AJPM FOCUS
INCLUSIVITY IN PEOPLE, METHODS, AND OUTCOMES
RESEARCH ARTICLE

Differences in Healthcare Utilization Across 2 Social Health Support Modalities: Results From a Randomized Pilot Evaluation

Ammarah Mahmud, PhD,[1,2] Edwin S. Wong, PhD,[1,3] Cara C. Lewis, PhD,[2] India J. Ornelas, PhD,[1] Robert Wellman, MS,[2] Roy Pardee, JD, MA,[2] Sophia Mun, MPH,[2] Annalisa Piccorelli, PhD,[2] Emily O. Westbrook, MHA,[2] Heidi Den Haan, BASc,[2] Meagan C. Brown, PhD, MPH[2,4]

Introduction: The aim of this study was to assess differences in utilization outcomes among patients with social needs as part of a pilot social health integration program in 2 clinics in an integrated health system in the Pacific Northwest.

Methods: Patients who reported social needs between October 2022 and January 2023 were randomized to receive support from either local, clinic-based community resource specialists or a centralized Connections Call Center. The authors used administrative and claims data for 534 participants to compare the following utilization outcomes between arms over 9 months after randomization: primary care encounters, specialty care encounters, behavioral health encounters, emergency department encounters, inpatient admissions, urgent care encounters, and secure patient messages. Using an intent-to-treat approach, the authors used negative binomial regression models to compare visit counts and logistic regression to estimate differences in the probability of any emergency department visit or inpatient admissions between groups. The authors conducted secondary as-treated analyses comparing participants who received resource information from community resource specialists with those who did not.

Results: Unadjusted results showed no statistically significant differences between community resource specialists and Connections Call Center. Adjusted results showed that community resource specialist participants received 1.04 more primary care encounters than Connections Call Center participants (95% CI=0.336, 1.746). As-treated results showed that participants who received support from community resource specialists had higher counts of primary care encounters, specialty care encounters, and patient messages than those who did not.

Conclusions: Beyond social needs navigation, clinic-based supports may be better integrated with care teams to provide ongoing support for patients' medical needs. Findings from this primary care social health pilot program showed that local, clinic-based support was associated with greater outpatient utilization than a call center support.

From the [1]Department of Health Systems and Population Health, School of Public Health, University of Washington, Seattle, Washington; [2]Kaiser Permanente Washington Health Research Institute, Seattle, Washington; [3]Veterans Administration Puget Sound Health Care System, Seattle, Washington; and [4]Department of Epidemiology, School of Public Health, University of Washington, Seattle, Washington

Correspondence to: Ammarah Mahmud, PhD, Department of Health Systems and Population Health, School of Public Health, University of Washington, 1730 Minor Avenue, Seattle, WA 98101. E-mail: amahmud@uw.edu.

2773-0654/$36.00
https://doi.org/10.1016/j.focus.2025.100323

INTRODUCTION

Social factors, such as food insecurity, housing instability, and limited transportation, are adverse conditions associated with poor health outcomes such as chronic health conditions and behavioral health conditions.[1−3] Healthcare systems have become increasingly interested in identifying and responding to patients' social needs, a practice known as social health integration (SHI). Previous studies suggest that connecting patients to social services can result in improved patient health outcomes.[4−7]

SHI is expected to increase across healthcare systems because recent payment policy reforms and a new quality measure encourage adoption of these practices.[8,9] The National Academies of Science, Engineering, and Medicine recently identified different types of SHI activities, with the most common practices falling under *awareness* and *assistance* categories. Under these, healthcare systems use tools to screen for social needs and provide patients with resources and referrals to social service organizations, respectively.[10] These activities can range from onsite community health workers to service call lines with operators who help with resource navigation.[11−13]

As healthcare systems continue to implement these activities in response to payment incentives and performance metrics, it is important to understand their impact. Previous research has contributed to frameworks that link SHI activities to changes in utilization and patient health status through multiple potential pathways.[14,15] For example, addressing patients' social needs can reduce their social health burden and, in turn, allow them to prioritize their clinical health needs and improve their health by increasing funds available to pay for medication or other services. Discussions about social health can also provide emotional support for patients and build trust with the healthcare system, helping them manage their mental wellbeing and supporting patient activation toward pursuing necessary medical care.[15] In addition, greater engagement through SHI initiatives can influence how patients interact with and access healthcare services such as scheduling preventive care or other outpatient services. Although optimizing health is a long-term goal, healthcare utilization measures can serve as more proximal outcomes to help healthcare systems understand the impacts of SHI activities.[15,16] In particular, this study was most interested in understanding the extent to which the emotional support and service connection mechanisms contributed to potential changes in utilization. This manuscript presents findings that are part of a larger evaluation in which the authors examined the impact an SHI program on social needs resolution, utilization, and healthcare costs.[17,18]

The current evidence on the effects of SHI on healthcare utilization is mixed. For example, studies that observed changes over a 6-month period commonly reported changes in primary care or outpatient utilization, but the directionality of these outcomes varied.[12,16,19,20] It is also uncertain whether there is an optimal follow-up duration to observe changes in emergent or avoidable utilization, such as emergency department (ED) encounters and inpatient admissions.[12,16,19,21,22] Variation in findings across studies is also due to differences in their target populations by age, setting, comorbidity status, or insurance status.[16,19−24] Differences in methods and often the lack of a comparison group make it difficult to establish causality.[12,22] These studies also vary in the structure and modality of interventions, which were often tailored to their unique setting or patient population, creating difficulty in identifying best practices for SHI interventions.

To address limitations of the prior research, the authors focused on a general primary care patient population rather than on certain subpopulations and used a randomized study design and rigorous methods to assess potential differences in utilization over 9 months. Specifically, the purpose of this study was to report results of a primary care−based SHI randomized pilot program on healthcare utilization outcomes and is part of a larger evaluation in which the authors also examined social needs resolution and healthcare cost outcomes.[17,18] This program took place in a national, not-for-profit, integrated healthcare system that serves more than 12.4 million members. The Washington State region of this national health system provides coverage for approximately 650,000 members in Washington State and Idaho. Under this SHI program, patients scheduled for primary care appointments in 2 Washington State primary care clinics were screened for social needs and randomized to a social health support program, both of which connect patients to resources in their communities: (1) Connections Call Center (CCC), which is a centralized call center available to health system patients nationally, and (2) community resource specialists (CRSs), which is a local, clinic-based program unique to the region. The authors report the relative differences between programs over 9 months in the following healthcare utilization outcomes: primary care encounters, specialty care encounters, behavioral health encounters, urgent care encounters, ED encounters, inpatient admissions, and patient messages. The authors hypothesized that the authors would observe lower urgent care encounters, ED encounters, and inpatient admissions among CRS participants than among CCC

participants. The authors expected CRS participants to have higher primary and behavioral health encounters as well as patient messages than CCC participants. The authors did not have a hypothesis about the directionality of the difference in specialty care encounters given the wide range of services captured in this category.

METHODS

Study Design

The authors used a stratified randomized design to examine differences in healthcare utilization among participants over time. Patients who reported any social need on a universal social health screener during a primary care visit were randomized to 1 of 2 social health support programs: a local, clinic-based CRS program or a centralized CCC. Computer-generated randomization occurred during the enrollment period between October 2022 and January 2023 within strata of sex, age group, and clinic. A 9-month window was selected to achieve the sample size needed for power to detect changes in social needs resolution.[17] This pilot program was part of a quality improvement initiative and received a determination of not human subjects research.

Study Sample

Two primary care clinics were identified to receive support for implementing an SHI program. These clinics were selected on the basis of their relative size and patient diversity compared with other clinics in the state. Patients who scheduled office encounters with a primary care provider (excluding nurse and walk-in clinic encounters) through a primary care department (family practice, pediatrics, general internal medicine) received a Social Health Questionnaire (SHQ)-9. This 9-item screener includes 8 items that ask about social risks. The last item asked whether the patient would like assistance with up to 10 social health factors, with any endorsement indicating a social need. Patients were able to select all that apply from the following list: food; housing; transportation; finances; loneliness or social isolation; employment; utilities; childcare; caregiving; and paying for medical care, medicine, medical supplies. Patients reporting any need during the pilot program enrollment period were eligible for randomization to either CRS or CCC. This screener could be completed online in advance or in person electronically or on paper. For patients aged <18 years, their caregiver was asked to complete the SHQ on their behalf. Patients were excluded from the study if they had a referral or encounter with a CRS in the past month, had someone in their household who was already in the evaluation, spoke a primary language other than English or Spanish, opted out of research outreach activities, or died during the follow-up period.

CCC is a centralized call center that is administered by the health system at a national level. CRSs are local, clinic-based specialists that are part of the care team and conduct follow-up with patients after their primary care appointments. They aim to bridge the gap between medical care and community resources.[12] Both CCC and CRS have a policy that requires the same specialist who initiates the first call to a patient to also conduct any follow-up contacts, if possible, until their social needs case is closed, which often ranged between 2 and 5 contacts. A closed case is defined by patients' refusal for assistance or additional follow-up calls or nonresponse after multiple contact attempts. Both programs had the specialist initiate contact with patients through phone after participants were randomized.

Both programs provide patients with resource information using a centralized database. The nature of conversations between patients and CRSs or CCC agents may differ on the basis of differences in program characteristics. For example, CRSs are integrated care team members who can access electronic health record (EHR) data. They may discuss patients' care plans and serve as a liaison within the healthcare system and provide community resource information to address social health. In addition, CRSs have localized knowledge about community resources that they can share with patients, and they are trained in motivational interviewing techniques to support patients toward taking action. Both CCC and CRS received contact information about participants from the study team to initiate outreach to patients. This was a slight change from the usual CRS workflow in which CRSs initiated contact with patients on the same day they reported any social need.

Measures

The authors imported descriptive characteristics from the EHR, including administrative sex, age groups (<18, 18−40, 41−60, or ≥60 years), and clinic (A or B), that were used for randomized stratification. The authors also had data on 9 race and ethnicity categories (African American or Black, Native American or Alaska Native, Asian, Hispanic, multiracial, Native Hawaiian or Pacific Islander, White, other, unknown). The multiracial category included participants who explicitly identified as multiracial or selected >1 race and ethnicity category. The unknown category included individuals who refused to respond or for whom these data were not collected. The authors also accessed insurance type (commercial, individual, Medicaid, Medicare, no coverage) and Johns Hopkins' Adjusted Clinical Group (ACG) resource utilization bands from the EHR (nonuser, healthy users, low,

moderate, high, very high, missing). ACGs are derived from patients' previous utilization patterns using claims data and categorize patients into comorbidity levels on the basis of their expected resource use in the future.[25]

The authors used claims data to construct the following utilization outcome measures: primary care encounters, specialty care encounters, behavioral health encounters, ED encounters, inpatient admissions, urgent care encounters, and secure patient messages. Any records that were entered as chargeable claims for these service types were extracted. The authors measured utilization outcomes over a 9-month period after the date of enrollment. Because patients were enrolled over the period of October 2022−January 2023, utilization data were extracted over the period between October 2022 and September 2023. Patient messages were kept as a separate category to distinguish between asynchronous patient-care team contacts and interactive encounters. Primary care encounters and patient messages excluded any CRS- or CCC-related contacts. For the study analyses, the authors used count measures for the following utilization outcomes: primary care encounters, specialty care encounters, behavioral health encounters, urgent care encounters, and secure patient messages. The authors created a binary measure for ED encountersand inpatient admissions because of a low frequency of encounters over 9 months.

The independent variable was social health support program assignment (CCC or CRS) given the intent-to-treat approach.

The authors included sex, age group, and clinic as covariates in the model because these variables were used for stratified randomization assignment to CCC or CRS. For longitudinal studies that use a randomized design, it is recommended to use stratification variables as covariates in outcome models.[26] The authors also used race and ethnicity and ACGs as covariates because these 2 variables were not balanced between CCC and CRS participants. The authors operationalized ACG as a binary measure denoting no user/low/healthy versus moderate/high/very high resource bands to increase cell sizes across categories. A composite race and ethnicity variable was also aggregated into 6 categories (African American/Black, Hispanic, multiracial, White, other, unknown) owing to small cell sizes. Standardized mean differences (SMDs) were used to identify these imbalances between groups on the basis of a threshold of an SMD >0.2. For the 5-count outcome models, the authors included the respective count of encounters from 9 months before randomization to baseline as a covariate to adjust for utilization at baseline.[2]

Statistical Analysis

The authors calculated descriptive statistics (proportions and SMDs) for the total sample and by social health support program. The authors used negative binomial regression models to compare visit counts between assigned groups for primary care encounters, specialty care encounters, behavioral health encounters, urgent care encounters, and patient messages. Differences in the probability of any ED visit or inpatient admission between groups were estimated using logistic regression. The authors reported average marginal effects to convey absolute differences between programs. The average marginal effects can be interpreted as absolute counts for count outcomes and probabilities for the binary outcomes. Stata 17 and RStudio 4.2.1 were used for analyses.[27,28]

Although the primary intent-to-treat analyses examined outcomes by randomized group, randomization did not guarantee that participants received resources from their assigned program. The authors conducted secondary as-treated analyses to assess utilization among those who received CRS (regardless of program assignment) compared with that among those who did not receive either CCC or CRS. The authors defined CRS receipt as speaking to and receiving resource information from a CRS, which the authors ascertained using case notes. This allowed the authors to compare full CRS engagement against a true comparison. These findings will also help inform healthcare systems about anticipated utilization outcomes in response to a local specialist social health support program.

To address potential differences between groups receiving CRS and those not receiving any support, the authors constructed a balanced comparison group using propensity score methods. This was accomplished by estimating propensity score weights using the twang package in R to balance groups who received and did not receive CRS using observable characteristics measured at baseline.[29] This package uses machine learning models that include data-driven nonlinearities and covariate interactions to devise the propensity score model. The authors extracted the propensity score weights from the model and applied them to the as-treated sample using the svyset command in Stata.[30] Additional details about the development of the as-treated sample using an inverse propensity score weighting method can be found in the Appendix (available online). The authors compared utilization between those who received CRS and those who did not receive any support using the new balanced sample with the same model types as the intent-to-treat analyses. Specifically, the authors used negative binomial regression models for the primary care encounters, specialty care encounters, behavioral health encounters, urgent care encounters, and patient messages. The authors used logistic regression models for ED encounters and inpatient

admissions. The authors were unable to create a balanced comparison group using propensity score weights for an as-treated CCC analysis owing to the small cell size of participants who received CCC.

RESULTS

A total of 534 patients were randomized after reporting a social need on the SHQ during the enrollment period and included in analyses (Figure 1). CCC consisted of 266 participants, and 268 individuals were assigned to CRS. Table 1 shows that two thirds of the sample were female (66%) and the largest age group was 18−40 years, representing over one third of the sample. Participants aged ≥60 years were the second largest group representing 33% of the sample. More than half of participants identified as White (55%), and about 40% had commercial health insurance. The majority of participants also fell into moderate or higher ACG levels. About 74% of participants were from Clinic A, which is proportional to the size of Clinic A compared with Clinic B.

Participants' demographics were mostly balanced between CCC and CRS, except race and ethnicity and ACG level. There were fewer participants who identified as Hispanic in CCC (4.5%) than in CRS (7.8%) and a larger proportion of White participants in CCC (57.5%) than in CRS (53.4%). The authors also observed that fewer CCC participants fell into a low ACG level than CRS participants (3.8% and 6.0%, respectively), and more CCC participants were in a high ACG level than CRS participants (18.8% and 15.3%, respectively).

Intent-to-treat unadjusted regression results showed that participants assigned to CRS had 0.92 (95% CI=0.310, 1.528) more primary care encounters than CCC participants (Table 2). Adjusted results showed that CRS participants had 1.04 (95% CI=0.336, 1.746) more primary care encounters than CCC participants over a 9-month period. Although statistically significant differences between groups were not identified for other utilization categories, the authors observed a trend of slightly higher specialty, behavioral, and urgent care utilization and patient message volume among CRS than among CCC participants. Coefficient estimates from these outcome models can be found in the Appendix (available online). Findings from a sensitivity analysis that excluded specialty care outliers were consistent with the main specialty care results.

The as-treated analyses showed that participants who received CRS had 1.66 (95% CI=0.303, 3.008) more primary care encounters and 3.90 (95% CI=1.010, 6.794) more specialty care encounters than those who did not receive social health support through CRS (Table 3). Those who received CRS also had 3.85 (95% CI=1.426, 6.276) more patient messages than those who did not. Similar to the intent-to-treat results, the authors observed a trend of slightly higher behavioral health encounters. However, the authors did not observe any statistically significant differences for all other utilization categories.

The authors also explored the most common types of services for the significant utilization outcomes categories. For example, high frequency services that fell under primary care included office and telehealth encounters, sick-visit consultations, and vaccinations. For specialty care, the most common services consisted of office encounters; eye-care−related encounters; and laboratory, imaging, and radiology services.

DISCUSSION

This study assessed the effects of a pilot SHI program on healthcare utilization. Specifically, the authors compared

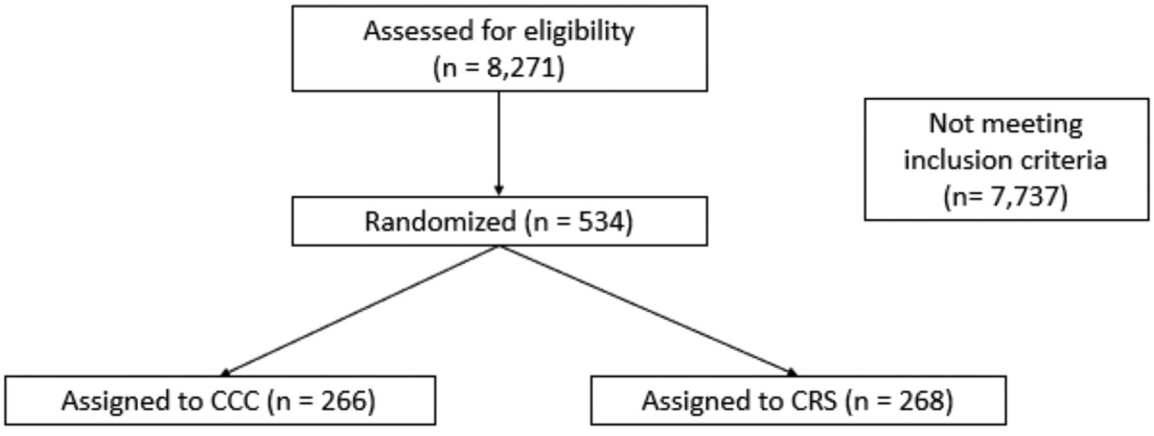

Figure 1. CONSORT diagram.

Table 1. Participant Characteristics

Characteristic	Connections Call Center (*n*=266)	Community resource specialist (*n*=268)	Total (N=534)	Standardized mean difference
Sex, *n* (%)				0.01
Female	176 (66.2)	176 (65.7)	352 (65.9)	
Male	90 (33.8)	92 (34.3)	182 (34.1)	
Age, years, *n* (%)				0.018
<18	23 (8.6)	24 (9.0)	47 (8.8)	
18–40	95 (35.7)	94 (35.1)	189 (35.4)	
41–60	62 (23.3)	62 (23.1)	124 (23.2)	
≥60	86 (32.3)	88 (32.8)	174 (32.6)	
Race and ethnicity, *n* (%)				0.188
African American or Black	12 (4.5)	12 (4.5)	24 (4.5)	
Native American or Alaska Native	1 (0.4)	2 (0.7)	3 (0.6)	
Asian	7 (2.6)	8 (3.0)	15 (2.8)	
Hispanic	12 (4.5)	21 (7.8)	33 (6.2)	
Multiracial	10 (3.8)	13 (4.9)	23 (4.3)	
Native Hawaiian or Pacific Islander	6 (2.3)	3 (1.1)	9 (1.7)	
White	153 (57.5)	143 (53.4)	294 (55.0)	
Other	5 (1.9)	6 (2.2)	11 (2.1)	
Unknown	60 (22.6)	60 (22.4)	120 (22.5)	
Insurance type, *n* (%)				0.079
Commercial	112 (42.1)	116 (43.3)	228 (42.7)	
Individual	8 (3.0)	6 (2.2)	14 (2.6)	
Medicaid	36 (13.5)	41 (15.3)	77 (14.4)	
Medicare	81 (30.5)	76 (28.4)	157 (29.4)	
No coverage	29 (10.9)	29 (10.8)	58 (10.9)	
Adjusted clinical group utilization band, *n* (%)				0.104
Nonuser	7 (2.6)	11 (4.1)	18 (3.4)	
Healthy users	10 (3.8)	7 (2.6)	17 (3.2)	
Low	10 (3.8)	16 (6.0)	26 (4.9)	
Moderate	84 (31.6)	82 (30.6)	166 (31.1)	
High	50 (18.8)	41 (15.3)	91 (17.0)	
Very high	36 (13.5)	33 (12.3)	69 (12.9)	
Missing	69 (25.9)	78 (29.1)	147 (27.5)	
Clinic				0.013
A	197 (74.1)	197 (73.5)	394 (73.8)	
B	69 (25.9)	71 (26.5)	140 (26.2)	

the impact of 2 social health support programs on utilization outcomes in a general patient population over 9 months. The study's intent-to-treat findings showed that participants assigned to CRS, a local, care-team–based program, had more primary care encounters than those assigned to receive support from CCC, a centralized operator call center, in the 9 months after screening. The as-treated results showed that those who spoke to and received support from CRSs not only had more primary care encounters but also had more specialty care encounters and patient messages with their care team than those who did not receive support. These combined findings suggest that receiving support and follow-up from a local specialist who is embedded in the care team is associated with increased nonurgent or emergent healthcare utilization.

There are a few things to consider when interpreting these findings. First, an increase in primary care encounters in the intent-to-treat findings as well as specialty care and patient messages in the as-treated results may

Table 2. Intent-to-Treat Unadjusted and Adjusted Results

	CCC		CRS		Difference	
Outcome	**Estimate**	**95% CI**	**Estimate**	**95% CI**	**AME**	**95% CI**
Unadjusted						
Primary care encounters	3.85	3.412, 4.296	4.77	4.244, 5.302	0.92	0.310, 1.528
Specialty care encounters	4.26	3.455, 5.056	5.00	3.929, 6.067	0.74	−0.397, 1.883
Behavioral health encounters	0.80	0.531, 1.076	1.09	0.661, 1.524	0.29	−0.137, 0.715
Urgent care encounters	0.47	0.339, 0.605	0.62	0.442, 0.791	0.14	−0.037, 0.325
Patient messages	5.91	5.182, 6.638	6.16	6.940, 6.940	0.64	−0.337, 1.623
ED encounters (any)	0.12	0.078, 0.155	0.13	0.093, 0.175	0.02	−0.039, 0.073
IP admissions (any)	0.07	0.040, 0.102	0.06	0.028, 0.083	−0.02	−0.057, 0.026
Adjusted						
Primary care encounters	4.37	3.874, 4.859	5.41	4.732, 6.084	1.04	0.336, 1.746
Specialty care encounters	3.67	2.866, 4.471	4.31	3.343, 5.282	0.64	−0.332, 1.619
Behavioral health encounters	0.78	0.460,1.093	1.06	0.658, 1.454	0.28	−0.113, 0.673
Urgent care encounters	0.38	0.251, 0.501	0.49	0.337, 0.644	0.11	−0.028, 0.258
Patient messages	5.38	4.485, 6.285	5.97	5.009, 6.932	0.59	−0.301, 1.473
ED encounters (any)	0.12	0.083, 0.162	0.15	0.109, 0.197	0.03	−0.029, 0.090
IP admissions (any)	0.08	0.045, 0.112	0.07	0.035, 0.097	−0.01	−0.058, 0.033

Note: AMEs for the count outcomes can be interpreted as the difference in the count of encounters between groups, with CCC as the ref group. AMEs from the binary outcome measures are the differences in the probability of a visit or admission occurring between groups.
AME, average marginal effect; CCC, Connections Call Center; CRS, community resource specialist; ED, emergency department; IP, inpatient.

reflect the CRS program structure. CRSs are embedded in care teams and can support participants by following up with them after their primary care appointments. In addition, increased engagement between CRSs and participants can increase trust and rapport with both their care teams and the healthcare system. This may help explain increased engagement in preventive and outpatient services among CRS participants to address their medical needs.

Second, it is important to understand the types of services that were captured through primary and specialty care claims. The most common services for primary and specialty care suggest that these encounters were most often for preventive, primary, and specialty care services. Third, the changes the authors observed align with the conceptual relationship between SHI programs and utilization outcomes.[14,15] For example, CRSs are trained in motivational interviewing and can promote participants' continuity of care and provide support after their primary care encounters as members of the care team. Resolution of social needs after meeting with CRS could also be another pathway to influence

Table 3. As-Treated CRS Weighted Results

CRS						
Outcome	**Comparison group**		**CRS receipt (*n*=119)**		**Difference**	
	AME	**95% CI**	**AME**	**95% CI**	**AME**	**95% CI**
Primary care encounters	4.68	4.095, 5.275	6.34	5.124, 7.557	1.66	0.303, 3.008
Specialty care encounters	4.57	3.871, 5.263	8.47	5.661, 11.275	3.90	1.010, 6.794
Behavioral health encounters	1.88	1.312, 2.442	2.66	1.418, 3.902	0.78	−0.582, 2.147
Urgent care encounters	0.76	0.583, 0.944	1.49	−0.004, 2.990	0.73	−0.779, 2.237
Patient messages	6.10	5.342, 6.859	9.95	7.648, 12.255	3.85	1.426, 6.276
ED encounters (any)	0.11	0.075, 0.142	0.17	0.091, 0.246	0.06	−0.024, 0.144
IP admissions (any)	0.06	0.039, 0.085	0.06	0.017, 0.109	0.00	−0.050, 0.053

Note: AMEs for the count outcomes can be interpreted as the difference in the count of encounters between groups, with CCC as the ref group. AMEs from the binary outcome measures are the differences in the probability of a visit or admission occurring between groups.
AME, average marginal effect; CCC, Connections Call Center; CRS, community resource specialist; ED, emergency department; IP, inpatient.

utilization patterns by improving participants' access to care, but previous findings did not find differences in resolution between CCC and CRS participants.[17]

Fourth, it is likely that the authors did not observe differences in other utilization outcomes because of the low frequency of these encounters in this sample and the study timeline. For example, behavioral health and urgent care encounters were not highly used services among participants in this pilot. Behavioral health encounters were a subset of specialty care encounters, and it is possible that there may be provider capacity or access issues that contributed to the low frequency of encounters, especially during the pandemic. In addition, it is likely that mild-to-moderate behavioral health concerns were addressed in primary care, whereas specialty care behavioral health encounters are often reserved for moderate-to-severe concerns in this health system. This suggests that the study findings from a primary care–based SHI program are informative about more immediate patterns of utilization, such as primary care, in addition to specialty care encounters and patient messages for participants who had a more intensive form of the care-team navigator CRS program.

Limitations

There are a few limitations to this study. The intent-to-treat analysis compared CRS participants with CCC participants, an active comparison group. There were more similarities between the 2 programs than originally anticipated owing to the pandemic and shift in CCC protocol, and this may have minimized potential outcome differences between programs. However, the as-treated analyses allowed the authors to assess differences between those who received CRS and participants who did not receive resource information from any program. In addition, the authors were only able to measure utilization within the healthcare system or through any external claims that were submitted, and it is possible that participants had out-of-insurance encounters. A larger sample size or a longer follow-up period could also have allowed the authors to detect larger counts and any potential changes in ED encounters or inpatient admissions. In exploring utilization patterns 9 months prior to randomization to understand baseline utilization, the authors observed low counts of ED encounters and inpatient admissions among the study sample. A larger sample size would have also allowed the authors to conduct an as-treated analysis of CCC to better understand how participants who received support from an operator center modality differed in their utilization from nonrecipients. Finally, patients were only eligible for randomization if they scheduled and completed a primary care appointment at 1 of the 2 clinics, limiting the sample to those who were already engaged with the healthcare system. It is possible that patients with little or no original engagement with the healthcare system may have a larger magnitude of changes in utilization in response to these types of interventions. However, the study design aligns with other SHI programs in which patients are recruited on the basis of an encounter with the healthcare system. Conducting patient outreach or including patients from multiple settings in future SHI initiatives may capture patients with varying levels of baseline engagement.

CONCLUSIONS

The evidence base on health systems' roles in addressing patients' social health and the potential impact of SHI programs on utilization is still growing. In this study, participants who fully engaged with the clinic-based CRS program had higher specialty care utilization, patient message volume, and primary care encounters than those who did not participate in any program. These findings can help inform decision makers about how to distribute resources as their healthcare systems develop SHI programming. There are a variety of ways that healthcare systems can allocate resources toward screening and resource connection, and it is possible that local, clinic-based support is necessary to realize change.

As a clinic-based and care team–embedded program, CRS is more local and contact intensive than CCC. Healthcare systems that adopt a similar approach may observe similar increases in primary and specialty care utilization in the short term, likely from increased support for patients as well as patient engagement with the health system. These findings align with the conceptual framework that SHI programs can influence utilization, supporting the potential of the CRS program. However, the study's findings on the impact on long-term, often emergent or avoidable utilization, outcomes remain unclear. To understand these long-term effects, additional research over a longer time frame would be beneficial for health systems to understand how long to expect higher counts of outpatient services and the extent of changes on other avoidable, emergent utilization.

ACKNOWLEDGMENTS

The authors thank all the Kaiser Permanente members who completed the survey and the Kaiser Permanente Washington Health Research Institute Survey Research Program.

Disclaimer: The content of this paper is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

Declaration of interest: None

Funding: AM was supported by Grant Number T32HS013853 from the Agency for Healthcare Research and Quality.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.focus.2025.100323.

REFERENCES

1. Alderwick H, Gottlieb LM. Meanings and misunderstandings: a social determinants of health lexicon for health care systems. *Milbank Q.* 2019;97(2):407–419. https://doi.org/10.1111/1468-0009.12390.
2. Dorr DA, Quiñones AR, King T, Wei MY, White K, Bejan CA. Prediction of future health care utilization through note-extracted psychosocial factors. *Med Care.* 2022;60(8):570–578. https://doi.org/10.1097/MLR.0000000000001742.
3. Heller CG, Rehm CD, Parsons AH, Chambers EC, Hollingsworth NH, Fiori KP. The association between social needs and chronic conditions in a large, urban primary care population. *Prev Med.* 2021;153:106752. https://doi.org/10.1016/j.ypmed.2021.106752.
4. Morales DX, Morales SA, Beltran TF. Racial/ethnic disparities in household food insecurity during the COVID-19 pandemic: a nationally representative study. *J Racial Ethn Health Disparities.* 2021;8(5):1300–1314. https://doi.org/10.1007/s40615-020-00892-7.
5. Gottlieb LM, Hessler D, Long D, et al. Effects of social needs screening and in-person service navigation on child health: a randomized clinical trial. *JAMA Pediatr.* 2016;170(11):e162521. https://doi.org/10.1001/jamapediatrics.2016.2521.
6. Berkowitz SA, Hulberg AC, Standish S, Reznor G, Atlas SJ. Addressing unmet basic resource needs as part of chronic cardiometabolic disease management. *JAMA Intern Med.* 2017;177(2):244–252. https://doi.org/10.1001/jamainternmed.2016.7691.
7. Poleshuck E, Wittink M, Crean HF, et al. A comparative effectiveness trial of two patient-centered interventions for women with unmet social needs: personalized support for progress and enhanced screening and referral. *J Womens Health (Larchmt).* 2020;29(2):242–252. https://doi.org/10.1089/jwh.2018.7640.
8. Crook HL, Zheng J, Bleser WK, Whitaker RG, Masand J, Saunders RS. *How are payment reforms addressing social determinants of health? Policy implications and next steps*. New York, NY: Milbank Memorial Fund; 2021. https://healthpolicy.duke.edu/sites/default/files/2021-02/How%20Are%20Payment%20Reforms%20Addressing%20Social%20Determinants%20of%20Health.pdf.
9. National Committee for Quality Assurance. HEDIS MY 2023. Measure description. Washington, DC: National Committee for Quality Assurance; 2022. https://www.ncqa.org/wp-content/uploads/2022/07/HEDIS-MY-2023-Measure-Description.pdf.
10. National Academies of Sciences, Engineering, and Medicine. Integrating Social Care into the Delivery of Health Care: Moving Upstream to Improve the Nation's Health. Washington, DC: The National Academies Press; 2019. https://www.nap.edu/catalog/25467/integrating-social-care-into-the-delivery-of-health-care-moving.
11. Sokol R, Austin A, Chandler C, et al. Screening children for social determinants of health: a systematic review. *Pediatrics.* 2019;144(4):e20191622. https://doi.org/10.1542/peds.2019-1622.
12. Hsu C, Hertel E, Johnson E, et al. Evaluation of the learning to integrate neighborhoods and clinical care project: findings from implementing a new lay role into primary care teams to address social determinants of health. *Perm J.* 2018;22:18–101. https://doi.org/10.7812/TPP/18-101.
13. Garg A, Toy S, Tripodis Y, Silverstein M, Freeman E. Addressing social determinants of health at well child care visits: a cluster RCT. *Pediatrics.* 2015;135(2):e296–e304. https://doi.org/10.1542/peds.2014-2888.
14. Gurewich D, Garg A, Kressin NR. Addressing social determinants of health within healthcare delivery systems: a framework to ground and inform health outcomes. *J Gen Intern Med.* 2020;35(5):1571–1575. https://doi.org/10.1007/s11606-020-05720-6.
15. Gottlieb LM, Hessler D, Wing H, Gonzalez-Rocha A, Cartier Y, Fichtenberg C. Revising the logic model behind health Care's social care investments. *Milbank Q.* 2024;102(2):325–335. https://doi.org/10.1111/1468-0009.12690.
16. Centers for Medicare and Medicaid Services. Accountable health communities model: 2018—2021. Baltimore, MD: Centers for Medicare and Medicaid Services; 2023. https://www.cms.gov/priorities/innovation/data-and-reports/2023/ahc-second-eval-rpt-fg.
17. Mahmud A, Brown MC, Wong ES, et al. Comparison of Clinic-Based Assistance Versus a Centralized Call Center on Patient-Reported Social Needs: Findings From a Randomized Pilot Social Health Integration Program; Under review.
18. Mahmud A, Brown MC, Lewis CC, et al. Differences in Health Care Costs Between Two Social Health Support Programs: Findings From a Randomized Social Health Integration Pilot Program; Submitted.
19. Schickedanz A, Sharp A, Hu YR, et al. Impact of social needs navigation on utilization among high utilizers in a large integrated health system: a quasi-experimental study. *J Gen Intern Med.* 2019;34(11):2382–2389. https://doi.org/10.1007/s11606-019-05123-2.
20. Conroy K, Samnaliev M, Cheek S, Chien AT. Pediatric primary care-based social needs services and health care utilization. *Acad Pediatr.* 2021;21(8):1331–1337. https://doi.org/10.1016/j.acap.2021.01.012.
21. Berkowitz SA, Parashuram S, Rowan K, et al. Association of a care coordination model with health care costs and utilization: the johns Hopkins Community Health Partnership (J-CHiP). *JAMA Netw Open.* 2018;1(7):e184273. https://doi.org/10.1001/jamanetworkopen.2018.4273.
22. Pantell MS, Hessler D, Wing H, et al. Association of 2 social needs interventions with child emergency department use and hospitalizations: a secondary analysis of a randomized clinical trial. *JAMA Pediatr.* 2022;176(7):716–717. https://doi.org/10.1001/jamapediatrics.2022.0503.
23. Yan AF, Chen Z, Wang Y, et al. Effectiveness of social needs screening and interventions in clinical settings on utilization, cost, and clinical outcomes: a systematic review. *Health Equity.* 2022;6(1):454–475. https://doi.org/10.1089/heq.2022.0010.
24. Kangovi S, Mitra N, Grande D, Long JA, Asch DA. Evidence-based community health worker program addresses unmet social needs and generates positive return on investment. *Health Aff (Millwood).*. 2020;39(2):207–213. https://doi.org/10.1377/hlthaff.2019.00981.
25. Johns Hopkins ACG System. Johns Hopkins Medicine. https://www.hopkinsacg.org. Updated March 4, 2025. Accessed October 5, 2023.
26. Holmberg MJ, Andersen LW. Adjustment for baseline characteristics in randomized clinical trials. *JAMA.* 2022;328(21):2155–2156. https://doi.org/10.1001/jama.2022.21506.
27. StataCorp, Stata, 17 Base Reference Manual, 2021, StataCorp LLC. https://www.stata.com/manuals17/r.pdf. Accessed August 24, 2022.
28. RStudio desktop. https://posit.co/download/rstudio-desktop/.
29. G. Ridgeway, D.F. McCaffrey, A.R. Morral, L.F. Burgette and BA. Griffin, Toolkit for weighting and analysis of nonequivalent groups: a tutorial for the R TWANG package, January 2022, RAND Corporation; Santa Monica, CA https://www.rand.org/pubs/tools/TLA570-5.html, Published July 2022, Accessed November 17, 2023.
30. StataCorp LLC. Svyset - declare survey design for dataset. College Station, TX: StataCorp LLC; 2023. https://www.stata.com/manuals/svysvyset.pdf.