1214 had complete data. Lifespan securely transferred client information for all clients who provided free and informed consent to the Rochester RHIO (Regional Health Information Organization), an electronic health information exchange that receives data on all admissions, discharges, and transfers for all health systems in 13 counties in upstate New York. The RHIO linked CCC client information to data on hospitalizations, emergency department (ED) visits, and observation stays. This study was approved by The New York Academy of Medicine’s Institutional Review Board.

### 2.3. Data analysis

We conducted 90-day pre-post analyses to examine changes in hospitalizations, ED visits, and observation stays before and after clients joined the CCC program. The post-period began 30 days after initial

program intake to allow time for services to begin. Paired *t*-tests were used to compare changes in healthcare outcomes for everyone and for those with the three most prevalent chronic health conditions (hypertension, diabetes, and high cholesterol—conditions that are costly to Medicare beneficiaries with multiple chronic conditions).(Philpot et al., 2016) Linear regression analysis and predictive margins (recycled predictions) were used to estimate average pre-post changes in hospitalizations, ED visits, and observation stays for different age group, gender, race/ethnicity, and income categories. (Glick et al., 2015; StataCorp, 2020) The average pre-post changes were adjusted for these variables as well as for health insurance coverage (Medicare and/or Medicaid) and chronic health conditions. All data were analyzed using Stata 16.1. (StataCorp, 2020)

## 3. Results

A total of 1214 clients enrolled in CCC services, provided informed consent during the study period, and had complete data. Most clients were women (62%), 75 or older (64%), and Non-Hispanic White (76%). Forty-one percent reported an income below \$1000 per month. The three most prevalent health conditions were hypertension (43%), diabetes (28%), and high cholesterol (21%). Clients were connected to an average of four services.

### 3.1. Healthcare utilization

Table 1 reports mean hospitalizations, ED visits, and observation stays per client in the CCC program. Hospitalizations decreased by 30% (Change =  $-0.029$ , 95% Confidence Interval (CI) =  $-0.053$ ,  $-0.005$ ), ED visits decreased by 29% (Change =  $-0.114$ , 95% CI =  $-0.163$ ,  $-0.066$ ), and observation stays decreased by 23% (Change =  $-0.041$ , 95% CI =  $-0.073$ ,  $-0.009$ ) in the 90 days after program enrollment compared to the 90 days before enrollment. Among participants with the most prevalent health conditions, ED visits decreased by 37% (Change =  $-0.140$ , 95% CI =  $-0.209$ ,  $-0.070$ ) for those with hypertension and by 30% (Change =  $-0.109$ , 95% CI =  $-0.199$ ,  $-0.020$ ) for those with high cholesterol during the pre-post period. Observation stays decreased by 46% (Change =  $-0.118$ , 95% CI =  $-0.185$ ,  $-0.052$ ) for those with diabetes and by 44% (Change =  $-0.082$ , 95% CI =  $-0.150$ ,  $-0.014$ ) for those with high cholesterol during the post period.

Table 2 reports the predictive margins of changes in hospitalizations, ED visits, and observation stays per client in the CCC program. Predictive margins were calculated by first estimating a linear regression of the pre-post change in each outcome (that included age, gender, race/ethnicity, income, health insurance coverage, hypertension, diabetes, and high cholesterol as regressors), predicting each outcome as if everyone belonged to the given category (e.g., as if everyone was female, as if everyone was male), and then calculating the average of these predicted outcomes. Hospitalizations decreased substantially for program participants ages 65–74, women, and Non-Hispanic Whites during the pre-post period. ED visits decreased substantially for program participants under the age of 65, those 85 and over, women, men, Non-Hispanic Whites, those identified as Other under race/ethnicity, and those with an income of \$1000 or more per month. Observation stays decreased substantially for female program participants as well as for Hispanics during the pre-post period.

## 4. Discussion

Findings from this demonstration project suggest that integrating community-based social workers and nurse care coordinators into medical care may be an effective method of improving health outcomes while also reducing healthcare utilization for older adults. CCC participants had significantly fewer hospitalizations, ED visits, and observation stays in the 90 days after receiving CCC services, compared to the 90 days before program enrollment. The reduction in hospital-based

**Table 1**  
Mean Hospitalizations, Emergency Department (ED) Visits, and Observation Stays per Client in Community Care Connections Program (N = 1214).

	Healthcare utilization 90 days before program start	Healthcare utilization 90 days after program start	Change (95% CI)
<b>All program participants</b>			
Hospitalizations	0.097	0.068	<b>-0.029</b> (-0.053, -0.005)
ED visits	0.395	0.281	<b>-0.114</b> (-0.163, -0.066)
Observation stays	0.176	0.135	<b>-0.041</b> (-0.073, -0.009)
<b>Hypertension (N = 516)</b>			
Hospitalizations	0.064	0.052	-0.012 (-0.042, 0.018)
ED visits	0.376	0.236	<b>-0.140</b> (-0.209, -0.070)
Observation stays	0.145	0.097	-0.048 (-0.098, 0.001)
<b>Diabetes (N = 338)</b>			
Hospitalizations	0.086	0.068	-0.018 (-0.061, 0.025)
ED visits	0.435	0.340	-0.095 (-0.191, 0.001)
Observation stays	0.254	0.136	<b>-0.118</b> (-0.185, -0.052)
<b>High cholesterol (N = 256)</b>			
Hospitalizations	0.059	0.063	0.003 (-0.035, 0.042)
ED visits	0.363	0.254	<b>-0.109</b> (-0.199, -0.020)
Observation stays	0.188	0.105	<b>-0.082</b> (-0.150, -0.014)

Note: Boldface indicates statistical significance at  $p < .05$ .

care was also significant among older adults who are costly to Medicare (i.e., beneficiaries with hypertension, diabetes, and high cholesterol).

We also examined changes in healthcare utilization before and after the program began for different age groups as well as by gender, race/ethnicity, and income. Hospitalizations decreased substantially for program participants ages 65–74, women, and Non-Hispanic Whites while ED visits decreased substantially for those under 65 or those 85 years of age and over, women, men, Non-Hispanic Whites, those identified as Other under race/ethnicity, and those with an income of \$1000 or more per month. Observation stays decreased substantially for women and Hispanics.

Other studies that have examined how integrated care models that incorporate social needs may impact acute health care utilization also report promising results. An evaluation of Hennepin Health, a Medicaid Accountable Care Organization, found a reduction in ED utilization over a six month period but no statistically significant changes in hospitalizations over the same time period.(Vickery et al., 2020) A pilot randomized controlled study of ED-based care coordination using community health workers found lower ED visits and hospitalizations for the intervention patients compared to control group patients during a seven month period but the results were not statistically significant.

**Table 2**  
Adjusted Changes in Hospitalizations, Emergency Department (ED) Visits, and Observation Stays per Client in Community Care Connections Program (N = 1214).

	Hospitalizations Change (95% CI)	ED visits Change (95% CI)	Observation stays Change (95% CI)
<b>Age</b>			
Under 65	-0.086 (-0.174, 0.003)	<b>-0.186</b> (-0.365, -0.008)	-0.079 (-0.196, 0.039)
65–74	<b>-0.051</b> (-0.099, -0.002)	-0.087 (-0.184, 0.011)	-0.049 (-0.113, 0.015)
75–84	0.002 (-0.039, 0.042)	<b>-0.101</b> (-0.182, -0.020)	-0.035 (-0.088, 0.019)
85 and over	-0.030 (-0.077, 0.017)	<b>-0.134</b> (-0.228, -0.040)	-0.031 (-0.093, 0.031)
<b>Gender</b>			
Female	<b>-0.032</b> (-0.063, -0.001)	<b>-0.120</b> (-0.183, -0.057)	<b>-0.062</b> (-0.103, -0.021)
Male	-0.023 (-0.063, 0.016)	<b>-0.106</b> (-0.185, -0.026)	-0.008 (-0.061, 0.044)
<b>Race/ethnicity</b>			
Non-Hispanic white	<b>-0.037</b> (-0.065, -0.008)	<b>-0.113</b> (-0.169, -0.056)	-0.029 (-0.066, 0.009)
African American	-0.018 (-0.088, 0.051)	-0.119 (-0.258, 0.020)	-0.050 (-0.142, 0.042)
Hispanic	-0.002 (-0.145, 0.140)	0.096 (-0.190, 0.382)	<b>-0.235</b> (-0.423, -0.047)
Other	0.017 (-0.070, 0.104)	<b>-0.199</b> (-0.374, -0.024)	-0.075 (-0.190, 0.040)
<b>Income per month</b>			
Less than \$1000	-0.032 (-0.071, 0.007)	-0.040 (-0.117, 0.039)	-0.041 (-0.093, 0.010)
\$1000 or more	-0.027 (-0.059, 0.006)	<b>-0.168</b> (-0.233, -0.102)	-0.041 (-0.084, 0.002)

Note: Boldface indicates statistical significance at  $p < .05$ .

(Lin et al., 2017) A care coordination intervention implemented by a safety-net health system for high cost patients led to statistically significant reductions in ED visits and hospitalizations after program enrollment, though the study did not include a comparison group. (Roberts et al., 2015) Similar to our results, these findings suggest that integrated care models focused on social needs may reduce acute care utilization. Still, there remains a need to design and implement larger studies that include comparison groups.

#### 4.1. Limitations

Our study has several limitations. The CCC program was implemented without a control group. We also used a relatively short follow up period (90 days) in large part because the median length of time from initial intake to the case close date was 117 days. As such, the findings reported here may not translate to a longer post-implementation period. There is also a small chance that hospitalizations, ED visits or observation stays take place within a 90 day period (e.g., the average number of hospitalizations, ED visits and observation stays for all program participants were 0.068, 0.281 and 0.135, respectively, over the 90 day post-implementation period). Finally, we did not have access to outpatient health care utilization which could also have been impacted by the CCC

program.

## 5. Conclusions

Addressing the social, economic, and clinical needs of older adults is a necessary condition to shifting from a volume- to value-based medical system. Partnerships across different sectors that address non-clinical factors which may impact health could also address fragmentation in the delivery of healthcare and social services and reduce healthcare utilization.

### CRedit authorship contribution statement

**Elisa M. Fisher:** Conceptualization, Data curation, Methodology, Formal analysis, Writing - original draft, Funding acquisition, Project administration. **Kelley Akiya:** Data curation, Formal analysis, Writing - review & editing. **Annie Wells:** Methodology, Data curation, Investigation, Writing - review & editing. **Yan Li:** Methodology, Funding acquisition, Writing - review & editing. **Christine Peck:** Data curation, Investigation. **José A. Pagán:** Conceptualization, Data curation, Methodology, Formal analysis, Writing - original draft, Funding acquisition, Supervision.

### Declaration of Competing Interest

None.

### Acknowledgments

This research study was funded by the Robert Wood Johnson Foundation through the Systems for Action National Coordinating Center, ID 75162. In addition to the Foundation, the authors thank Wendy Beehner and Andrea Richardson of the Rochester RHIO for their

support related to hospital encounter data, as well as Sandy Schencke, CCC Program Coordinator, for her guidance implementing the CCC program. The research work presented in this paper is that of the authors and does not reflect the opinions of the funders or other organizations acknowledged here.

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