Community Preventive Services Task Force

Heart Disease and Stroke Prevention: Interventions Engaging Community Health Workers

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Finding and Rationale Statement
Ratified March 2015

Table of Contents

CPSTF Finding and Rationale Statement

Intervention Definition

Community Health Workers (including promotores de salud, community health representatives, community health advisors, and others) are frontline public health workers who serve to bridge communities with healthcare systems. They are from, or have an unusually close understanding of, the community served and they are trained to provide culturally appropriate health education and information, offer social support and informal counseling, connect people with the services they need, and in some cases deliver health services such as blood pressure screening. Since community health workers are considered trusted community members, they are uniquely positioned to advocate on behalf of individuals and communities and help build capacity. Community health workers often receive on-the-job training and work without professional titles. Organizations may hire paid community health workers or recruit volunteers to act in this role.

Community health workers may address a broad range of health issues. Interventions that engage community health workers to focus on cardiovascular disease (CVD) prevention implement one or more of the following models of care:

- Screening and Health Education. Community health workers screen for high blood pressure, cholesterol, and behavioral risk factors recommended by the United States Preventive Services Task Force (USPSTF); deliver individual or group education on CVD risk factors; provide adherence support for medications; and offer self-management support for health behavior changes, such as increasing physical activity and smoking cessation.
- Outreach, Enrollment, and Information. Community health workers reach out to individuals and families who are eligible for medical services, help them apply for these services, and provide proactive client follow-up and monitoring, such as appointment reminders and home visits.
- Team-Based Care. In a team-based care arrangement, community health workers partner with patients and licensed providers, such as physicians and nurses, to improve coordination of care and support for patients.
- Patient Navigation. Community health workers help individuals and families navigate complex medical service systems and processes to increase their access to care.
- Community Organization. Community health workers facilitate self-directed change and community development by serving as liaisons between the community and healthcare systems.

CPSTF Finding (March 2015)

The Community Preventive Services Task Force (CPSTF) recommends interventions that engage community health workers to prevent cardiovascular disease (CVD). There is strong evidence of effectiveness for interventions that engage community health workers in a team-based care model to improve blood pressure and cholesterol in patients at increased risk for CVD. There is sufficient evidence of effectiveness for interventions that engage community health workers for health education, and as outreach, enrollment, and information agents to increase self-reported health behaviors such as physical activity, healthy eating habits, and smoking cessation, in patients at increased risk for CVD. Economic evidence indicates that interventions engaging community health workers to prevent cardiovascular disease are cost-effective.

Additionally, a small number of studies suggest that engaging community health workers improves appropriate use of healthcare services and reduces morbidity and mortality related to CVD. When interventions engaging community health workers are implemented in minority or underserved communities, they can improve health, reduce health disparities, and enhance health equity.

Rationale

Basis of Finding

The CPSTF findings are based on evidence from 31 evaluations of interventions that engaged community health workers (CHWs) to prevent CVD among persons at increased risk (search period through July 2013). To be included in the review, evaluated interventions had to address patients' high blood pressure or high cholesterol.

Included studies evaluated interventions that engaged CHWs as health education providers (31 study arms), outreach, enrollment, and information agents (20 study arms), members of care delivery teams (17 study arms), patient navigators (8 study arms), and community organizers (4 study arms).

Large improvements in blood pressure and cholesterol outcomes were seen in interventions that engaged CHWs in a team-based care model where they often worked alongside physicians and nurses (Table 1). Improvements in blood pressure and cholesterol outcomes also were found for the outreach, enrollment, and information; patient navigation; and health education models; however improvements were smaller when team-based care studies were removed from analysis.

Table 1: Blood Pressure and Cholesterol Outcomes

Outcome Measure	Results[A] from Studies with a Team-Based Care Model	Results[A] from Studies without a Team-Based Care Model
Proportion of Participants with BP at Goal	**Greatest/moderate suitability of study design**[B] (4 studies): Median increase of 17.6 pct pts (range: 3.8 to 22.5 percentage points). **Least suitable study design**[C] (2 studies): Increases of 10.8 pct pts (95%CI: 3.2 to 18.3 pct pts) and 14.5 pct pts (95%CI: 11.1 to 18.0 pct pts)	**Greatest/moderate suitability of study design** (3 studies): Median decrease of 2.4 pct pts (range: –11.0 to 3.0 percentage points) **Least suitable study design** (2 studies): Increases of 1.6 pct pts (95%CI: –10.6 to 13.8 pct pts) and 4.5 pct pts (95%CI: –2.4 to 11.0 pct pts)
Change in Mean Systolic Blood Pressure (SBP)	**Greatest/moderate suitability of study design** (6 studies with 7 study arms): Median decrease of 6.0 mmHg (IQI: –6.4 to 2.4 mmHg) **Least suitable study design** (4 studies): Median decrease of 11.2 mmHg (Range: –17.9 to –2.0 mmHg)	**Greatest/moderate suitability of study design** (5 studies): Median decrease of 2.2 mmHg (IQI: –4.1 to 4.2 mmHg) **Least suitable study design** (2 studies): An increase of 2.3 mmHg (not significant) and a decrease of 3.9 mmHg ($p<0.05$)

Outcome Measure	Results[A] from Studies with a Team-Based Care Model	Results[A] from Studies without a Team-Based Care Model
Change in Mean Diastolic Blood Pressure (DBP)	**Greatest/moderate suitability of study design** (6 studies with 7 study arms): Median decrease of 1.1 mmHg (IQI: –4.0 to 0.21 mmHg) **Least suitable study design** (3 studies): Median decrease of 4.2 mmHg (Range: –11.4 to 5.0 mmHg)	**Greatest/moderate suitability of study design** (5 studies): Median decrease of 1.3 mmHg (IQI: –2.7 to 7.4 mmHg) **Least suitable study design** (1 study): Increase of 0.05 mmHg (not significant)
Proportion of Participants with Total Cholesterol at Goal	**Greatest/moderate suitability of study design** (1 study): Increase of 7.0 pct pts (95%CI: –5.5 to 19.5) **Least suitable study design** (0 studies)	**Greatest/moderate suitability of study design** (2 studies): Increases of 8.1 pct pts (95%CI: 3.3 to 12.7 pct pts) and 0.4 pct pts (95%CI: –0.4 to 5.2 pct pts) **Least suitable study design** (0 studies)
Proportion of Participants with LDL-Cholesterol at Goal	**Greatest/moderate suitability of study design** (2 studies): Increases of 28.9 pct pts and 3.2 pct pts (95%CI: –6.1 to 12.5 pct pts) **Least suitable study design** (1 study): Increase of 10.0 pct pts (95%CI: –1.0 to 2.1 pct pts)	**Greatest/moderate suitability of study design** (1 study): Decrease of 1.1 pct pts (95%CI: –6.6 to 4.6 pct pts) **Least suitable study design** (0 studies)
Change in Mean Total Cholesterol	**Greatest/moderate suitability of study design** (2 studies): Decrease of 19.7 mg/dL ($p<0.05$) and 0.4 mg/dL (not significant) **Least suitable study design** (1 study): Increase of 1.5 mg/dL (not significant)	**Greatest/moderate suitability of study design** (4 studies): Median decrease of 8.3 mg/dL (Range: –12.7 to 0.8 mg/dL) **Least suitable study design** (1 study): Decrease of 15.4 mg/dL ($p<0.05$)

Outcome Measure	Results[A] from Studies with a Team-Based Care Model	Results[A] from Studies without a Team-Based Care Model
Change in Mean LDL-Cholesterol	**Greatest/moderate suitability of study design** (3 studies): Median decrease of 15.5 mg/dL (Range: –15.9 to –2.7 mg/dL) **Least suitable study design** (3 studies): Median decrease of 15.0 mg/dL (Range: –22.0 to 3.2 mg/dL)	**Greatest/moderate suitability of study design** (3 studies): Median decrease of 7.4 mg/dL (–11.8 to 5.0 mg/dL) **Least suitable study design** (1 study): Decrease of 11.4 mg/dL (p<0.05)
Change in Mean HDL-Cholesterol	**Greatest/moderate suitability of study design** (3 studies): Median of 0 (Range: –0.4 to 0.8 mg/dL) **Least suitable study design** (2 studies): Increase of 1.0 mg/dL (not significant) and decrease of 2.1 mg/dL (not significant)	**Greatest/moderate suitability of study design** (4 studies): Median increase of 1.3 mg/dL (range: 0 to 2.1 mg/dL) **Least suitable study design** (1 study): Decrease of 3.3 mg/dL (p<0.05)
Change in Mean Triglycerides	**Greatest/moderate suitability of study design** (3 studies): Median decrease of 8.0 mg/dL (Range: –16.3 to 2.7 mg/dL) **Least suitable study design** (2 studies): Decrease of 23.0 mg/dL (p<0.05) and increase of 1.7 mg/dL (not significant)	**Greatest/moderate suitability of study design** (1 study): Increase of 8.7 mg/dL (not significant) **Least suitable study design** (1 study): Decrease of 3.4 mg/dL (not significant

A Results shown in table were those reported at the end of each intervention
B Includes the following study designs: Individual RCT, group RCT, non-randomized trial, prospective cohort, case-control, other design with concurrent comparison group
C Includes the following study design: before-after without comparison group
CI, confidence interval
IQI, interquartile interval
pct pts, percentage points

Modest improvements in health behavior outcomes were found in studies that engaged CHWs as health education providers or as outreach, enrollment, and information agents (Table 2). Researchers most often used before-after study designs without comparison groups, and health behavior outcomes were largely self-reported. Only a few studies reported health behavior outcomes associated with team-based care models and they did not provide enough data to reach conclusions on this model of care.

Table 2: Health Behavior Change Outcomes

Outcome Measure	Results[A] from Studies with Health Education Model	Results[A] from Studies with Outreach, Enrollment, and Information Model
Physical Activity Outcomes	**Greatest/moderate suitability of study design**[B] (2 studies): One study reported statistically significant improvements in physical activity outcomes and one reported non-significant improvements **Least suitable study design**[C] (5 studies with 6 study arms): Six study arms reported statistically significant improvements in physical activity outcomes	**Greatest/moderate suitability of study design** (2 studies): One study reported statistically significant improvements in physical activity outcomes and one reported non-significant improvements **Least suitable study design** (3 studies with 4 study arms): Four study arms reported statistically significant improvements in physical activity outcomes)
Nutrition Outcomes	**Greatest/moderate suitability of study design** (2 studies): Two studies reported statistically significant improvements in nutrition outcomes **Least suitable study design** (5 studies with 6 study arms): Six study arms reported statistically significant improvements in nutrition outcomes	**Greatest/moderate suitability of study design** (2 studies): Two studies reported statistically significant improvements in nutrition outcomes **Least suitable study design** (3 studies with 4 study arms): Four study arms reported statistically significant improvements in nutrition outcomes
Proportion of Current Smokers	**Greatest/moderate suitability of study design** (3 studies): Median decrease of 0.5 pct pts (Range: –1.9 to 1.0 pct pts) **Least suitable study design** (2 studies): Decreases of 3.7 pct pts (95%CI: –10.7 to 3.3 pct pts) and 0.6 pct pts (95%CI: –4.4 to 3.3 pct pts)	**Greatest/moderate suitability of study design** (2 studies): Decreases of 1.9 pct pts (95% CI: –5.1 to 1.3 percentage points) and 0.5 pct pts (95%CI: –2.5 to 1.5 pct pts) **Least suitable study design** (0 studies)

A Results reported in table were those reported at the end of each intervention
B Includes the following study designs: Individual RCT, group RCT, non-randomized trial, prospective cohort, case-control, other design with concurrent comparison group
C Includes the following study design: before-after without a comparison group
CI, confidence interval
IQI, interquartile interval
pct pts, percentage points

There was not enough evidence to draw conclusions on interventions engaging CHWs as navigators or community organizers.

A small number of included studies in this review also reported improvements in appropriate use of healthcare services (i.e., increases in the proportion of clients who obtained health insurance or a physician for hypertension care, and decreases in the length of hospital stays and costs to be reimbursed by Medicaid; 2 studies); a statistically significant increase in the proportion of clients screened for CVD risk factors (1 study); and reductions in hospital admissions, emergency room visits and admissions, and in-hospital deaths from CVD (2 studies).

Most included studies engaged CHWs to work with underserved groups suggesting these interventions can be effective in improving minority health and reducing health disparities related to CVD.

Applicability and Generalizability Issues

Included studies were mostly conducted in the U.S. (28 studies), with two studies in Canada and one in the Netherlands. Most studies were in urban areas (22 studies) with only four studies in rural areas. CHWs delivered services in the community (11 studies), the healthcare system (13 studies), or both (7 studies). Studies that evaluated the use of CHWs in healthcare settings typically incorporated a team-based care model whereas programs delivered in community settings incorporated other models of care (i.e., health education or outreach, enrollment, and information). The number of CHWs engaged and clients served was reported in 22 studies; the median number of CHWs included per study was 11, and the median number of clients served was 270. Only five studies served more than 500 clients, and outcomes reported from these studies showed improvements.

Regarding the populations that CHWs served, 23 studies included adult clients ages 18-64 years, and 5 included older adults ≥65 years. Gender was evenly distributed across most studies, though 10 studies reported study populations that were more than 75% female. Results from these 10 studies were mixed for CVD risk factor outcomes and mostly favorable for health behavior outcomes. Included studies provided limited information about clients' education, sexual orientation, disability status, or insurance status.

Twenty-two studies evaluated programs that enrolled clients from underserved groups, defined here as ≥75% African-American, ≥75% Hispanic, or ≥75% classified as low-income. Based on this evidence, CHW interventions targeted to underserved groups are likely effective in addressing health disparities and social determinants of health.

High blood pressure was the most common CVD risk factor among clients in the included studies, followed by obesity, high cholesterol, diabetes, and current smoking. Six studies reported the proportion of clients with multiple CVD risk factors and found generally favorable results.

Data Quality Issues

Included study designs consisted primarily of before-after designs without comparison groups (13 studies), followed by individual randomized controlled trials (RCTs; 7 studies), group RCTs (4 studies), non-randomized trials (3 studies), other designs with concurrent comparison groups (2 studies), a prospective cohort (1 study), and a case-control (1 study). Common limitations affecting this body of evidence were loss to follow-up, significant differences between intervention and comparison groups at baseline (for studies including a comparison group), and, for studies without a comparison group, insufficient reporting of sampling methods and potential for self-selection bias.

Calculating overall effect estimates for physical activity and nutrition was not possible owing to the inconsistent measures used for these outcomes. Therefore, findings for these measures could only be summarized qualitatively.

Other Benefits and Harms

One study included counseling services for depression in addition to providing services for CVD risk factors, suggesting that other conditions may be addressed concurrently with CVD prevention. No harms to patients, communities, or CHWs were identified from the review or the broader literature.

Economic Evidence

Economic evidence indicates that interventions engaging community health workers to prevent cardiovascular disease are cost-effective.

The economic review included 9 studies from a search of the literature through July 2016. Studies were based in the United States (6 studies), the United Kingdom (2 studies), and Canada (1 study). Studies were set in communities, clinics, and in one study, a retail pharmacy. The majority of patients served were from minority or low-income populations. Three of the interventions engaged CHWs within team-based care. All monetary values are reported in 2015 U.S. dollars.

Intervention Cost

Eight studies reported on cost of intervention, with a median cost per person per year of $329 (IQI: $98 to $422). The major drivers of cost were the cost of CHW time, supervision and training of CHWs, and the cost of any additional staff or additional interventions. Based on these drivers, 5 studies provided complete estimates for the cost of intervention. The costs most often missing from studies were the cost of training, followed by the cost of supervising CHWs.

Healthcare Cost

The change in patients' healthcare cost due to intervention was reported in 7 studies, with a median reduction in cost per person per year of $82 (IQI: $415 decrease to $14 increase). The major drivers of healthcare cost were outpatient and inpatient care, medication, and emergency room visits. Four of the studies provided complete estimates based on their inclusion of these drivers.

Total Cost

Total cost is measured as the sum of change in healthcare cost due to intervention and the cost of intervention. A negative value indicates averted healthcare cost exceeds the intervention cost. One study with complete assessment of intervention and healthcare costs showed a return on investment of $1.80 for every dollar invested by a large health plan serving an underserved urban population. Seven other studies reported a median total cost of $311 (IQI: $16 to $375). Four of these estimates were complete in their inclusion of intervention and healthcare cost drivers. The overall evidence from the total cost estimates indicated savings in healthcare cost did not exceed the cost of intervention.

Cost-effectiveness

The median cost per quality adjusted life year (QALY) saved was $17,670 (IQI: $8,233 to $24,149; 5 estimates from 4 studies). Two estimates from one study reported a reduction in systolic blood pressure that the review team translated to QALY using two published methods (Mason et al. 2005; McEwan et al. 2005). This study had an incomplete assessment of intervention cost.

All five cost-effectiveness estimates were far below $50,000, indicating the interventions were cost-effective based on this conservative benchmark.

Overall, evidence indicates interventions engaging community health workers to prevent cardiovascular disease are cost-effective.

Considerations for Implementation

The 2013 ruling by the Centers for Medicaid Services (CMS) allows states to provide Medicaid reimbursement for USPSTF recommended preventive services when "recommended by a physician or other licensed practitioner" and delivered by a broad array of health professionals, including CHWs. Under this ruling, states determine which services will be covered, who will provide them (including any required education, training, experience, credentialing, certification, or registration), and how providers will be reimbursed. Therefore, implementers of CHW interventions should consider these state-specific regulations when making decisions about CHW engagement in their organizations.

CHWs' years of experience and educational attainment were not reported in most included studies. Six studies reported CHWs had "some" prior experience but did not provide enough information to draw meaningful conclusions about the value of this experience. Most studies reported that CHWs received "some" form of training, usually focused on CVD risk factors, but there was limited evidence on the specific types and methods of training received and it was unclear whether training contributed to program success. Education and training of CHWs need to be considered, especially formal training that addresses collaboration with other healthcare providers. Supervision and performance feedback and coaching should also be addressed.

Implementers should consider how CHWs deliver their services and the interaction frequency between community health workers and clients. In 18 of the included studies, CHWs used more than one mode of delivery to communicate with clients; the most common combination being face-to-face sessions accompanied by telephone contact. Although these studies reported improvements in blood pressure, cholesterol, and health behavior outcomes overall, there was not enough evidence to determine whether the mode of delivery had an effect on each individual outcome. A few studies reported on interaction frequency between CHWs and clients (e.g., weekly, bimonthly), but there were not enough data to assess an impact on outcomes.

Other implementation considerations include how CHWs are matched to the populations they serve and the specific services they deliver. In the included studies, CHWs were frequently matched with populations by location, race or ethnicity, and/or language. CHWs usually provided clients with culturally appropriate information and education on CVD risk factors; lifestyle counseling to help build individual capacity; informal counseling and social support; information on community resources; and conducted home visits to ensure clients got the services they needed.

To address implementation barriers, included studies commonly worked to achieve community buy-in during the planning phase, addressed issues related to gender and culture, and provided periodic quality assurance checks to maintain intervention fidelity. Future interventions should also aim to allocate program resources adequately; ensure sustainability mechanisms are in place; implement strategies to reduce loss to follow-up; involve CHWs in the planning phase; have reimbursement mechanisms in place as well as strategies to ensure CHWs have manageable workloads; and support state legislation and policies that define CHW duties.

It is essential for CHWs to have a clear scope of work and open lines of communication with other licensed healthcare providers. When CHWs are engaged to provide direct health services, consideration should be given to issues of privacy, liability, and the Health Insurance Portability and Accountability Act (HIPAA).

Evidence Gaps

Most included studies evaluated outcomes at 12 months, a relatively short follow-up time for studies of CVD risk factors. More evidence is needed on programs evaluated over a longer time period. It also would be useful to have more evidence on larger-scale interventions (i.e., >500 patients) and interventions conducted in rural areas or worksite

settings. Evidence is needed to assess intervention effectiveness among a wider range of population subgroups, based on characteristics such as comorbidity, insurance, education, sexual orientation, disability, and race/ethnicity (in addition to African American and Hispanic populations).

More evidence is needed on CVD screening outcomes, especially among patients who do not have a usual source of healthcare. It also would be beneficial to know whether CHWs are effective in helping patients access care for their CVD risk factors, especially patients from medically underserved groups.

In the included studies, CHWs usually delivered services in either community or healthcare settings. More evidence is needed on the effectiveness of CHWs who work interchangeably in both community and healthcare settings to determine whether they can build and enhance community–clinical linkages.

Among interventions that use a team-based care model, more evidence is needed on the incremental value of having CHWs on the team. Future studies that use models of care focused on culturally appropriate health education and engage CHWs as outreach, enrollment, and information agents (without a team-based care approach) should assess intervention effects on CVD risk factor outcomes (e.g., blood pressure and cholesterol). More evidence is needed also on the effectiveness of engaging CHWs as community organizers and navigators.

Specific to the CHWs themselves, it would be useful to know more about effective methods for recruiting, training, supervising, and evaluating CHWs; the importance of prior experience and educational attainment; and the necessary frequency and duration of CHW–client interactions.

Finally, more information is needed on the overall administration of these interventions, including sustainability and reimbursement arrangements. Because most studies were funded by public grants, it would be useful to understand whether CHW interventions funded by other mechanisms are equally effective, and how well interventions that use a community-based participatory approach work to prevent CVD.

Studies that qualified for the economic review had incomplete reporting and inclusion of the important drivers of intervention cost and healthcare cost. In addition to reporting this type of information, future studies should assign a cost for the services of CHWs, whether such services are voluntary or otherwise. It also would be beneficial for studies to report physiological outcomes such as blood pressure reductions which could be translated to QALY saved.

References

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McEwan P, Peters JR, Bergenheim K, Currie CJ. Evaluation of the costs and outcomes from changes in risk factors in type 2 diabetes using the Cardiff stochastic simulation cost-utility model (DiabForecaster). *Current Medical Research and Opinion* 2005;22(1):121-9

The data presented here are preliminary and are subject to change as the systematic review goes through the scientific peer review process.

Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. CPSTF evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and other interventions best meet the needs, preferences, available resources, and constraints of their constituents.

Document last updated August 21, 2017