Effectiveness of Interventions Engaging Community Health Workers to Prevent Cardiovascular Disease

A Community Guide Systematic Review

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Disclaimer

The findings and conclusions in this presentation are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

The Centers for Disease Control and Prevention provides administrative, research, and technical support for the Community Preventive Services Task Force.
What is The Community Guide?

- Credible source of systematic reviews and findings of an independent US Task Force: Community Preventive Services Task Force

- A focus on population-based interventions in:
  - Communities
  - Health Care systems

- Provides evidence-based findings and recommendations regarding use

http://www.thecommunityguide.org/index.html
# Cardiovascular Disease Prevention and Control

<table>
<thead>
<tr>
<th>Task Force Recommendations and Findings</th>
<th></th>
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<tbody>
<tr>
<td>Team-based Care to Improve Blood Pressure Control</td>
<td>Recommended April 2012</td>
</tr>
<tr>
<td>Reducing Out-of-Pocket Costs for Cardiovascular Disease Preventive Services for Patients with High Blood Pressure and High Cholesterol</td>
<td>Recommended November 2012</td>
</tr>
<tr>
<td>Clinical Decision Support Systems to Prevent Cardiovascular Disease</td>
<td>Recommended April 2013</td>
</tr>
<tr>
<td><strong>Interventions Engaging Community Health Workers (CHWs) to Prevent Cardiovascular Disease</strong></td>
<td>Recommended March 2015</td>
</tr>
<tr>
<td>Self-Measured Blood Pressure Monitoring Interventions to Improve Blood Pressure Control</td>
<td>Recommended June 2015</td>
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</tbody>
</table>

More information on these recommendations can be found here: [http://www.thecommunityguide.org/cvd/index.html](http://www.thecommunityguide.org/cvd/index.html)
CHW Cardiovascular Disease Coordination Team

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What are Community Health Workers (CHWs)?

- Frontline public health workers who serve as a bridge between communities and healthcare systems
- Also known as promotores de salud, community health representatives, community health advisors
- Are from, or have an unusually close understanding of, the community served
- Trained to provide culturally appropriate health education and information
- Offer social support, informal counseling, connect people with the services they need
- Can deliver health services such as blood pressure screening
- Advocate on behalf of individuals and communities
- Often receive on-the-job training and work without professional titles
- May be paid workers or volunteers
Engaging Community Health Workers (CHWs) to Prevent Cardiovascular Disease

Interventions that engage CHWs to focus on cardiovascular disease (CVD) prevention implement one or more of the following models of care:

- **Screening and Health Education**
  - Screen for high blood pressure, cholesterol, and behavioral risk factors
  - Deliver individual or group education on CVD risk factors
  - Provide adherence and self-management support for medications

- **Outreach, Enrollment, and Information**
  - Help people and families apply for eligible medical services
  - Provide proactive follow-up and monitoring such as appointment reminders and home visits

- **Team-based Care**
  - Partner with patients and licensed providers, such as physicians and nurses to improve coordination of care and support for patients

- **Patient Navigation**
  - Help people and families navigate complex medical systems and processes

- **Community Organization**
  - Serve as liaisons between the community and healthcare system to help facilitate self-directed change and community development

Analytic Framework: Interventions Engaging CHWs to Prevent CVD

Population (especially underserved communities)

Interventions engaging community health workers in CVD prevention

Key Potential Effect Modifiers:
- Model of care
- Training
- Supervision
- Access to resources

Increased knowledge of
- CHW activities
- Available social and healthcare services
- Available community resources
- Navigating complex systems

Improved knowledge
- Knowledge
- Attitudes
- Behaviors

Regarding CVD risk

Improved
- Utilization of services
- Social support received
- Quality of care received

Improved patient experience

Additional benefit:
- Addressing comorbidities

Improved rate of recommended screening for CVD risk factors

Improved patient health behavior
- Smoking
- Diet
- Physical activity
- Medication adherence

Reduced CVD risk factors
- Blood pressure
- Lipids
- Diabetes
- 10-yr CVD risk
- BMI/Weight

Reduced CVD morbidity
- Events
- Hospitalizations

Reduced CVD mortality

Reduced health disparities

Improved
- Utilization of services
- Social support received
- Quality of care received

Improved patient satisfaction with care

Improved
- Knowledge
- Attitudes
- Behaviors

Regarding CVD risk

Improved knowledge
- Knowledge
- Attitudes
- Behaviors

Improved
- Utilization of services
- Social support received
- Quality of care received

Improved patient experience

Improved
- Knowledge
- Attitudes
- Behaviors

Regarding CVD risk

Improved knowledge
- Knowledge
- Attitudes
- Behaviors

Improved
- Utilization of services
- Social support received
- Quality of care received

Improved patient experience

Potential additional benefits

Key potential effect modifiers

Diagram Key

Interventions considered in this review
Outcomes considered in the Task Force assessment of effectiveness
Target population(s)

Postulated intermediate outcomes

Potential additional benefits

Key potential effect modifiers

8
Research Questions

How effective are interventions engaging CHWs in:

1. Increasing recommended screening for CVD risk factors?
2. Improving outcomes for CVD risk factors (i.e., blood pressure, cholesterol)?
3. Improving client health behaviors (i.e., physical activity, diet, smoking, medication adherence)?
4. Reducing CVD-related health disparities?
5. Improving client satisfaction with care?
6. Reducing morbidity and mortality?
Search for Evidence

- Search for CHW intervention studies and reviews focused on reducing risk for cardiovascular disease (e.g., blood pressure, cholesterol, diabetes) conducted in high income countries as identified by the World Bank*

- Electronic databases searched:
  - PubMed
  - Cochrane
  - Google Scholar
  - CINAHL

- Search period: Database inception – July 2013

- Additional studies from reference lists of relevant articles, systematic reviews, and suggestions from team members.

*http://data.worldbank.org/country
Inclusion/Exclusion Criteria

- **Inclusion criteria**
  - Required focus on addressing at least high blood pressure or high cholesterol
  - Study designs: RCTs/Quasi RCTs, other design with concurrent comparison, interrupted time series, before/after without comparison
  - Included one or more of 5 models of care (HRSA, 2007)*
  - All settings: community, healthcare system

- **Exclusion criteria**
  - Greater than 50% of participants with CVD
  - Focus of study is only on: CHW training, peer support group(s), or interpreter/translation services
  - Study design: cross-sectional

Results from the Systematic Search

Broad search of all potentially relevant articles from electronic databases (beginning of database-July 2013)

N=9,958

Not relevant/Duplicates (n=6,404)

Articles potentially relevant to this topic

n=3,554

Not a CHW intervention (n=2,213)

Full-texts screened

n=1,341

Did not meet inclusion criteria (n=1,254)

Total CHW intervention studies

n=87

CVD prevention studies

n=35

Diabetes management studies

n=52
## Body of Evidence on CVD Prevention (n=35 studies)

<table>
<thead>
<tr>
<th>Quality of Execution</th>
<th>Suitability of Study Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greatest</td>
</tr>
<tr>
<td>Good (0-1)</td>
<td>4</td>
</tr>
<tr>
<td>Fair (2-4)</td>
<td>13</td>
</tr>
<tr>
<td>Limited (&gt;4)</td>
<td>-</td>
</tr>
</tbody>
</table>

Included intervention studies: 31  
Excluded intervention studies: 4
Setting and Population Characteristics (n=31)

- **Location and Setting**
  - Majority conducted in U.S. (90%)
  - Settings: Healthcare system (42%), community (35%), or both (7%)
  - Most studies took place in urban areas (71%)

- **Population**
  - Included adults and older adults with even distribution of men and women
  - Mainly enrolled clients from medically underserved populations
    - ≥ 75% African American (9 studies)
    - ≥ 75% Hispanic (8 studies)
    - ≥ 75% low-income (12 studies)
  - Limited information on education, sexual orientation, disability, or insurance
  - Most common risk factor addressed: high blood pressure
Distribution of Models of Care (n=31)

<table>
<thead>
<tr>
<th>Models of Care</th>
<th># of Study Arms Reporting Model of Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening &amp; Health Education Provider</td>
<td>n=31</td>
</tr>
<tr>
<td>Outreach/Enrollment/Information Agent</td>
<td>n=20</td>
</tr>
<tr>
<td>Member of Care Delivery Team</td>
<td>n=17</td>
</tr>
<tr>
<td>Navigator</td>
<td>n=8</td>
</tr>
<tr>
<td>Community Organizer</td>
<td>n=4</td>
</tr>
</tbody>
</table>
Specific Intervention Components

- # of Study Arms Reporting Intervention Component

- CHW delivered component
- Other team member delivered component

- Patient education
- Lifestyle counseling
- Appt. tracking
- Screening/pheretomy
- Education on meds
- Motivational counseling
- Client reminder
- Transportation services
- Med. adherence assessment
- Tracking response to treatment
- Info. on community resources
- Home visits
- Appt. referral
- Self-management materials
- Behavior goal setting
- Family/Friend support
- Home BP monitoring
## Summary of Other Intervention Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method of Interaction</strong></td>
<td>• Most common combination: one-on-one face-to-face + telephone sessions</td>
</tr>
</tbody>
</table>
| **Interaction Frequency**                           | • Approx. 1/3 of studies had weekly regular meetings  
• Another 1/3 varied in frequency  
• Remaining had either monthly or bi-monthly meetings                                      |
| **Matching**                                        | • Typically by location, race/ethnicity, and language                                                                                  |
| **Payment Status**                                  | • 40% of studies reported CHWs being paid, few provided information on amount                                                          |
| **Training**                                        | • Most studies reported some form of CHW training usually focused on CVD risk factors                                                   |
| **Other Providers**                                 | • CHWs usually worked with physicians and nurses                                                                                     |
| **Community-Based Participatory Research (CBPR)**   | • 25% of studies reported using a CBPR approach                                                                                     |
## Changes in Client Blood Pressure

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Measure</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion with blood pressure (BP) at goal</td>
<td>Median change in proportion of patients achieving BP control</td>
<td>Increase of 4.5 pct pts IQI: 1.7 to 17.4 pct pts 11 studies</td>
</tr>
<tr>
<td>Systolic Blood Pressure (SBP)</td>
<td>Median change in mean SBP (mmHg)</td>
<td>Decrease of 3.9 mmHg IQI: -6.6 to 2.1 mmHg 17 studies (18 study arms)</td>
</tr>
<tr>
<td>Diastolic Blood Pressure (DBP)</td>
<td>Median change in mean DBP (mmHg)</td>
<td>Decrease of 1.2 mmHg IQI: -3.8 to 0.8 mmHg 15 studies (16 study arms)</td>
</tr>
</tbody>
</table>

**pct pts**, percentage points  
**IQI**, interquartile Interval
## Changes in Client Cholesterol Levels

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Measure</th>
<th>Finding</th>
</tr>
</thead>
</table>
| Proportion with total cholesterol at goal    | Median change in proportion of patients achieving cholesterol control | Increase of 7.0 pct pts  
Range: 0.4 to 8.1 pct pts  
3 studies |
| Proportion with LDL-cholesterol at goal      | Median change in proportion of patients achieving LDL control | Increase of 6.6 pct pts  
Range: -1.1 to 28.9 pct pts  
4 studies |
| Total cholesterol                            | Median change in mean total cholesterol (mg/dL)              | Decrease of 8.3 mg/dL  
IQI: -14.7 to 0.5 mg/dL  
8 studies |
| LDL-Cholesterol                              | Median change in mean LDL levels (mg/dL)                     | Decrease of 11.6 mg/dL  
IQI: -15.6 to -1.2 mg/dL  
10 studies |
| Triglycerides                                | Median change in mean triglyceride levels (mg/dL)            | Decrease of 3.4 mg/dL  
IQI: -16.3 to 2.7 mg/dL  
7 studies |

pct pts, percentage points  
IQI, interquartile Interval
## Changes in Client Self-Reported Health Behaviors

<table>
<thead>
<tr>
<th>Outcome</th>
<th># of Studies</th>
<th>Direction and Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity</td>
<td>11 studies</td>
<td>• 8 studies reported favorable improvements ($p&lt;0.05$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 studies reported favorable improvements (NS)</td>
</tr>
<tr>
<td>Nutrition</td>
<td>12 studies</td>
<td>• 9 studies reported favorable improvements ($p&lt;0.05$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2 studies reported favorable improvements (NS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 study reported mixed effects</td>
</tr>
<tr>
<td>Smoking</td>
<td>9 studies</td>
<td>• 5 studies reported favorable improvements ($p&lt;0.05$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3 studies reported favorable improvements (NS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 study reported unfavorable outcome</td>
</tr>
<tr>
<td>Medication Adherence</td>
<td>4 studies</td>
<td>• 1 study reported favorable improvements ($p&lt;0.05$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1 study reported favorable improvements (NS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2 studies reported null effects</td>
</tr>
</tbody>
</table>

NS, non-significant
Other Outcomes Reported

- Screening for CVD risk factors
  - 1 study reported an increase of 3.0 percentage points in proportion of clients screened for CVD risk factors (relative risk: 1.7; 95% CI: 1.2 to 2.4)

- Change in CVD risk scores
  - Median decrease in Framingham risk score of -0.8 percentage points (IQI: -1.9 to 0.3 percentage points; 5 studies)
  - 3 studies reported improvements in CVD risk using other CVD risk measures

- Utilization of healthcare services
  - 1 study reported a decrease in the proportion of clients with no health insurance and an increase in the proportion of clients with a primary care provider
  - 1 study reported reductions in length of hospital stays and decreases in Medicaid reimbursements

- Morbidity and Mortality
  - 2 studies reported reductions in heart attacks, heart failure, stroke, ER admissions, hospital admissions and in-hospital deaths

IQI, interquartile Interval
BP at Goal by CHW Model of Care: With and Without Team-based Care (TBC)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Suitability of Design</th>
<th>n</th>
<th>BP Control Median (percentage points)</th>
<th>n</th>
<th>BP Control Median w/out TBC studies (percentage points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Median</td>
<td>Greatest/Moderate</td>
<td>7</td>
<td>+3.8 (IQI: -2.4 to 17.9)</td>
<td>3</td>
<td>-2.4 (range: -11.0 to 3.0)</td>
</tr>
<tr>
<td></td>
<td>Least</td>
<td>4</td>
<td>+7.7 (Range: -1.6 to 14.5)</td>
<td>2</td>
<td>3.1 (mean)</td>
</tr>
<tr>
<td>Member of care delivery team/Team-based care (TBC)</td>
<td>Greatest/Moderate</td>
<td>4</td>
<td>+17.6 (range: 3.8 to 22.5)</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Least</td>
<td>2</td>
<td>Effect estimates: +10.8 and 14.5</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Navigator</td>
<td>Greatest/Moderate</td>
<td>4</td>
<td>+10.8 (range: -2.4 to 22.5)</td>
<td>1</td>
<td>Effect estimate: -2.4</td>
</tr>
<tr>
<td></td>
<td>Least</td>
<td>1</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Screening and health education provider</td>
<td>Greatest/Moderate</td>
<td>6</td>
<td>+3.4 (IQI: -4.6 to 19.0)</td>
<td>3</td>
<td>-2.4 (range: -11.0 to 3.0)</td>
</tr>
<tr>
<td></td>
<td>Least</td>
<td>4</td>
<td>+7.7 (-11.0 to 22.5)</td>
<td>2</td>
<td>Effect estimates: 1.6 and 4.5</td>
</tr>
<tr>
<td>Outreach/enrollment/information agent</td>
<td>Greatest/Moderate</td>
<td>3</td>
<td>+17.4 (range: 3.0 to 17.9)</td>
<td>1</td>
<td>Effect estimate: 3.0</td>
</tr>
<tr>
<td></td>
<td>Least</td>
<td>3</td>
<td>+4.5 (range: 1.68 to 10.8)</td>
<td>2</td>
<td>Effect estimate: 1.6 and 4.5</td>
</tr>
</tbody>
</table>

No studies examined use of CHWs as community organizers on BP control
Applicability

Based on results for interventions in different settings and populations, findings are applicable to the following:

- Adults at increased risk for cardiovascular disease with at least high blood pressure and high cholesterol
- Women and men
- African American, Hispanic, and low-income populations
- Urban environments
- U.S. healthcare system and community settings
Considerations for Implementation

- **Intervention delivery**
  - One-on-one face-to-face interactions in combination with telephone contact

- **CHW intervention components delivered**
  - Patient education, lifestyle counseling, information on community resources, and home visits

- **Training/continuing education**
  - Provide ongoing continuing education and training
  - Training includes aspects on collaboration with other providers

- **Potential liability issues**
  - Privacy and HIPAA issues when CHW is a provider of healthcare services
  - CHW used as substitute for licensed healthcare providers

- **CHW integration into healthcare systems**
  - Scope of work considerations
  - Communication with other providers
## Considerations for Implementation (cont’d)

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reimbursement for community-based preventive services including those with a CHW</td>
<td>• Restriction of CHWs to aspects of care that are simple and rules-based</td>
<td>• Continue to provide training opportunities for CHWs and their supervisors</td>
</tr>
</tbody>
</table>
| • States decide whether to reimburse CHWs | • Participation of CHWs and patients may be impacted by  
  • Formal training programs  
  • State certifications  
  • Reimbursement | • Enhance opportunities for CHWs to meet regularly, either in person or via telephone or internet |
| • Responsibility of individual states to define CHW roles and responsibilities and training needed | • Expand across existing institutions of care to improve outcomes and utilization (not necessarily cost-saving) | • Have CHW supervisors monitor activities of CHWs:  
  • Setting boundaries  
  • Providing continuous performance  
  • Feedback coaching |
Summary

- CHWs engaged in team-based care model led to large improvements in blood pressure and cholesterol.
- CHWs engaged as health educators, or outreach, enrollment and information agents led to modest improvements in health behaviors.
- Most included studies engaged CHWs to work with minorities and medically underserved groups.
- Applicable to a variety of population and settings.
- Limited evidence for CHWs engaged as navigators and community organizers.
- Limited economic evidence to draw conclusions on cost-benefits and cost-effectiveness.
Task Force Finding

The Community Preventive Services Task Force 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 (e.g., physical activity, healthful eating habits, smoking cessation) in patients at increased risk for CVD.

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.

http://www.thecommunityguide.org/cvd/CHW.html
Evidence Gaps

Setting
- Population density (US) – Rural areas
- Large scale interventions (>500)
- Worksite

Population
- Sexual orientation
- Disability status
- Risk factor status
- SES – Education
- SES – Insurance status
- Race/ethnicity other than African American and Hispanic

CHW characteristics
- Recruitment
- Years of experience
- Educational attainment
- Supervision
- Performance evaluation
- CHW training – type and method

Intervention Delivery
- Duration (> 12 months)
- Matching – SES
- Matching – personal experience
- Intensity – Frequency and length of each interaction

Context
- Sustainability/maintenance
- Reimbursement mechanism
- Malpractice insurance
- Participatory approach
- Practice based studies
- Funding mechanisms other than grants

Models of care
- Navigator and Organizer (without team-based care)

Core roles
- Advocating for individual and community needs
Go to The Community Guide website for

- Community Preventive Services Task Force findings on over 20 public health topics
- Systematic reviews, methods and publications
- Real-world stories about using The Community Guide
- Automatic notices when new information is posted

Visit [http://www.thecommunityguide.org](http://www.thecommunityguide.org) today!

The Community Preventive Services Task Force is an independent, nonfederal, unpaid group of public health and prevention experts whose members are appointed by the Director of the Centers for Disease Control and Prevention (CDC). CDC provides administrative, research, and technical support for the Community Preventive Services Task Force.
Thank you!

Kproia@cdc.gov
References


   http://www.iom.edu/~media/Files/Activity%20Files/Quality/VSRT/Cost%202/30-Decentralizing%20Health%20Care%20Delivery%20By%20Using%20Community%20Health%20Workers.pdf