The Community Health Educator Referral Liaison (CHERL)

A Primary Care Practice Role for Promoting Healthy Behaviors

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Background: Tobacco use, unhealthy diet, physical inactivity, and risky alcohol use are leading causes of preventable death. As there are many barriers that prevent primary care clinicians from effectively assisting patients with these behaviors, connecting patients with health behavior resources may reduce these unhealthy behaviors.

Methods: A new adjunct role in primary care practice, the community health educator referral liaison (CHERL), was tested in 15 practices in three Michigan communities. All practices were advised how to access this liaison, and nine practices were randomly selected to receive support to develop a systematic referral process. Adult patients needing improvement in at least one of the four unhealthy behaviors were eligible for referral. The CHERL contacted referred patients by telephone; assessed health risks; provided health behavior–change counseling, referral to other resources, or both; and sent patient progress reports to referring clinicians. Data were collected from February 2006 through July 2007.

Results: The CHERLs received 797 referrals over 8 months, a referral rate of 0%–2% per practice. Among referred patients, 55% enrolled, and 61% of those participated in multiple-session telephone counseling; 85% were referred to additional resources. Among patients enrolling, improvements ($p<0.001$) were reported at 6 months for BMI, dietary patterns, alcohol use, tobacco use, health status, and days of limited activity in the past month.

Conclusions: The results of this study suggest that through relationships with practices, patients, and community resources, these liaisons successfully facilitated patients' behavior change. The CHERL role may fill a gap in promoting healthy behaviors in primary care practices and merits further exploration.

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Introduction

The key preventable causes of death in the U.S. are related to four unhealthy behaviors—tobacco use, unhealthy diet, physical inactivity, and risky alcohol use.[1] Actions are needed to identify the Americans practicing unhealthy behaviors and to help them improve these behaviors, thus reducing their risk for morbidity and mortality. Although primary care clinicians and their staffs can identify and assist patients with changing unhealthy behaviors,[2,3] their potential for providing this help has not been met[4,5] due to barriers such as lack of time, inadequate reimbursement from health insurance payers, and suboptimal clinician training.[3,6–8] Patients' needs often exceed available staffing resources, even among primary care practices that would like to offer support for behavior change.[7,9,10] Practices need help in successfully offering this support to their patients.

One option is for primary care practices to refer patients to resources for health behavior change[11,12]; however, this is not typically done.[12–14] Barriers to referral have been described, including the unawareness of the quality and availability of resources, the transient nature of resources because of fluctuating public health budgets and organizational priorities, and the inability to connect patients because the resources are behavior- and/or insurance-specific. Finally, clinicians express frustration with making referrals and not receiving any feedback regarding a patient's connection to the resource or progress with behavior change, thus stifling interest in making further referrals.[12,15,16]

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To help practices overcome these barriers, a role called a *community health educator referral liaison* (CHERL) was created. The purpose of the CHERL is to forge relationships with practices, patients, and community resources to facilitate patients' behavior change. This article describes the CHERL's role and presents the results of a feasibility study in primary care practices.

Methods

Approval was obtained from the university- and practice-associated IRBs.

Practices and Patients

Adult patients at 15 practices selected for convenience in three Michigan communities were eligible for CHERL referral if a patient was identified by the clinician as needing improvement in one or more of the four unhealthy behaviors.

Intervention

The availability of the CHERL to practices and patients was the intervention. Table 1 outlines the main tasks of the CHERL. Although the CHERL's role is similar to many roles, the distinct feature of the CHERL is how he or she acts as a relationship broker to bring together the assets of patients, clinicians, and the community to support patients in adopting and maintaining healthier lifestyles. The CHERL's role was designed to enhance the clinician–patient relationship, extend the impact of the clinician's advice beyond the patient's visit, and employ motivational techniques to engage the patient in health behavior change. Such a role is new, and has not been available in primary care.

Qualifications, Location, and Training of CHERLs

Three CHERLs in three geographically distinct communities were employed at 70%–80% time to serve three to six practices each. These individuals had bachelors degrees; were trained in health education, nursing, or dietetics; and had extensive community and healthcare experience. They worked only for the practices but were physically located in a community location.

Each liaison received an initial 1-week training led by the study investigators, followed by 3 months of iterative training as they developed community resource guides, practiced health behavior–change counseling techniques, and assisted practices with the development of a referral plan. They also provided ongoing support to one another over the course of the study.

Assistance to Practices by CHERLs

The practices were randomly assigned to two groups who received different levels of support. Referral-only practices (n=6) were given information about and encouraged to refer patients to the liaison; they received one visit in which the service was described and the referral process explained. Each consultant-enhanced practice (n=9) received the referral-only information but, in addition, also received multiple visits from the CHERL, who served as a consultant to the practice to ensure that the practice developed a plan detailing how it would identify patients needing health behavior improvement and refer them to the liaison. Because of limited capacity to service the referred patients, practices were asked to identify for referral only a subset of eligible patients, such as only those patients having health maintenance examination visits or diabetic chronic disease visits. Both referral-only and consultant-enhanced practices were asked to fax referrals to the CHERL on a regular basis, using a specially developed fax form. A brochure describing the CHERL's role was available for practices to share with patients. Patient self-referral was not allowed.

Assistance to Patients by CHERLs

Prior to accepting referrals, each liaison, in conjunction with the other CHERLs and the investigators, developed a

Table 1. Community health educator referral liaison (CHERL) tasks

Audience	Tasks
Practice	Develop a relationship with the practice to act as a resource
	Educate clinicians and clinical staff regarding health behavior care processes (5A's) and recommendations for health behavior improvement
	Assist practice in developing systematic plan to identify patients needing health behavior improvement and for referring patients to the CHERL (including offering CHERL referral to patients and faxing that referral)
	Accept patient referrals from participating practices
	Provide patient-specific feedback in the form of a letter outlining patient contact (or lack of contact) with CHERL, and patient goals and progress toward goals at regular intervals
Patient	Develop supportive relationships with the patient
	Assist patient by providing health behavior–change support via telephone. This support is behavior-change–specific counseling toward the accomplishment of single or multiple behavioral goals
	Connect patient with community-, healthcare-, or web-based resources, including identifying and coordinating referral to resources
	Serve as an advocate for the patient in coordinating and negotiating the use of community and practice resources
Community	Develop and maintain a knowledge base of community-, healthcare-, and web-based resources available to assist patients with health behavior change. This includes services that may be needed before behavior change can occur (such as counseling services for depressed patients)
	Develop a relationship with the community resources and leverage these relationships to improve access and use resources on behalf of patients

referral resource guide specific to each community. This guide listed the resources, costs, and eligibility criteria for participation in various resources, including programs, other professionals, facilities, and educational materials both at hand and online.

The liaison accepted faxed referrals from participating practices and initiated contact with the patients. All patient contacts were via telephone. During the baseline call and the 3- and 6-month follow-up calls, health behavior data were collected via patient self-report. Counseling calls occurred every 2 weeks after the baseline call.

There were three options for CHERL service to patients: (1) multi-session health behavior–change counseling: baseline call plus three additional counseling calls, with no referral to other resources; (2) single-session counseling at enrollment, and then referral to resources: baseline call plus one check-up call; and (3) multi-session counseling and referral to other resources (same as [1] with referral to resources). For all patients, follow-up calls occurred at 3 and 6 months post-baseline. The liaison made three initial attempts to contact each patient, and then sent a letter asking the patient to call her or him.

During calls, liaisons provided individualized behavior-change assistance. They encouraged patients to consider both long-term and weekly goals, and to identify specific action plans.[17–19] Regardless of the unhealthy behavior for which a patient was referred, he or she was allowed to self-select one or more areas for improvement within the four unhealthy behaviors. Patients were asked to consider barriers and facilitators to successful change, and to develop strategies for coping while adapting to their new behavior(s).[20,21] CHERLs utilized techniques of brief motivational interviewing and provided support, guidance, and accountability to patients.[22–24] They provided information and encouragement to patients regarding potential additional resources, and referred patients with potential mental health issues to the primary care physician and mental health resources. They also provided patient-specific progress feedback to the referring clinician in the form of a letter at baseline, at 3 months, and at 6 months.

Instruments

A computerized support system was developed to collect patient data; track patient calls, dates of service, and clinician feedback; and guide the counseling. Patient-specific health behavior and demographic information was entered by the CHERL based on self-report by the patients.

Patient health behavior and demographic data were collected, utilizing a common set of measures determined for the ten studies funded in Prescription for Health.[25] This included dietary patterns, cigarette smoking, alcohol use, health status, and basic demographics. For physical activity, the International Physical Activity Questionnaire (IPAQ short form) was utilized.[26] The CDC Healthy Days questions were included to assess quality of life.[27] Two questions were added from the Patient Health Questionnaire (PHQ-2) to screen for depression.[28,29] Practice characteristics and environments were assessed via written surveys. Data were collected from February 2006 through July 2007.

Data Analysis

The Reach, Efficacy/Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) model provided the framework for the analysis of study results.[30–32] *Reach* refers to the percentage and risk characteristics of persons who receive or are affected by a program.[30] In this study, such persons were those patients eligible for CHERL referral. To determine the CHERL-eligible patients, a waiting room–intercept survey was taken of consecutive adult patients (73–200, based on practice size) in each practice to estimate the patient prevalence of the four unhealthy behaviors. This anonymous survey asked patients about their health behavior(s) and interest in improving them. Patients eligible for improvement were those who had smoked one puff or more in past 7 days; had drunk >2 alcoholic drinks per one occasion most days in the past month; did not eat a low-fat diet or at least five total fruits and/or vegetables per day; and/or did not participate in moderate exercise at least 5 days per week, or vigorously at least 3 days per week. Of those eligible for health behavior improvement, the number indicating interest in improving each health behavior was calculated. The number of eligible, interested patients was determined as a percentage of all patients surveyed for each health behavior; this was then multiplied by the number of adult patients per week as an estimate of the potential number of CHERL referrals per week for each practice.

Effectiveness is the impact of the intervention on targeted outcomes and quality of life.[33] The outcomes in this study included patients' health behaviors and quality of life. Multilevel hierarchical regression analysis was performed to assess the fact that patient outcomes were nested within clinicians who were nested within practices. For each unhealthy behavior, a separate model was created. Univariate analysis was completed for each potential predictor, and any predictor with a p-value <0.15, and/or with known clinical importance, was included in the model. Coefficients in the univariate model were compared with those in the multivariate model.

Adoption, *implementation,* and *maintenance* refer to the degree to which a studied intervention (1) represents settings that adopt such programs; (2) is delivered as intended; and (3) becomes practice, policy, or routine and part of the norms of the organization.[30] To measure these RE-AIM factors, the practices were assessed for the degree to which they created and utilized plans for referral to the CHERL, actually referred patients to him or her, and continued the intervention past grant funding. Descriptive statistics included practice characteristics, patient characteristics, actual and potential referrals by practice, call completion rates, and referral to additional resources. Based on a median referral rate of 0.5%, the practices were divided into those with higher referral rates (>0.5%) and those with lower referral rates (≤0.5%). Bivariate analysis compared referral rates and practice characteristics. A logistic regression model was created with practice referral status (low versus high) as the dependent variable and practice characteristics as independent variables. Statistical analysis was completed using SPSS version 15.

Table 2. Practice characteristics

Practice characteristic	East (6 practices)	West (6 practices)	Upper Peninsula (3 practices)	Overall (15 practices)
Specialty				
Family medicine	2	3	3	8
Internal medicine	1	1	0	2
Family+internal	3	2	0	5
Ownership				
Hospital	1	4	3	8
Physician	3	0	0	3
FQHC	2	2	0	4
Average clinician full-time equivalent per practice (range 0.5–12.7)	3.1	5.4	4.6	4.3
Average patients per week (range 40–850)	305	467	227	321
Average percentage of patients with Medicaid+uninsured (range 9%–71%)	41	28	22	33
Average percentage of patients who are pediatric (range 5%–55%)	19	26	9	25
Average percentage patients aged >65 years (range 5%–40%)	19	26	37	25

FQHC, federally qualified health center

Results

Referrals from the Practice to the CHERL

Table 2 describes the practices' characteristics. Thirteen of the 15 practices referred at least one patient, with a mean of 1.8 (range 0.2–4.9) patients referred per week for these practices. The actual-to-potential referral ratio ranged from 0% to 2%, with a mean of 0.7% across all 15 practices. Bivariate analysis compared higher-referring practices (seven practices, M=1.0%) with lower-referring practices (eight practices, M=0.3%), adjusted for patient volume and patients' health behaviors, and found no significant relationships between practice characteristics and being a high- or low-referring practice, including relationships between the consultant-enhanced practices (0.6%) and the referral-only practices (0.7%), p=0.83, power=5%.

Patient Engagement with the CHERL

Of the 797 referrals, most referrals were for diet (73.9%); followed by physical activity (64.9%); tobacco use (33.5%); and alcohol use (2.4%). Patients were commonly referred for two unhealthy behaviors (52%), and the most common pairing (60%) was for both diet and physical activity. Thirty-five percent were referred for one behavior; 12% for three; <1% for four; and 4% for no specific behavior. Table 3 outlines the enrollment, program completion, number and type of calls, and follow-up calls completed by patients referred to the CHERL.

Many patients, once enrolled with the CHERL, were referred to resources to assist them with their health behavior–improvement goals. Patients could be referred to more than one resource, and often were. Of 446 patients completing a baseline call, 85% were referred to at least one resource. Of all referrals made for all patients, 42% (272/654) were known to have connected with the resource to which they were referred. For tobacco, most referrals were to quitline (e.g., telephone) counseling and self-help guides in the form of state-sponsored quit kits; for diet, group programs such as Weight Watchers, diabetic education, dietitians, or informational websites; and for physical activity, to

Table 3. Patient engagement with the community health educator referral liaison (CHERL) service

Patient engagement types	East *n* (%)	West *n* (%)	Upper Peninsula *n* (%)	Overall *n* (%)
Total referrals	243	360	194	797
Completed baseline calls	87 (35.8)	204 (56.7)	155 (79.9)	446 (56)
Refusals	23 (9.5)	40 (11.1)	18 (9.3)	81 (10.1)
Not able to contact	133 (54.7)	116 (32.2)	21 (10.8)	270 (33.9)
Completed counseling calls	58	88	125	271
1 session	3 (5)	1 (1)	8 (6)	12 (4)
2 sessions	8 (14)	30 (34)	30 (24)	68 (25)
3 or more sessions	47 (81)	57 (65)	87 (70)	191 (71)
Check-up only	0 (0)	49/137 (36)	10/135 (7)	59/330 (18)
Total calls	58	137	135	330
Completed follow-up calls				
3-month follow-up	33 (37.9)	134 (65.7)	123 (79.4)	290 (65)
6-month follow-up	34 (39.1)	116 (56.9)	109 (70.3)	259 (58)
Both 3- and 6-month follow-up	26 (29.9)	109 (53.4)	99 (63.8)	234 (52.5)

Table 4. Patient characteristics

Patient characteristic	East (*n*=87) *n* (%)	West (*n*=204) *n* (%)	Upper Peninsula (*n*=155) *n* (%)	Overall (*n*=446) *n* (%)
Age (years)	43.5	48.5	51	48.4
Gender (female)	62 (71)	148 (73)	101 (65)	311 (70)
Race				
White	45 (52)	158 (78)	146 (94)	349 (78)
African American	42 (48)	35 (17)	3 (2)	80 (18)
Other	0	11 (5)	6 (4)	17 (4)
Education				
<high school diploma	10 (11)	19 (9)	6 (4)	35 (8)
High school grad or GED	30 (35)	57 (28)	51 (33)	138 (31)
>high school	47 (54)	128 (63)	98 (63)	273 (61)
Income ($)				
<20,000	50 (57)	40 (20)	56 (36)	146 (33)
20,000–75,000	33 (38)	123 (60)	85 (10)	241 (54)
>75,000	3 (3)	36 (18)	13 (8)	52 (12)
Missing	1 (1)	5 (2)	1 (1)	7 (2)
Health insurance				
No insurance	35 (40)	12 (6)	8 (5)	55 (12)
Medicaid	26 (30)	18 (9)	26 (17)	70 (16)
Medicare	5 (6)	22 (11)	27 (17)	54 (12)
Commercial plan	21 (24)	140 (68)	82 (53)	243 (54)
Other	0	12 (6)	11 (7)	23 (5)
Missing	0	0	1 (1)	1 (1)

facilities for exercise such as the YMCA or hospital-based fitness or rehabilitation programs.

Patient Characteristics and Health Behaviors

Table 4 describes the characteristics of the patients in the three communities, which varied by community. The majority (88%) had one or more chronic conditions, and 42% screened positive for depression. Table 5 reveals health behavior data. Improvements were found in all health behavior areas. The hierarchical model did not reveal a significant practice- or clinician-level effect on the outcomes, and revealed only a minimal effect of patient characteristics such as race, gender, age, level of education, insurance status, income, or number of chronic diseases. For each of the outcomes, the following were analyzed: (1) the entire data set with missing values; (2) the entire data set with intention-to-treat (using last observation carried forward); (3) the data set consisting of all patients who completed the 6-month follow-up with missing values; and (4) all patients who completed the 6-month follow-up with intention-to-treat analysis with last observation carried forward. The results from each of these analyses were similar, suggesting that the conclusions are robust with respect to missing/attrition data. A pattern–mixture analysis[34] suggested that the missing data were ignorable.

Discussion

Implementing the CHERL role was feasible for most practices, and potentially effective with a wide variety of patients. In examining the reach of the CHERL, the referral rate was 0%–2% of eligible patients. In determining the estimate for eligible patients, a high benchmark was established in that a high percentage of patients were eligible by having one or more unhealthy behaviors needing improvement, which is reflective of primary care practice.[35,36] In this study, limited liaison capacity was the primary factor contributing to limited reach and artificially lowered referral rates. Additional research with greater CHERL capacity is needed to determine the full utilization of these liaisons regarding total patients served and number of visits per patient.

In regard to the effectiveness of the CHERL intervention, the pre–post study design, the lack of comparison group, and the self-report nature of the data limit the ability to make definitive statements about the program. Yet it appears that patients enrolling with these liaisons were able to demonstrate improvements in their health behaviors, even in the context of comorbidities and potential depression. Also, once patients were able to engage with the CHERL, they were generally able to make health improvements regardless of factors such as race, level of education, or income.

The practices in this study represented various types with varying patient populations, speaking to the adoption of an eventual CHERL intervention. Although this study was not powered to detect significant differences by practice, it appeared that none of the factors examined was predictive of practice referral rates. The degree of implementation was highly variable across the practices and, as in many practical-effectiveness trials, practices had the flexibility to make decisions regarding how they would identify patients and refer them to the liaison,[31] which resulted in highly variable referrals from practices. During exit interviews, practice team members expressed a high degree of interest in having a CHERL available for their practice, but reported a lack of funding as the greatest barrier to continuation. Therefore, funding mechanisms need to be explored to assure the maintenance of this liaison's role.

A pertinent finding of this research is how the CHERL functioned in serving patients. In a small

Table 5. Patient self-reported health behaviors[a]

Health behaviors	Baseline	3-month follow-up	6-month follow-up	*p*-value[b]	Adjusted *p*-value
Current smokers[c] (%) (*n*=446)	30.9	26.5	25.6	<0.001	<0.001
Diet score (M)					
All patients (*n*=445)	12.8	11.5	11.3	<0.001	<0.001
Patients selecting diet as goal (*n*=380)	12.9	11.5	11.3	<0.001	<0.001
Patients not selecting diet as goal (*n*=65)	12.6	11.5	11.5	<0.001	<0.001
BMI[d] (M)					
All patients (*n*=441)	35.6	35.2	35.1	<0.001	<0.001
Patients selecting diet as goal (*n*=377)	36.5	36.1	35.8	<0.001	<0.001
Patients not selecting diet as goal (*n*=64)	30.5	30.4	30.8	0.394	0.386
Physical activity in total minutes/week (median)[e]					
All patients (*n*=398)	150	203	180	0.335	0.277
Patients selecting exercise as goal to improve (*n*=214)	83	138	130	0.012	0.015
Patients not selecting exercise as goal to improve (*n*=184)	313	280	285	0.007	0.007
Alcoholic drinks/occasion (M)					
All patients (*n*=446)	1.0	0.9	0.9	<0.001	<0.001
Patients selecting alcohol as goal to improve (*n*=12)	4.9	3.8	3.0	0.074	0.093
Patients not selecting alcohol as goal to improve (*n*=434)	1.0	0.9	0.9	0.047	0.039
Number of times alcohol drinks ≥5/occasion in the past month (M)					
All patients (*n*=446)	0.4	0.2	0.3	0.494	0.617
Patients selecting alcohol as goal to improve (*n*=2)	4.5	2.8	4.5	0.439	0.526
Patients not selecting alcohol as goal to improve (*n*=434)	0.2	0.1	0.2	0.767	0.891
Health status (*n*=446)	3.2	3.0	2.9	<0.001	<0.001
Days of limited activity in past month due to poor physical or mental health (*n*=446)	4.8	4.4	3.5	<0.001	<0.001

Note: Adjusted for clustering of patients within clinicians and within practices and patient characteristics with a $p<0.15$ on univariate testing, including gender, education, income, health insurance, and number of chronic diseases. *p*-value is for change in measure given best model.
[a]Intention-to-treat analysis with last observation carried forward was used for this analysis. Smokers (*n*=63) not completing 3- or 6-month calls were assumed to be smoking. The *n* for some of the variables is less than 446 because the data were not collected for those patients.
[b]*p*-values represent change from baseline to 6 months.
[c]Univariate analysis by chi-square test. Hierarchical analysis done by modeling the number of cigarettes per day among smokers.
[d]Calculated from patient self-report of height and weight
[e]Median selected because data were markedly skewed due to outliers

number of cases, this person functioned only as a resource connector; accepting patients referred from the practice and referring them to other resources. In most cases, however, the CHERL functioned as a resource facilitator, meaning that he or she provided the means for the patient to engage in the additional resource. The role of the CHERL became not only to make the referral but also to manage the referral. Because of the rapport developed with patients, and the relationships that the liaisons had with both the practices and the community resources, they were able to leverage those relationships on behalf of patients and enable the patients to have better access to, and willingness to, participate in the programs and services of both entities. Where resources were lacking, when patients would not participate, or in both circumstances, the CHERL filled the gap in providing behavior-change support.

This study focused on measuring the real-world effectiveness of a new service in community primary care medical practice. Therefore, the results should be interpreted with the following limitations. First, although the practices represented a diversity of primary care practices, they do not represent all practices, patients, or settings. Second, although allowing the practices to self-select their own plans for identifying and referring patients was realistic from a practical implementation perspective, it may have been more or less effective in getting referrals to the CHERL than having one standardized approach. Third, the liaisons were a limited resource, and referrals were intentionally constrained for this reason. The burden of collecting patient-level health behavior data also consumed more CHERL time than if this had not been required.[37] This study was a pre–post design and lacked a comparison or control group; therefore, other factors may have influenced the results. Patients' health behaviors were self-reported, leading to potential inaccuracies due to social desirability bias. Also, self-reported data were not verified by biochemical or other measures. Last—although unlikely—multiple comparisons may have contributed to the finding of some significant results.

Conclusion

The results of this study suggest that through relationships with practices, patients, and community resources, the CHERL successfully facilitated patients'

behavior change. This role is one option in expanding the primary care practice team to serve the health behavior needs of patients with and at-risk for chronic health conditions, as recommended by the chronic care model and the Future of Family Medicine project.[38–42] The utilization of a community health educator referral liaison supports many of the suggested improvements for a patient-centered team approach by focusing on health (not just disease); reducing barriers to access; and offering specialized counseling for health behavior change, care coordination, and link to community.[43,44] This study represents a first step to understanding the roles of primary care practices in the improvement of patients' health behaviors. Future research is needed to explore how CHERLs could be utilized most effectively and sustained.

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