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

Clarissa Hsu, PhD; Erin Hertel, MPA; Eric Johnson, MS; Carol Cahill, MLS; Paula Lozano, MD, MPH;
Tyler R Ross, MA; Kelly Ehrlich, MS; Katie Coleman, MSPH; June BlueSpruce, MPH; Allen Cheadle, PhD;
Juno Matthys; Michelle Chapdelaine, MPH; Marlaine Gray, PhD; Janice Tufte; Michele Robbins

ABSTRACT

Introduction: Health systems increasingly recognize the impact of social determinants of health such as access to housing, transportation, and nutritious food. Lay health workers have been used to address patients' social determinants of health through resource referral and goal setting in targeted populations, such as individuals with diabetes. However, we know of no studies that evaluate this type of role for a general primary care population.

Objective: To assess the implementation and impact of the Community Resource Specialist (CRS) role in Kaiser Permanente Washington.

Methods: We analyzed data from staff interviews, patient focus groups, clinic site visits, patient surveys, the electronic health record, and administrative sources.

Results: Satisfaction with CRSs was high, with 92% of survey respondents choosing "very satisfied" or "somewhat satisfied." Of patients with a resource referral and follow-up encounter, 45% reported using the resource (n = 229) and 86% who set a goal and had a follow-up encounter (n = 218) progressed toward their goal. Primary care teams reported workload easing. Patients who used CRSs and participated in focus groups reported behavior changes and improved health, although no changes were detected from electronic health records or patient survey data. Key learnings include the need to clearly define the CRS role, ensure high visibility to clinical staff, and facilitate personal introductions of patients (warm handoffs).

Conclusion: Adding an individual to the primary care team with expertise in community resources can increase patient satisfaction, support clinicians, and improve patients' perceptions of their health and well-being.

INTRODUCTION

By 2020, an estimated 157 million Americans are expected to have at least 1 chronic illness, with 81 million having 2 or more.[1] Chronic illness accounts for more than 85% of health care spending in the US.[2] Recognition is increasing that social determinants of health (SDH)— economic and social conditions that influence health such as inadequate housing, social isolation, and food insecurity—have a role in preventing and managing chronic illness.[3] The Chronic Care Model (CCM), which is associated with improved patient outcomes and care quality,[4] posits that health outcomes improve when primary care practices partner with community organizations to address patients' needs. The Expanded CCM[5,6] emphasizes the key roles of community agencies in self-management support and health skills development, decision support, and healthy living activities. Examples include local YMCAs with exercise programs for seniors and obesity prevention programs that clinicians can prescribe for patients to help prevent or treat chronic conditions.

As a result of this growing recognition of the interconnection between SDH and chronic disease management, health systems and researchers have been experimenting with roles to support patients in accessing community resources. One approach is adding lay or community health workers to primary care teams to help patients through resource referral, goal setting, and follow-up.[7,8] A recent literature review revealed growing evidence of the impact of lay or community health workers in primary care settings.[9-15] However, existing studies tend to target specific clinical populations, such as patients recently discharged from the

Clarissa Hsu, PhD, is an Assistant Investigator at the Kaiser Permanente Washington Health Research Institute in Seattle (clarissa.w.hsu@kp.org).
Erin Hertel, MPA, is a Senior Research Associate at the Center for Community Health & Evaluation, Kaiser Permanente Washington Health Research Institute in Seattle (erin.m.hertel@kp.org). **Eric Johnson, MS,** is a Biostatistician at the Center for Community Health & Evaluation, Kaiser Permanente Washington Health Research Institute in Seattle (eric.johnson@kp.org). **Carol Cahill, MLS,** is a Communication and Analytics Consultant at the Center for Community Health & Evaluation, Kaiser Permanente Washington Health Research Institute in Seattle (carol.l.cahill@kp.org).
Paula Lozano, MD, MPH, is a Senior Investigator at the Kaiser Permanente Washington Health Research Institute in Seattle (paula.lozano@kp.org).
Tyler R Ross, MA, is the Director of Information Technology at the Kaiser Permanente Washington Health Research Institute in Seattle (tyler.ross@kp.org). **Kelly Ehrlich, MS,** is a Project Manager at the Kaiser Permanente Washington Health Research Institute in Seattle (kelly.j.ehrlich@kp.org). **Katie Coleman, MSPH,** is an Assistant Investigator at the Kaiser Permanente Washington Health Research Institute in Seattle (katie.f.coleman@kp.org). **June BlueSpruce, MPH,** is a Project Manager at the Kaiser Permanente Washington Health Research Institute in Seattle (jbluespruce@gmail.com). **Allen Cheadle, PhD,** is a Senior Research Associate at the Center for Community Health & Evaluation, Kaiser Permanente Washington Health Research Institute in Seattle (allen.d.cheadle@kp.org). **Juno Matthys** is a Research Associate at the Center for Community Health & Evaluation, Kaiser Permanente Washington Health Research Institute in Seattle (juno.f.matthys@kp.org).
Michelle Chapdelaine, MPH, is a Research Associate in the Center for Community Health & Evaluation, Kaiser Permanente Washington Health Research Institute in Seattle (michelle.a.chapdelaine@kp.org). **Marlaine Gray, PhD,** is an Acting Assistant Investigator at the Kaiser Permanente Washington Health Research Institute in Seattle (marlaine.s.figueroagray@kp.org). **Janice Tufte** is a Patient Coinvestigator at the Kaiser Permanente Washington Health Research Institute in Seattle (janicetufte@yahoo.com). **Michele Robbins** is a Patient Coinvestigator at the Kaiser Permanente Washington Health Research Institute in Seattle (michelerobbins321@gmail.com).

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hospital or those with specific chronic conditions such as diabetes, rather than a general primary care population.[9,11,12,14,15] Our study addressed this gap by using a patient-centered design process to create and implement a lay health worker role into primary care, with the intent of testing the feasibility and impact of this type of role on a more broadly defined population.

Supported by funding from the Patient-Centered Outcomes Research Institute, our team launched the Learning to Integrate Neighborhoods and Clinical Care (LINCC) project. LINCC created a new primary care team role focused on helping patients connect to community resources using motivational interviewing and goal setting, and resource referral and follow-up. We piloted the role in 3 primary care clinics (A, B, and C) in a health system that is now spreading the role throughout its 25 primary care facilities. Clinic A was in a suburban area, serving about 14,000 members whose average census median household income was $56,000. Clinic B served approximately 7000 members in an urban area with a diverse population; average census median household income was $60,800. Clinic C was in a suburban area, serving about 16,000 members whose average census median household income was $69,700.

This article describes the process and outcome findings from our evaluation of the implementation and impact of the LINCC project. Our results will be useful to health systems that want to use lay health workers to increase clinical staff efficiency and patient satisfaction, integrate new roles into care teams, and address their patients' SDH by referral to community health resources. Additionally, our findings will help inform future research and implementation of similar interventions to address SDH.

METHODS
Role and Setting

This project was carried out at Kaiser Permanente Washington (KPWA, formerly Group Health), an integrated health system in Washington State with nearly 600,000 members in 2015. KPWA serves a primarily insured population. The pilot clinics were selected with the aim of balancing geographic, racial/ethnic, and income diversity. We involved 12 patients, 11 primary care team members (including primary care providers, registered nurses [RNs], medical assistants [MAs], behavioral health/social workers, and front desk staff), and delivery system leaders who provided high-level oversight in a participatory design process for the new primary care role. The outcome of the design process was a role called the Community Resource Specialist (CRS) along with a job description, training schedule and outline, draft electronic health record (EHR) referral and visit documentation templates, and an information sheet for patients. The CRS role was piloted at 3 KPWA primary care clinics. The job description, hiring process, training program, tools, and workflow remained relatively constant over time, although efforts were made throughout the project to improve on CRS workflow processes and tools. The CRSs were hired by the health system (rather than the research team) and were supervised by Clinic Managers. Figure 1 shows a timeline of key implementation events. Because the position was created de novo (no similar roles existed in the organization), finalizing, approving, and posting the job description and hiring CRSs took approximately 3 months. Throughout the project, the research team provided extensive support for the CRS role, including from a hired consultant with experience coaching clinical staff to use motivational interviewing and health coaching techniques. Unlike many community health worker interventions, the CRS role was not designed to serve a specific subpopulation such as patients with the highest health care utilization or a specific condition such as diabetes. Rather, the role was designed to serve a broad array of patients who may need additional support and resources to improve or maintain health with a strong emphasis on those with moderate health care needs and utilization.

The CRS role focused on 3 key activities: 1) working directly with patients to help them access community resources and set health-related goals, 2) researching and becoming familiar with community resources, and 3) increasing the primary care team's knowledge of those resources. Patients could be referred to the CRS by clinic staff through a warm handoff or the EHR referral process. *Warm handoffs* were defined as in-person introductions from a member of the primary care team who had an existing relationship with the patient. Patients could also self-refer. On referral or at their first visit with the CRS, patients were automatically entered into an EHR-based CRS registry. The CRSs had a series of EHR-based tools to help them work with patients, including templates for intake, action planning, and follow-up.

In December 2014, about 5 months after CRSs started seeing patients, both the CRS and the Clinic Manager (the CRS's supervisor) at Clinic A resigned. Because of staffing instability at the clinic, the CRS position was moved to Clinic C approximately 10 miles away. The second original pilot clinic (Clinic B) had a stable CRS for 14 months, after which the CRS resigned to relocate. Sufficient notice was provided to allow the CRS at Clinic B to train her successor (Figure 1). In late April 2015, a follow-up design event was held to troubleshoot challenges and improve workflow for the CRS role. Key issues addressed included better guidelines and communication efforts to clinic staff regarding appropriate patients to refer to the CRS and increasing warm handoffs.

Mixed-Methods Approach

Our mixed-methods approach to documenting and evaluating the LINCC intervention included analyzing the following: 1) EHR-CRS documentation, 2) site visits/implementation observations, 3) a patient survey, 4) patient focus groups, 5) staff interviews, and 6) administrative data. For most analyses, we included data from all 3 clinics. For follow-up qualitative data (ie, interviews and focus groups), we used only Clinics B and C, because Clinic A had no active CRS service at the time. The time frame for most data collection activities was from onset of implementation in April 2014 through December 2015. The CRS documentation of patient encounters was collected through December 2016.

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Analysis of Community Resource Specialist Documentation

The EHR tools developed to support CRSs included a patient registry for tracking and documenting care and services provided. We conducted a chart review of all CRS documentation in the EHR and carried out a detailed coding process to abstract more reliable data on types of resource referrals and goal setting, follow-up, progress made toward goals, and resources used by patients.[a] After coders achieved a high rate of agreement, they coded all encounters for patients of all ages who had worked with a CRS from July 2014 (the month that CRSs began seeing patients) through December 2016.

Site Visits and Observations

Clinic observations provided formative feedback for quality improvement and documented training and implementation of the CRS role, with a focus on observing successes and barriers. Each pilot clinic was visited every 2 to 4 months, with more frequent visits and observation early and fewer visits once the position stabilized. The research team developed a daylong site visit/clinic observation protocol[a] that was based on results of previous studies. The protocol included a combination of observation, shadowing, and informal interviewing. Two observers (EH and CH) took detailed notes, which were transcribed and summarized. Summaries were shared with the research team, Clinic Managers, and CRSs.

Patient Survey

We surveyed patients aged 18 years and older who were referred or self-referred to a CRS and appeared in the CRS registry. Patients were asked to complete a survey regarding whether or not they had contact with the CRS. Patients were mailed an initial survey on being entered into the CRS registry. Three-month follow-up surveys were sent to all patients who did not refuse the first survey, regardless of whether they returned a completed initial survey or saw a CRS. Surveys were by mail, with telephone follow-up from April 2015 to January 2017. All patients surveyed received a $2 presurvey incentive and a $10 incentive for survey completion. We used a standard sequence for survey approach and nonresponder follow-up.

Survey content included the Consumer Assessment of Healthcare Providers and Systems: Patient-Centered Medical Home Items[16]; the Patient Activation Measure (the 6-question version)[17]; physical activity and social isolation questions adapted from the Behavioral Risk Factor Surveillance System[18]; a single-item health status question[19]; questions about goal setting, action planning, CRS referral, and follow-up; patient-reported use of community programs for health; and satisfaction with the CRS service.[a]

Items presented only at baseline or follow-up have no associated statistical tests and are presented to describe the population that worked with the CRS. Follow-up survey data were restricted to patients who reported working with the CRS. For the cohort that responded at both baseline and follow-up, we used prespecified analyses to detect changes in clinical follow-up rates, average weekly exercise, self-reported health status, and patient activation. Categorical variables were compared by χ^2 test. Continuous variables were compared using a 2-sample t-test with unequal variances.

Patient Focus Groups

Two focus groups were conducted at Clinics B and C (4 groups total) with patients who used the CRS service. The aim was assessing patient experience, impact of CRS services on patient behavior and well-being, and patient recommendations for improvement.[a]

The recruitment sample was all patients aged 18 years and older who had worked with a CRS at Clinics B or C at least once in 2015 (n = 227). The CRS at each clinic reviewed the list of potential participants and excluded 11 individuals for reasons that included serious mental illness or physical disability, no contact with the CRS despite appearing in the automated data, or death. The 216 remaining potential participants were invited by letter with a phone number to volunteer or decline; 16 declined or were ineligible. Patients were called until each group had 8 to 12 participants. Participants received a $75 thank-you. Two research team members (CH and EH) facilitated focus groups, which were audio-recorded and real-time transcribed by a court reporter.

The analysis team included 3 project team members who attended some or all focus groups. A thematic analysis approach[20,21] with iterative rounds of coding was used to develop and finalize codes. Two team members (CH and JB) coded
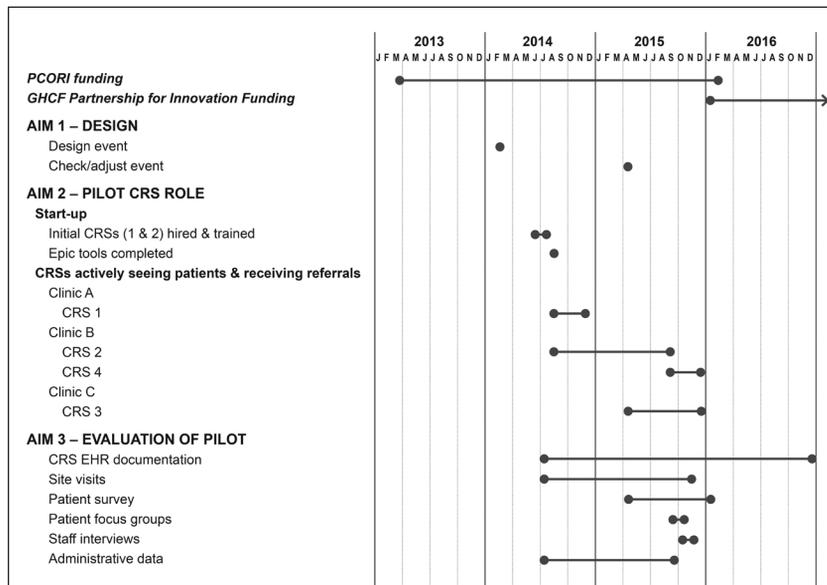

Figure 1. Project timeline.

Abbreviations under years = months; CRS = Community Resource Specialist; EHR = electronic health record (Epic); GHCF = Group Health Community Foundation; PCORI = Patient-Centered Outcomes Research Institute.

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all transcripts and reconciled differences, with all transcripts entered in qualitative data analysis software (Atlas.ti, Berlin, Germany).[22-25] Codes were again reviewed by one team member (CH), who identified subthemes and synthesized and summarized the results.

Staff Interviews

Qualitative interviews in late Fall 2015 assessed staff reactions to the CRS position. Interviewers asked respondents about their experience with CRS implementation, how they felt the role was working in the clinic, how the referral process was working, the extent to which they felt the role was becoming integrated into clinic workflow, how it affected their work, and their perception of benefits or challenges.

Participants in formal interviews included KPWA organizational leaders with responsibilities relevant to the CRS position; Clinic Managers; and up to 5 purposively selected primary care providers and staff working at Clinics B and C, including physicians, RNs, medical assistants, and social workers. Interviews were 1 hour long, either in person or by phone. Participants provided written consent and were given permission to use work time to participate. All interviews were audio-recorded and transcribed. Informal interviews were conducted with CRSs, clinic leaders, and staff during regular research site visits. Interview consent was verbal. These interviews were not audio-recorded, but detailed notes were taken. Three research team members conducted interviews (CH, EH, and JM).

Data were analyzed by interviewers and an additional team member (MG) using a thematic analysis approach.[20] One team member (EH) developed an initial code list using themes from review of 3 transcripts. Three team members (CH, EH, and JM) applied the initial code list to 3 transcripts, then reconciled revised codes and clarified definitions. Additional coding comparison finalized the code book and confirmed shared

Table 1. Key questions and data sources		
Data source	**Description of data**	**Key questions informed by data source**
EHR-CRS documentation	**Data collection time frame:** July 2014-December 2016 **Final dataset:** 4505 records analyzed for 1182 unique patients	Who was served by the CRS? What services did CRS patients receive? What impact did the CRS have on the patient? What were the key lessons learned?
Site visits/ implementation observations	**Data collection time frame:** July 2014-November 2015 **Final dataset:** Clinic A, 3 daylong visits Clinic B, 6 daylong visits Clinic C, 3 daylong visits	Who was served by the CRS? What services did CRS patients receive? What impact did the CRS have on the delivery system? What were the key lessons learned?
Patient survey	**Data collection time frame:** April 2015-January 2017 **Final dataset:** Mailed to 518 unique individuals. (Not all patients received both follow-up and a baseline survey because of timing issues.) Baseline surveys were mailed to 354 patients at the time of CRS registry entry. Of these, 169 were completed, 115 refused, 30 were ineligible, and 40 never responded, resulting in a 52% response rate.[a] Follow-up surveys were mailed to 384 patients 3 months after registry entry. Of these, 200[b] were completed, 71 refused, 16 were ineligible, and 97 never responded, resulting in a 54% response rate.[a]	What impact did the CRS have on the patient?
Patient focus groups	**Data collection time frame:** September 2015-October 2015 **Final dataset:** A total of 33 individuals participated in 4 focus groups.	What impact did the CRS have on the patient?
Staff interviews	**Data collection time frame:** October 2015-November2015 **Final dataset:** Participants in formal interviews were Kaiser Permanente Washington (KPWA) organizational leaders with responsibilities relevant to the CRS position (N = 5); clinic managers (N = 2); and clinic staff (N = 10) working at the 2 final pilot clinics, including physicians, registered nurses, medical assistants, and social workers.	What impact did the CRS have on the delivery system? What were the key lessons learned?
Administrative data (EHR, Health Plan, etc)	**Data collection time frame:** July 2014-September 2015 **Final dataset:** 420 CRS patients met inclusion criteria: 1) at least 1 full encounter with the CRS, 2) aged 18 years or older, and 3) enrolled at KPWA at time of CRS encounter. A total of 1036 patients served as matched controls. Up to 3 individual controls were matched to every CRS patient. Controls were selected on the basis of having similar 1) health care utilization in the index month, 2) race/ethnicity, 3) duration of enrollment before CRS visit, 4) age, 5) sex, and 6) ACG RUB. Some CRS patients were matched with only 2 controls if a third comparable control could not be identified.	Who was served by the CRS? What impact did the CRS have on the delivery system?

[a] Response rate was calculated by subtracting the ineligibles from the total number mailed and using that number as the denominator and the completed surveys as the numerator.
[b] Not all those responding to the survey had a visit with the CRS.
ACG RUB = Adjusted Clinical Group Resource Utilization Band; EHR = electronic health record; CRS = Community Resource Specialist.

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understanding and consistent application of codes. Transcripts were coded in Atlas.ti software.[22-25] On the basis of review of coded data, one team member (EH) drafted a coding memo with feedback from the coding team (JM, MG, CH).

Administrative Data

Health care utilization was examined using administrative data from the EHR and Health Plan data systems. Data were analyzed using an interrupted time-series design with observations by patient-month. We included anyone who saw the CRS at the 3 pilot clinics who was aged 18 years and older at the intake visit. Individuals contributed data until disenrollment from KPWA or the end of September 2015, whichever came first. To control for temporal trends at KPWA, we matched patients referred to a CRS ("CRS patients") to as many as 3 control patients at selected KPWA control clinics. Control clinics were geographically close to intervention sites (and therefore had access to similar community resources); were of similar size; and had similar patient demographics, including race/ethnicity distributions. Every CRS patient (as of September 30, 2015) was matched with up to 3 individuals from the corresponding control clinic using these criteria: 1) health care utilization in the index month, 2) race/ethnicity, 3) duration of enrollment before the CRS visit, 4) age, 5) sex, and 6) Adjusted Clinical Group Resource Utilization Bands.[26] In several cases, an individual was matched with only 1 or 2 controls because appropriate controls were not available. Missing clinical outcomes data were accounted for with multiple imputation via chained equations, using 100 imputed datasets. Analyses were conducted in Stata software (Version 15.1, StataCorp LLC, College Station, TX).[27]

We used random-effects models to analyze data, accounting for correlation between observations in the same patient. We used a restricted cubic spline to model the overall temporal trend in KPWA, with a knot placed at the time of the CRS visit and 2 additional knots at 6 months before and after the visit. To identify changes associated with the introduction of the CRS, we included interaction variables of the splines against an indicator variable, defined as 1 if the patient was in a clinic where the CRS was active at that time. Because the intervention-group patients and the controls may have had slight differences in average utilization rates before the CRS visit, we adjusted for intervention/control status to avoid potential confounding. We present the estimated differences between cases and matched controls at 3 and 6 months after the visit, adjusting for patient characteristics and baseline differences in rates.

RESULTS

We present our results organized around 5 key questions: 1) Who was served by the CRS? 2) What services/support did patients receive from the CRS? 3) What impact did the CRS have on the patients they worked with? 4) What impact did the CRS have on the health system? and 5) What were the key lessons learned? Because of our mixed-methods approach, findings were often

Table 2. Characteristics of patients referred to a Community Resource Specialist with at least 1 complete visit

Characteristic	Clinic A (n = 59), no. (%)	Clinic B (n = 331), no. (%)	Clinic C (n = 429), no. (%)	All clinics (N = 819), no. (%)
Sex, female	45 (76)	266 (80)	290 (68)	601 (73)
Age, y				
≤ 18	5 (8)	36 (11)	55 (13)	96 (12)
19-34	8 (14)	81 (24)	40 (9)	129 (16)
35-64	29 (49)	120 (36)	115 (27)	264 (32)
≥ 66	17 (29)	94 (28)	219 (51)	330 (40)
Race				
Asian	1 (2)	77 (23)	10 (2)	88 (11)
Black	10 (17)	130 (39)	12 (3)	152 (19)
Hawaiian/Pacific Islander	3 (5)	10 (3)	6 (1)	19 (2)
Native American	2 (3)	10 (3)	9 (2)	21 (3)
Other	2 (3)	19 (6)	13 (3)	34 (4)
Unknown	1 (2)	11 (3)	18 (4)	30 (4)
White	40 (68)	74 (22)	361 (84)	475 (58)
Hispanic ethnicity				
No	54 (92)	296 (89)	387 (90)	737 (90)
Yes	5 (8)	24 (7)	23 (5)	52 (6)
Unknown	0 (0)	11 (3)	19 (4)	30 (4)
ACG RUB (from lowest to highest predicted utilization)				
RUB 0	0 (0)	1 (0)	2 (0)	3 (0)
RUB 1	1 (2)	16 (5)	7 (2)	24 (3)
RUB 2	0 (0)	37 (11)	21 (5)	58 (7)
RUB 3	24 (41)	137 (41)	152 (35)	313 (38)
RUB 4	19 (32)	63 (19)	85 (20)	167 (20)
RUB 5	9 (15)	29 (9)	87 (20)	125 (15)
Missing	6 (10)	48 (15)	75 (17)	129 (16)
Chronic condition				
Congestive heart failure	4 (7)	21 (6)	43 (10)	68 (8)
Depression	23 (39)	81 (24)	165 (38)	269 (33)
Diabetes	18 (31)	66 (20)	91 (21)	175 (21)
Hypertension	33 (56)	143 (43)	220 (51)	396 (48)
Persistent asthma	16 (27)	63 (19)	89 (21)	168 (21)
None of selected conditions	13 (22)	132 (40)	137 (32)	282 (34)

ACG RUB = Adjusted Clinical Group Resource Utilization Band.

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based on multiple data sources. Table 1 describes the data sources and the key questions they answer.

Population Served by Community Resource Specialist

Overall, 1182 patients were referred to CRSs. Of referred patients, 69% (819) had at least 1 complete visit documented in the medical record; 11% (126) had no CRS interaction but received resource information via mail, phone, or secure messaging; and 20% (237) had no CRS interaction despite referral. Figure 2 summarizes the number of patients referred to the CRS between July 2014 and December 2016 and the disposition of those patients, including whether they received services from the CRS and the outcomes of those services. We also tracked the number of overall encounters and unique individuals seen by the CRS each month between April 2015 and October 2016, a period when the CRS role had been fully implemented, was running smoothly, and had stable staffing. The CRS capacity peaked at approximately 55 to 60 patient visits per month with 40 unique patients during this time frame. The CRS patients were diverse in age and ethnicity but were mostly female (73%, Table 2). The racial and ethnic diversity of the CRS patients roughly reflected the diversity in each pilot clinic (Figure 3). Patients who were referred to a CRS were primarily concentrated in Adjusted Clinical Group Resource Utilization Bands corresponding to moderate or
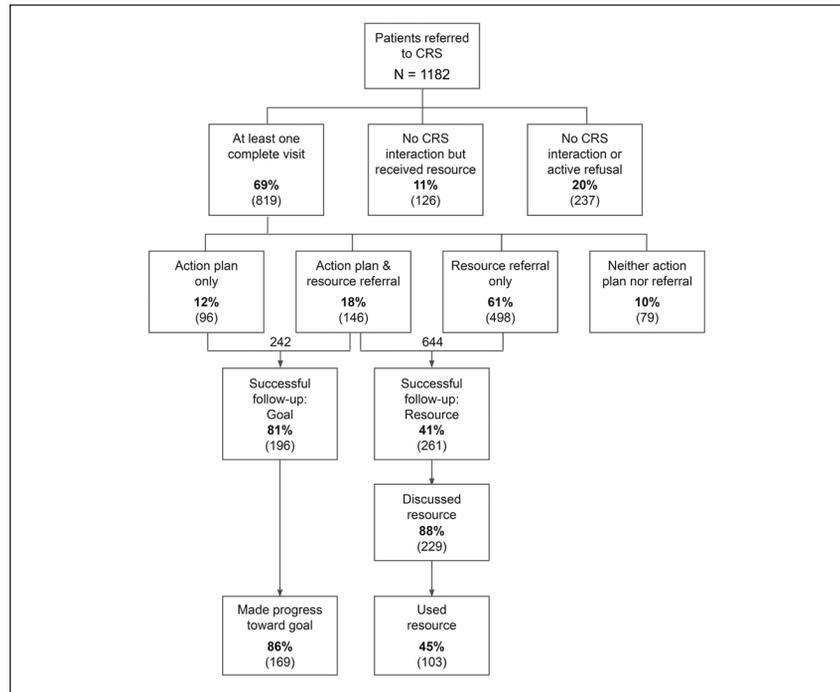

Figure 2. Referrals, level of connection to Community Resource Specialist (CRS), and outcome of interaction.[a]
[a] Values in parentheses are numbers of patients.

high health care utilization, which was the desired focus. Most CRS patients (66%) had 1 or more of the 5 common chronic diseases described in Table 2.

Services/Support Provided by a Community Resource Specialist

In our analysis of EHR-CRS documentation data, services to patients ranged from providing information about community resources to developing action plans (tools to elicit and document next steps for patients). Figure 2 shows the numbers of patients receiving specific types of services. Different service types were associated with a different intensity of contact from the CRS. Action planning involved more contacts per client; approximately 60% of clients with action plans had 3 or more contacts.
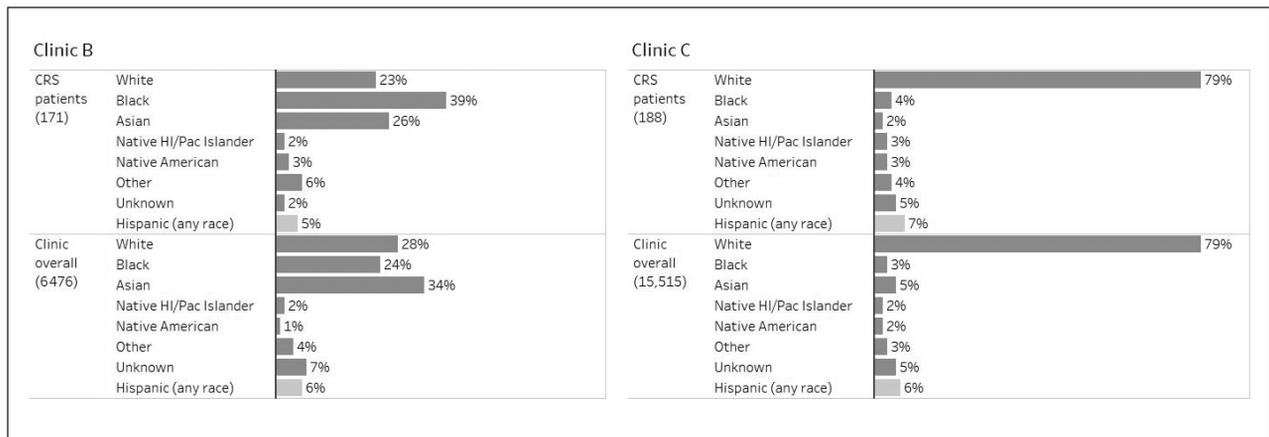

Figure 3. Race/ethnicity for pilot clinics and CRS patients.[a]
[a] Data are for 2 of the 3 pilot clinics with CRSs, from administrative data on 420 patients total. Clinic A was excluded because of the small number of CRS patients seen at the clinic during the pilot. Percentages may not total to 100% because more than 1 response was possible.
CRS = Community Resource Specialist; HI = Hawaiian: Pac Islander = Pacific Islander.

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Of patients with whom the CRS had 1 or more follow-up visits and discussed a resource, almost half reported that they used it (Figure 2). The 5 most frequent CRS referral types to external resources were social services (n = 328), physical activity (n = 199), support groups (n = 62), health care resources outside KPWA (n = 59), and parenting support (n = 50). Referrals to resources within KPWA were also common; 82 CRS patients received referrals to KPWA written or Web site materials, and 29 were referred to KPWA's Living Well with Chronic Conditions class. The CRSs often referred patients to different health care practitioners, including social workers or behavioral health practitioners (n = 66) or primary care providers (n = 47), and other practitioners such as specialists or eye care providers (n = 26). Overall, 45% of patients who were given a resource referral and had a follow-up encounter with a CRS reported using the resource (n = 103, Figure 2). If a patient set a goal, the likelihood of an accompanying action plan was higher. We found that 86% of patients who set a goal and had a follow-up encounter (n = 169) made progress toward their goal, according to analysis of CRS documentation.

Impact of Community Resource Specialist on Patients

Three-month follow-up surveys showed high satisfaction with CRS services. Of 106 patients who returned 3-month follow-up surveys who had at least 1 visit with the CRS, 63% (67 patients) marked very satisfied, 29% (31) marked somewhat satisfied, and 8% (8) marked not satisfied when asked about CRS services. Satisfaction levels were similar across all pilot clinics. These survey results were consistent with focus group data, which showed high CRS satisfaction.

A key goal for the CRS role was supporting patients in making changes to increase overall health and wellness. We found no significant differences in patient survey responses between baseline and follow-up for several health status-related questions for respondents who had seen CRSs (data not shown). Focus group data, however, indicated that the subset of patients who came to a focus group felt that working with the CRS contributed

Table 3. Health care utilization (per 1000 members per month) over time among patients seen by a Community Resource Specialist (CRS; N = 420 from administrative data) and matched controls (N = 1045)

Utilization	3 months after CRS contact	6 months after CRS contact
Total overall primary care utilization		
CRS patients, no.	523	481
Controls, no.	467	423
Adjusted difference (95% CI)	35.3 (-134, 205)	36.4 (-98, 171)
p value[a]	0.683	0.597
Emergency Department		
CRS patients	23.8	19.8
Controls	16.6	17.1
Adjusted difference (95% CI)	-6.7 (-29.8, 16.5)	-11.2 (-30.5, 8.2)
p value[a]	0.572	0.259
Urgent care		
CRS patients	50.3	51.9
Controls	72.7	71.5
Adjusted difference (95% CI)	-5.6 (-62.2, 51.0)	-2.8 (-49.1, 43.6)
p value[a]	0.847	0.907
Behavioral health		
CRS patients	147	118
Controls	82	74
Adjusted difference (95% CI)	15.1 (-49.1, 79.2)	-6.5 (-67.0, 53.9)
p value[a]	0.646	0.832
Primary care face-to-face		
CRS patients	329	299
Controls	230	227
Adjusted difference (95% CI)	82.7 (15.5, 149)	56.7 (-1.6, 115)
p value[a]	0.016	0.057
Outpatient		
CRS patients	959	853
Controls	847	766
Adjusted difference (95% CI)	166 (-30, 361)	141 (-53, 335)
p value[a]	0.097	0.154
Consulting nurse		
CRS patients	97	90
Controls	117	102
Adjusted difference (95% CI)	-21.7 (-60.9, 19.5)	-13.7 (-47.3, 19.9)
p value[a]	0.312	0.423
Secure messages		
CRS patients	2079	1955
Controls	2010	1878
Adjusted difference (95% CI)	580 (143, 1018)	588 (192, 985)
p value[a]	0.009	0.004
Secure-message threads[b]		
CRS patients	1312	1257
Controls	1317	1245
Adjusted difference (95% CI)	313 (36, 589)	330 (73, 586)
p value[a]	0.027	0.012
Telephone		
CRS patients	643	581
Controls	491	436
Adjusted difference (95% CI)	36.4 (-106.6, 179.4)	29.7 (-96.7, 156.0)
p value[a]	0.618	0.645

[a] p value compares intervention and control rates, after adjusting for baseline trends. Baseline values were evaluated at 1 month before the CRS visit.
[b] A series of related messages about a specific issue.
CI = confidence interval.

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to positive behavior change and/or increased wellness. Focus group participants reported behavior changes mainly related to healthy eating or active living.

> *I kind of liked it because the goals were little ones, like I promised I wasn't going to park in the handicapped parking. … I got to park at the end of the lot and that would give me a little walk. … It helped me because I did push myself to at least walk a little more. (Patient, Clinic B)*

> *[I]t's been like 2 or 3 weeks that I have been going to the gym every day, and the last time I weighed myself it was 248, and today was 238, so I lost 10 pounds. (Patient, Clinic C)*

In addition to changing behaviors, almost all focus group participants reported improved health and well-being. Some improvements were general, such as feeling better, whereas others were specific, such as improved strength, decreased pain, or losing weight.

> *I've been in a yoga class now for 11 weeks. I haven't missed at all. I can see and feel how the yoga is making my knee stronger [and] taking the pain away from my shoulders. (Patient, Clinic C)*

Several focus group participants described increased self-efficacy, both in knowing how to access health care and community resources and in increased goal-setting abilities.

> *It's lifted my spirits to know that I have the ability to find what I need and that I can go to [the CRS] for that kind of help. (Patient, Clinic C)*

> *I think what was really important to me was she taught me to organize my action plan for life … because, you know, I would talk about it, but I wouldn't specify—actually execute—what I wanted to do. And she really taught me how to motivate myself … to actually do it. That was really helpful, and that still stays with me. (Patient, Clinic B)*

Impact of Community Resource Specialist on Health System

A key measure of the impact of the CRS on the delivery system was changes in health care utilization. Table 3 shows changes in utilization measures over time, comparing patients with a CRS encounter vs the matched comparison group (rates are per member per month).

Most measures showed no significant differences between the groups in utilization patterns at 3 and 6 months after CRS contact. However, we did observe increases in both face-to-face visits (adjusted difference in rates per member per month, 82.7 at 3 months) and secure-message utilization (adjusted difference in rates per member per month, 580 at 3 months and 588 at 6 months). Exceptions were face-to-face primary care visits and secure messaging, which showed slightly higher rates among CRS patients; and secure messaging to the health care team, which showed slightly lower rates for CRS patients.

Other indicators of impact on the delivery system were the experiences of primary care team members who were interviewed in fall 2015. Nearly all interviewed staff reported that the CRS role made their jobs easier or saved them time by finding resources they would otherwise have searched for; coaching patients who might have required substantial time with a physician, RN, social worker, or medical assistant; and allowing other staff to deliver care that requires specific licensure.

> *[S]he enhances what we can do for the patient, and she saves me time. (Provider, Clinic C)*

Clinic staff also reported that CRSs brought new knowledge and awareness to the primary care team. They acknowledged the importance of knowing factors that affect patients' lives outside the clinic, especially for diverse or low-income populations. The CRS role was described as "eye opening."

> *[The CRS and I] learn a lot from each other. … Sometimes we might know patients for years and years, and there's stuff I didn't know, stuff [that the CRS] found out what's happening in their personal life, and how she's been helpful to them, and I thought it was very, very helpful to me. … Everything, I think, is positive about this for our clinic. (Staff, Clinic B)*

Key Lessons Learned

Our data collection and analysis also surfaced a number of lessons learned that were used for formative feedback and improvement. We summarize a few of the key learnings that have broad applications to SDH interventions involving

the addition of a new role to a primary care team.

Role Clarity

The CRS was designed as a bridge between medical care and community resources. A number of other roles in health care occupy this interstitial space, including behavioral health workers, social workers, care coordinators, community health workers, *promotoras,* and patient navigators. Clearly articulating what was in and out of scope for the CRS, especially regarding other related positions, such as the team social workers, was a challenge. Clinical and administrative leaders also had different priorities regarding the patient needs that they thought the CRS was best positioned to address, compounding the difficulty in clearly articulating the role. Perhaps because of these challenges, staff were often surprised that the CRS could help patients with a wide variety of issues.

Value of Warm Handoffs

Warm handoffs were extremely important for both the CRS patient engagement and job efficiency. Patients who had a warm handoff required fewer outreach attempts to successfully complete their initial visit (Table 4).

Community Resource Specialist Visibility

Having the CRSs be physically visible to other primary care team members and personally connected with them was important. When CRSs were not visible, clinical staff often forgot the role existed. Visibility and availability made warm handoffs easier because staff could quickly find and signal the CRS when they had a patient to refer. Visibility to team members proved even more critical than visibility to patients, as we found by experimenting with a CRS desk in the lobby. The lobby desk did not result in any patients using CRS services beyond CRS-initiated offers of resource information; however, we did see differences in referral rates when the CRS was sitting in a location where other members of the primary care team could easily see the CRS's desk.

DISCUSSION

The LINCC project designed and piloted a new primary care team role—the CRS—in 3 clinics. Most patients who

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Table 4. Contact attempts with and without warm handoff for patients with a documented Community Resource Specialist encounter after May 15, 2015 (N = 272)[a]

Handoff status	No. of patients	No. of contact attempts	Average attempts per patient
With warm handoff	98	111	1.10
Without warm handoff	174	306	1.76

[a] Time frame was limited because warm-handoff training occurred just before May 15, 2015. A warm handoff was a personal introduction to the Community Resource Specialist by staff.

interacted with the CRS received resource recommendations, and many set personal goals. Of those who set goals and had CRS follow-up documented in the EHR, most made progress. Almost half who received a referral and had a follow-up visit used the resource. In focus groups, patients reported behavior changes and improved health and well-being; however, we found no systematic differences in clinical or health status at the population level using administrative data or patient surveys. Overall, patients were highly satisfied with the services of referral, coaching, and motivational interviewing provided by the CRSs. Other primary care team members reported that benefits of the role included overall improved patient care and the ability to offload work so others could work at the top of their license.

After research funding for the CRS role ended, Clinics B and C chose to fund the position from their own budgets and subsequently, the health system leadership decided to hire a total of 19 full-time CRSs across all 25 KPWA clinics. The CRS role is now fully deployed at KPWA. The system sees this role as critical to the implementation of behavioral health integration because it allows clinic social workers to work at the top of their license, providing behavioral health counseling rather than resource referrals and health coaching. The goal is for the costs of this role to be offset by increasing the productivity of more expensive primary care team roles such as social workers, nurses, and primary care providers. However, the longer-term financial sustainability of this type of role is an ongoing question for KPWA and the field as a whole.

The CRS pilot occurred simultaneously with a proliferation of innovations nationwide addressing SDH in clinical settings, including development of

screening tools,[28-30] use of community health workers for patient navigation and resource referral,[10,14,31] and specialized services such as medical legal aid partnerships[32,33] and food security interventions.[34-36] Several studies similar to LINCC had promising results related to decreased reported needs and improvement in clinical outcomes such as improved blood pressure or hemoglobin A_{1C} measures.[10,14,30] LINCC provides unique documentation of key implementation measures, including patient uptake of services, patient follow-through on accessing resources, and primary care team integration of the new role. The lessons learned provide guideposts for primary care teams interested in introducing a similar role. Our measurement challenges and qualitative findings may provide guidance for researchers interested in testing broadly targeted SDH interventions who struggle to identify appropriate and realistic outcome measures for testing the impact. As shown by our findings, examining patient experience and/or psychological impacts such as sense of well-being and resilience might be a promising approach for evaluation of SDH interventions aimed at a broad set of needs and a diverse patient population. Finally, given the proliferation of programs to address SDH, primary care clinics need not develop these roles and related tools de novo but can use the guidance, resources, and services of organizations already doing work in this area.

This project encountered and overcame challenges inherent in implementing changes in a real-world health care setting. We experienced staff turnover, complexity in developing EHR tools and metrics for clinic use, and a major health care system reorganization. Because we chose not to target a specific subpopulation of patients, the heterogeneous nature

of patients' health issues and resource needs led to diverse clinical outcomes and small subgroup populations (eg, only 89 CRS patients had an indication of diabetes in the EHR, and even fewer had prescriptions or associated laboratory results). These low numbers affected our ability to conduct subanalyses. Also, lack of randomization in CRS referral provided the potential for confounding. Our matching of patients from CRS and control clinics did not produce samples that were comparable in baseline clinical outcome measures. Therefore, we were unable to test whether these measures changed after working with CRSs and could not determine if health care utilization by patients who interacted with CRSs was affected by the poorer health of CRS patients compared with controls. Finally, our survey, focus groups, and staff interview methods were limited by self-report and selection bias. We mitigated these potential biases by ensuring that data collection timing was proximal to the intervention and by surveying all individuals referred to a CRS rather than a sample. Focus group invitations had no restrictions.

Our evaluation of the addition of CRSs to primary care teams explored what type of patients were served by this type of community health worker, the most common services and types of support provided by CRSs, the impact of CRSs on their patients and their primary care team members, and key lessons for delivery systems considering community health workers as links to community resources. Ongoing challenges exist around quantifying the impact of CRSs on patient health outcomes and health care utilization. A related issue is the need to identify appropriate and feasible measures of the impact of community health workers because clinical outcomes may be too long-term and heterogeneous to evaluate programs that serve a broad population of patients in primary care settings. Other measures of impact may be more sensitive and feasible such as patient satisfaction, mental health, and resiliency. Finally, a major challenge for our data analysis was identifying appropriate control groups for this real-world primary care intervention. Recently developed

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social-needs screening and assessment tools[28-30] may provide effective means of identifying appropriate control populations. Furthermore, having team members such as the CRS screen for SDH needs, adverse childhood events, and elicitation of patient values may offer new ways to foster a therapeutic relationship between patients and their primary care teams.

CONCLUSION

We identified requirements for efficiently implementing a primary care team member who specializes in community resources that address SDH. Effective use of the CRS required a relationship with clinic staff, high visibility to providers and staff, and a commitment to warm handoffs. The CRS role had multiple positive impacts. Use of CRSs increased patient satisfaction and sense of well-being, although health changes from this pilot study were not detected in patient survey findings or administrative data. Clinic staff and providers appreciated the ease on their workload that allowed them to work at the top of their licensure. ❖

a Supplemental material is available from the author.

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Casting a Stone

I alone cannot change the world,
but I can cast a stone across the waters
to create many ripples.

— Mother Teresa, 1910-1997, also known as Saint Teresa of Calcutta,
Roman Catholic nun and missionary