



The New England Comparative Effectiveness Public Advisory Council

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Community Health Workers:

A Review of Program Evolution, Evidence on Effectiveness and Value, and Status of Workforce Development in New England

Final Report – July 2013

Developed by:

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Table of Contents

<i>Introduction</i>	<i>3</i>
<i>1. Background</i>	<i>4</i>
<i>2. Effectiveness of CHW Programs.....</i>	<i>14</i>
<i>3. Economic Impact of CHW Programs.....</i>	<i>24</i>
<i>4. Policy Expert Perspectives</i>	<i>34</i>
<i>5. CEPAC Votes, Discussion, and Best Practice Recommendations.....</i>	<i>44</i>
<i>References.....</i>	<i>55</i>

Introduction

To make informed healthcare decisions, patients, clinicians, and policymakers need to consider many different kinds of information. Rigorous evidence on the comparative clinical risks and benefits of alternative care options is always important; but along with this information, decision-makers must integrate other considerations. Patients and clinicians must weigh patients' values and individual clinical needs. Payers and other policymakers must integrate information about current patterns of utilization, and the impact of any new policy on access, equity, and the overall functioning of systems of care. All decision-makers, at one level or another, must also consider the costs of care, and make judgments about how to gain the best value for every healthcare dollar.

The goal of this initiative is to provide a forum in which all these different strands of evidence, information, and public and private values can be discussed together, in a public and transparent process. Initially funded by a three-year grant from the federal Agency for Healthcare Research and Quality (AHRQ), and backed by a consortium of New England state policymakers, the mission of the New England Comparative Effectiveness Public Advisory Council (CEPAC) is to provide objective, independent guidance on how information on comparative effectiveness can best be used across New England to improve the quality and value of health care services. CEPAC is an independent body composed of clinicians and patient or public representatives from each New England state with skills in the interpretation and application of medical evidence in health care delivery. Representatives of state public health programs and of regional private payers are included as ex-officio members of CEPAC. The latest information on CEPAC, including guidelines for submitting public comments, is available online: cepac.icer-review.org.

The Institute for Clinical and Economic Review (ICER) is managing CEPAC and is responsible for developing evidence reviews for CEPAC consideration. ICER is an academic research group based at the Massachusetts General Hospital's Institute for Technology Assessment. ICER's mission is to lead innovation in comparative effectiveness research through methods that integrate evaluations of clinical benefit and economic value. By working collaboratively with patients, clinicians, manufacturers, insurers and other stakeholders, ICER develops tools to support patient decisions and medical policy that share the goals of empowering patients and improving the value of healthcare services. More information about ICER is available at www.icer-review.org.

ICER has produced this evidence review and policy analysis to support CEPAC deliberations. Building upon initial research conducted by AHRQ, the U.S. Health Resources and Services Administration (HRSA), and various state-based initiatives, the goals of this review are to 1) document the evolution of community health worker (CHW) programs within New England as well as nationally; 2) summarize the evidence on CHW program impact on health outcomes and costs and identify program components associated with success; 3) examine the potential budgetary impact of implementing CHW programs; and 4) provide insights from policy experts on potential best practices in CHW implementation. This report is part of an experiment in enhancing the use of evidence in practice and policy, and comments and suggestions to improve the work are welcome.

1. Background

1.1 The Role of the Community Health Worker

Disparities across racial and socioeconomic lines in the utilization of health care services and in patient outcomes continue to plague healthcare systems in the U.S. (AHRQ, 2008; Smedley, 2003; Children's Defense Fund, 2006). Policies to address health care disparities have varied, including steps to increase access to health insurance coverage at both the state and federal levels, policies aimed at increasing the diversity and numbers of primary care practitioners, and a multiplicity of programs aimed at coordinating care across settings and provider types, including disease management, case management, and multi-disciplinary clinics (Smedley, 2009).

One health care role that has gained increasing attention in recent years is that of the community health worker (CHW). It is estimated that there are currently 120,000 CHWs working in the U.S. today in a variety of healthcare settings, communities, and clinical contexts (Rosenthal, 2010). The role has become prominent enough that the U.S. Department of Labor created a Standard Occupational Classification for CHWs in 2009. The most widely accepted definition for CHWs, however, is that of the American Public Health Association, which characterizes CHWs as the following:

A Community Health Worker (CHW) is a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served. This trusting relationship enables the CHW to serve as a liaison/link/intermediary between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery.

A CHW also builds individual and community capacity by increasing health knowledge and self-sufficiency through a range of activities such as outreach, community education, informal counseling, social support and advocacy. (American Public Health Association, 2009)

In practice, CHWs may be known by a variety of titles, including community health advisor, lay health worker, community health representative, promotora or promotores de salud, and patient navigators. The actual responsibilities of CHWs vary both within and across these different job titles, but there are several core elements that are common across them. For one, CHWs typically have a strong connection to the patient community they are serving, and are often members of that same community themselves. Second, CHWs are distinguished from other health professionals because their training and orientation focus on education and health system navigation rather than direct provision of health care services. CHWs provide support to the clinical care team by resolving issues that create obstacles to accessing services, such as transportation to appointments,

intervention with utility companies, etc. The work of CHWs thus often transcends the medical system, and CHWs may be employed by public health agencies, schools, and other community-based organizations. In these ways CHWs can be differentiated from nurse case managers and other clinically-trained personnel typically engaged in care coordination activities. There have been attempts to create a standard definition and role for CHWs, but the scope of their work and the methods of integration within a clinical team continue to take many forms.

While there are commonalities in the general role that CHWs play, the deployment of these individuals is highly variable. CHWs may operate as “generalists” across multiple patient populations or be focused on a patients with a single clinical condition. They may be employed as part of a short-term grant-funded initiative or be permanent employees of a community health center. CHWs may be full-time or part-time employees or may even be unpaid volunteers. In the sections that follow, we seek to understand the evolution of the CHW workforce on both a national and regional level, understand the evidence on the clinical and financial impact of CHW programs, and seek to identify program components most closely associated with success.

A Similar Tradition: Peer Support Specialists in Behavioral Health

There is a long history of academic research and practical experience with the use of non-licensed health professionals known as peer support specialists who work with mental and behavioral health patients using approaches analogous in many ways to that of CHWs. Peer support specialists have personal experience of mental illness or substance abuse and they are paired with patients having similar issues to help them achieve success in their own path to recovery. Like CHWs, peer support specialists provide a wide range of peer support, consumer advocacy, and patient education functions to support a patient’s interaction with the health system.

Although the federal Substance Abuse and Mental Health Services Administration (SAMHSA) has a long track record of involvement with peer support specialists, the primary locus of activity is at the state level. Many state departments of behavioral health offer peer support specialist training and services. In addition, there are numerous private organizations that offer peer support services for people with mental health problems, including [Fountain House](#), [Emotions Anonymous](#), the [Depression and Bipolar Support Alliance](#) (DBSA), [GROW](#), [Wildflowers' Movement](#) and [Recovery International](#). Although there are currently no national standards in place for training or certification, many states offer programs using their own criteria, with most training programs focusing on the development of core competencies like motivational interviewing and problem solving, in addition to mental health recovery-specific curricula. Duration of training can range from a 10-week to 40-hour course, with many certification programs requiring the completion of a written or oral exam.

In 2001, Georgia became the first state to reimburse services provided by a certified peer specialist (CPS), with many states having since followed suit. A 2010 survey found that 22 states reimbursed CPS through Medicaid and that 11 were in the planning stages of doing so (Shea-Delaney, 2010).

Although peer support specialists would seem to have important similarities with CHWs, and it is widely acknowledged that many patients with chronic health conditions also suffer mental and behavioral health issues, the policy infrastructures appear to have evolved quite separately, with little apparent collaboration or structural connection between the two.

1.2 Evolution of U.S. CHW Workforce

The notion of an individual assisting other members of his or her community in health-related matters is a longstanding one. Evidence of lay individuals advocating for, and in some cases providing basic healthcare dates back to at least the 17th century. Examples include the “feldshers,” who were deployed to treat Russian military personnel during a shortage of doctors, “barefoot doctors,” who provided basic primary care services in remote Chinese villages that did not have medical personnel, and “promotores,” a movement that grew in Latin America in the 1950s to bring health care to the poor as a means of empowerment (Perez, 2008; Wiggins, 1998).

In the U.S., published literature on CHW programs began to appear in the mid-1960s. Early efforts focused primarily on anti-poverty strategies rather than specific health improvement activities. For example, the passage of the Federal Migrant Health Act of 1962 mandated outreach by community aides, and programs sponsored by the U.S. Office of Economic Opportunity focused on community roles as a means for job creation (Meister, 1992). Early examples of community health worker activity were centered on localized programs to treat acute conditions such as tuberculosis and pediatric respiratory infections (Wilkinson, 1992; Cauffman, 1970).

The largest federal CHW program began in the late 1960s with the establishment of the Community Health Representative (CHR) program of the Indian Health Service. The CHR program began as a means of directly involving American Indians/Alaskan Indians in their own healthcare by supporting CHRs to work with tribal managers to increase the provision of basic health services in 550 federally recognized American Indian and Alaskan Native communities (Indian Health Service, 2013). The specific job-related tasks of CHRs have evolved over time, but primarily involve disease prevention and health promotion activities, including regular home visits to conduct health assessments and transportation to appointments.

In the 1970s and 1980s, the World Health Organization’s recognition of the need for CHWs served to increase awareness of their potential role in public health and sparked substantial growth in private and public funding for more broad-based initiatives. Examples include the “Resource

Mothers” programs that dealt with maternal and child health issues (May, 2005) and the Health Education Training Centers program to serve immigrant populations along the U.S.-Mexico border (HRSA, 2007).

Efforts to organize, train, and credential CHWs began in earnest in the early 1990s. Training programs began at community health centers in Boston and San Francisco. The New Mexico Community Health Worker Association was founded with support from the University of New Mexico and created a training program with a grant from the Robert Wood Johnson Foundation (Love, 2004). The Centers for Disease Control and Prevention (CDC) and the Department of Education provided federal grants for the development of educational curricula. Arizona and Kentucky used annual state appropriations to fund CHW programs; the former has focused on maternal and child health issues in specific communities since 1992 (Arizona Department of Health Services, 2013), while the latter has targeted medically needy individuals in selected poor and rural counties across the state since 1994 and is administered by the University of Kentucky (University of Kentucky Center of Excellence in Rural Health, 2013).

The first effort to describe the profile of CHWs on a national basis, the National Community Health Advisor Study, was released in 1998 (Rosenthal, 1998). As previously mentioned, in 2009 the U.S. Dept. of Labor recommended the establishment of a Standard Occupational Classification for CHWs (Office of Management and Budget, 2008). And in 2010 the Patient Protection and Affordable Care Act passed including language that specifically identified CHWs as health professionals, while also authorizing grant funding for the use of CHWs to support medically underserved populations (PPACA, 2010). In addition to national activities, several states have been particularly active in developing public policy around CHWs, most notably Massachusetts, Minnesota, Oregon, and Texas. We describe these state-specific experiences in further detail below.

Massachusetts

Support for CHWs in Massachusetts began in the 1960s with the development of the Columbia Point Community Health Center in Dorchester, which became the first community health center in the U.S. (Ballester, 2005). In more recent years, several initiatives have developed to support the advancement of CHWs and establish a more comprehensive approach to training and deploying CHWs in Massachusetts. Movements to standardize training for CHWs began in the 1990s with the establishment of the Community Health Education Center of the Boston Public Health Commission. Other training programs evolved over time, including the Outreach Worker Training Institute of the Central Massachusetts Area Health Education Center (AHEC).

The creation of the Massachusetts Association of Community Health Workers (MACHW) in 2000 established a state-wide professional organization for CHWs, which has become a national leader

with regard to education, research, and advocacy on behalf of CHWs (Rosenthal, 2010). The state health care reform law of 2006 included two key provisions for CHWs. First, the state Department of Public Health (DPH) was directed to conduct a comprehensive evaluation of CHW programs in the state and provide recommendations for workforce sustainability. This report, which was released to the state legislature in late 2009, included 34 recommendations for maintaining a viable workforce. Among the key recommendations were those advocating a statewide “identity” campaign to standardize CHW nomenclature, roles, and responsibilities; creating a training, certification, and continuing education infrastructure; expanding funding mechanisms; and establishing a state government infrastructure to support CHW work moving forward (Anthony, 2009). The 2006 legislation also provided a seat for MACHW on the state’s Public Health Council, the body that advises DPH on major policy decisions.

The state legislature responded to the report’s recommendations by passing legislation in 2010 to authorize the creation of a Board of Certification for CHWs (Commonwealth of Massachusetts, 2010), which includes the Commissioner of Public Health, community health, public health, and health plan representatives, and representatives from MACHW. The Board, which began meeting in July 2012, is tasked with creating a program of certification for CHWs and defining standards and requirements for educational and training programs over a 5-year time horizon. In addition, legislation passed in 2012 designed to control costs in part by shifting from fee-for-service reimbursement to global payments authorized a formal role for CHWs as part of the primary care team within accountable care organizations, and recommended that the state Medicaid program include CHWs in its alternative payment methodologies (AHRQ, 2013; Turnbull, 2012).

Oregon

Oregon’s efforts to integrate CHWs into primary care practice began in 2008 with the development of a statewide CHW network in conjunction with the Northwest Regional Primary Care Association (NRPCA, 2013). Relevant legislative efforts began in earnest following the election of John Kitzhaber for a non-consecutive third term as governor in 2010. Kitzhaber, a former emergency room physician and health services researcher, has campaigned consistently for improved efficiency and wider access to care (Goldsmith, 2003). In 2011, the first of two laws was enacted, requiring the Oregon Health Authority to explore methods of improving birth outcomes among women of color, including but not limited to the use of doulas (non-medical birth assistants) (Oregon State Legislature, 2011). The second law, more far-reaching in nature, established an integrated network of care delivery systems known as “coordinated care organizations” (CCOs) to deliver care to recipients of medical assistance with a focus on prevention, reducing disparities, and improving health equity using alternative payment methods, patient-centered medical home structures, and evidence-based information. The law also specifies that beneficiaries must have access to personal health navigators and qualified CHWs (OregonLaws.org, 2011).

In 2013, the Center for Medicare and Medicaid Services (CMS) Center for Medicare and Medicaid Innovation awarded Oregon a \$45 million grant and Medicaid waiver to test the effects of the CCO framework and alternative payment models on both clinical outcomes and costs. All CCOs will utilize CHWs as part of integrated care teams (Oregon.gov, 2013). Oregon has identified 33 performance measures against which to judge the program's impact, including rates of appropriate/inappropriate resource utilization, clinical measures (e.g., BMI, tobacco use), patient satisfaction, and others (Johnson, 2013). The state legislature is also currently considering a bill to establish a health workers commission that would identify training and education requirements for CHWs and other health professionals.

Minnesota

In the early 2000s, Minnesota recognized that a shortage of health care personnel coupled with an increasingly diverse population had the potential to increase disparities in terms of access to and use of health care services. A multi-stakeholder coalition known as the Healthcare Education-Industry Partnership Council (HEIP) worked to develop a standardized description of CHW roles and responsibilities as well as a credit-based educational curriculum that could be offered at community and technical colleges (Minnesota Community Health Worker Alliance, 2013). The curriculum is summarized in Table 1 on the following page. The state legislature adopted this curriculum in 2007 as part of a system to allow CHWs, with appropriate supervision by advance practice nurses and physicians, to become billable Medicaid providers. The Centers for Medicare and Medicaid Services approved this change in 2008, which has since been expanded to include public health nurses and dentists as supervisors (Rosenthal, 2010). Minnesota thus became the first state to establish Medicaid reimbursement for CHW services, though covered benefits are limited to diagnosis-related education services that follow a standardized curriculum (Minnesota Department of Human Services, 2013)

Table 1. Standard Curriculum for Community Health Workers in Minnesota.

Phase	Components	Credit Hours
I: Core Competencies	Advocacy and Outreach	9
	Community and Personal Strategies	
	Teaching and Capacity Building	
	Legal and Ethical Responsibilities	
	Coordination, Documentation, and Reporting	
	Communication Skills and Cultural Competence	
II: Health Promotion Competencies	Healthy Lifestyles	3
	Heart and Stroke	
	Maternal/Child/Teen Health	
	Diabetes	
	Cancer	
	Oral Health	
	Mental Health	
III: Internship	72-80 Hours of Supervised Experience	2

Source: Minnesota Community Health Worker Alliance (<http://www.mnchwalliance.org/CurriculumOutline.asp>)

Texas

In 2001, Texas became the first state to adopt legislation requiring that state health and human service agencies use CHWs/promotores, to the extent possible, to assist recipients of medical assistance (McCormick, 2012). Additional legislation enacted later in the same year tasked the Department of State Health Services with developing and implementing a training and certification program to meet minimum standards. The certification standards are among the most stringent in the nation, requiring 160 hours of initial education and training as well as 20 hours of continuing education every 2 years for any salaried CHW (Texas Department of State Health Services, 2013).

In 2011, the state legislature charged the Department of State Health Services and Health and Human Services Commission with exploring the feasibility of deployment of CHWs and promotores across the state as well as funding and reimbursement mechanisms that could sustain the workforce. The resulting report, which was presented to the state legislature in 2012, featured an employer survey of organizations that did and did not employ CHWs (Texas Department of State Health Services/Health and Human Services Commission, 2012). Results indicated interest in maintaining and expanding CHW services among a substantial majority of employers, even those

who did not currently employ CHWs. Recommendations to the legislature included consideration of successful Medicaid models from other states, alterations to the state uniform managed care contract to include CHWs, integration of CHWs into patient-centered medical homes and other alternative delivery initiatives, and exploration of inclusion of CHWs into Texas' own Medicaid waiver project.

1.3 CHW Status in Other New England States

Implementation of CHW policy and CHW-related activities have progressed at varying rates in the New England states other than Massachusetts. The New England Community Health Worker Coalition convened for the first time in 2012 to form a collaborative for resource sharing and the development of regional policy initiatives. CHW status is highlighted in each state in the sections that follow.

Connecticut

Connecticut established the Connecticut Association of Community Health Workers in March 2013 in order to improve the recognition of CHWs in the state, further define their role in the healthcare workforce, and identify mechanisms for CHW credentialing and reimbursement. Presently there is no mandated training or certification for CHWs, but training opportunities exist through the Connecticut Area Health Education Center (AHEC) network, an independent non-profit organization first developed as part of a national program that received Congressional appropriations in the 1970s (Gessert, 1981). The Connecticut AHEC has developed post-secondary education training programs for CHWs that include a core competency curriculum through several academic partnerships.

Funding for CHWs in Connecticut is primarily through grants from both the federal and local levels, which are often short-term in nature.

Maine

Although several health centers and independent programs in Maine make use of CHWs, there is no statewide program committed to expand their use. CHWs are not required to be certified or to have received training to practice in the state, and no training curriculum has been implemented at any state college or university. However, a recent collaboration between the University of New England, Portland Community Health Center, and the Portland Public Health Division has developed

a new “interprofessional” training curriculum for health professionals that is focused on the deployment of CHWs as part of team-based care (University of New England, 2013).

Through Maine’s Patient Centered Medical Home (PCMH) Pilot program, health centers across the state are considering using CHWs as part of Community Care Teams (CCTs), though discussions on the use of CHWs are very preliminary. The PCMH pilot began in 2010 and includes participation from major commercial payers, Medicaid, and Medicare, as well as a diverse mix of adult and pediatric practices from across the state. CCTs are “multi-disciplinary, community-based, practice-integrated care management teams” designed to improve care for the most complex, high need patients in each practice (Maine Quality Counts, 2013). CCTs connect patients to broader community and health services, including referrals to community-based agencies, transportation services, behavioral health, medication management, and education services. Currently there are 10 CCT providers operating in the state. Other training and resources are available for CHWs, particularly in the southern region of the state where the Minority Health Program of the Portland Public Health Division launched a CHW initiative in 2003 to improve access to care for minority populations. This program provides a range of services, including language interpretation, cultural brokering for patients and providers, and assistance in scheduling and reminders for appointments (Portland Maine Public Health Division, 2013).

New Hampshire

As in Connecticut and Maine, there is no statewide coordinated effort to develop the community health workforce in New Hampshire, and no legislative requirements are currently in place for certification or training.

Regardless, some independent initiatives are making use of CHWs. For example, in May 2012 the National Health Care for the Homeless Council received a CMS Innovation grant to integrate CHWs into Federally Qualified Health Centers in 10 states, including New Hampshire, for the purpose of performing outreach and case coordination services to improve access to care and reduce inappropriate utilization of emergency services (CMS, 2012).

Rhode Island

Rhode Island is the only other New England state in addition to Massachusetts and Connecticut with a professional association for CHWs. In 2009, the state Department of Labor and Training launched an investigation into the status of CHWs and found that there were over 3,300 self-identified or employed CHWs in the state (Rhode Island Department of Labor and Training, 2009).

Efforts are in place through the Rhode Island Community Health Worker Association to develop a curriculum as well as training modules for CHWs, though certification or formal training is not currently required for practice in the state.

According to the state's report, the majority of CHWs in Rhode Island are funded through fee-for-service reimbursement or grant support (Rhode Island Department of Labor and Training, 2009), though funding is often short-term or limited. Details on funding sources and payer participation were not available in the report.

Vermont

As with most of the other states in the region, Vermont is without a statewide CHW association or formal legislative efforts to recognize, certify, or train CHWs. The majority of Vermont's community health workforce development is based in efforts to implement patient centered medical homes. Vermont is 1 of 8 states selected for the CMS patient centered medical home demonstration project. The Vermont Blueprint for Health, launched in 2006, is a statewide reform initiative that forms the core of the state's participation in the CMS project by recognizing Advanced Primary Care Practices as patient centered medical homes, and requiring health insurers to reimburse "Community Health Teams" (CHTs) (VanLandeghem, 2012). Some sites have embedded CHWs onto these teams to help patients and their families navigate social services, connect to community resources, and secure health appointments. In this model, CHWs also support a patient's self-management goals and help reinforce the physician's treatment plan. CHTs are funded through a combination of fee-for-service and capitated payments from commercial insurers, Medicare, and Medicaid (Bielaszka-DuVernay, 2011).

2. Effectiveness of CHW Programs

2.1 Summary of the Evidence

In 2009, the Agency for Healthcare Research and Quality (AHRQ) published an evidence report evaluating the characteristics of CHW programs and outcomes associated with CHW interventions (Viswanathan, 2009). To frame the review, CHWs were defined as individuals that “connect community members, particularly difficult-to-reach populations, to the health care system; receive training associated with their scope of work; and are a recognized or identifiable member of the community in which he or she works, defined by but not limited to geographic location, race or ethnicity, and exposure or disease status” (Viswanathan, 2009). The literature search included English-language studies published from 1980 – November 2008 that were conducted in the U.S., included ≥ 40 participants, involved randomized or nonrandomized comparisons of CHW interventions to an alternative, and allowed for the effect of the CHW intervention to be isolated (some studies included CHWs in a combination intervention without the ability to measure the effects of the CHW component) (Viswanathan, 2009). Search terms included multiple synonyms for CHWs, including “health advisor,” “health advocate,” “dumas,” “promotoras,” “outreach worker,” and others.

Study quality was rated using a customized form that evaluated multiple reporting domains, including description of study objectives/hypotheses, sample definition and selection, randomization technique, description of intervention, adjustments for bias, blinding, measurement techniques, follow-up, comparability of groups, use of intent-to-treat analysis, and supported conclusions. We focused attention on good- or fair-quality studies in the AHRQ review that measured the impact of CHW interventions on “health outcomes” and/or resource utilization, as listed below:

- Clinical measurements (e.g., BMI, blood pressure, HbA1c)
- Symptoms (e.g., “symptom-free” days)
- Missed work or activity limitations
- Health-related quality of life
- Medication adherence
- “Appropriate” resource utilization (e.g., appointments kept, screenings performed)
- “Unscheduled” resource utilization (e.g., ED/urgent care visits, hospitalizations)

We did not include studies in our analysis that focused attention solely on improvements in patient knowledge or satisfaction. Of the 53 studies identified in the AHRQ review that involved active comparisons of CHW interventions to lower-intensity interventions or usual care, 29 included an

assessment of CHW intervention impact on health outcomes as described above and were of good or fair quality (see Appendix , Table 1).

We also conducted an updated systematic literature search utilizing the search criteria and quality ratings from the AHRQ review, spanning the period January 2008 – April 2013. A total of 18 studies examined the impact of CHW interventions on health outcomes and were of good or fair quality (see Appendix, Table 3 for individual study details). Findings from the AHRQ review as well as our analysis of more recent literature are summarized in the sections that follow, organized by clinical context.

Chronic Disease Management

Diabetes

The impact of CHWs on the prevention and management of diabetes was evaluated in 8 studies. Study locations included a community health center in Oahu, HI, family health centers in Los Angeles, CA and primary care clinics in East Baltimore, MD. Studies recruited patients using a combination of criteria, including race or ethnicity, income, residence, enrollment at health center, and/or physician referral. Interventions consisted of individual home visits or group sessions; one study evaluated an intervention that included group education classes, home visits, and a joint provider visit with the CHW at the clinic (Spencer, 2011). Comparators included usual care with access to medical care and educational materials. Most studies followed patients for 6 months, but 2 studies assessed outcomes after a 2-year intervention (Katula, 2013; Gary, 2000). At least one significant positive outcome favoring the CHW intervention was reported in 6 studies, including significant changes in glycosylated hemoglobin (HbA1c) and improved self-reports of dietary changes. Two studies found no significant differences in HbA1c and other measures (Sixta, 2008; Gary, 2000).

Asthma

Four studies assessed CHW interventions in children's asthma (Krieger, 2002; Parker, 2008; Fisher, 2009; Krieger, 2009). Patients were recruited from urban neighborhoods in Detroit, MI and Seattle-King County, WA, along with communities in St. Louis County, MO. The studies enrolled participants who experienced persistent asthma as identified by a provider diagnosis or screening questionnaire. Participants typically came from low-income households and lived in a neighborhood with a predominantly African American or Latino population. Multiple home visits by CHWs during 1-year follow-up occurred in 2 studies as compared to a single visit or educational material (Krieger, 2002; Parker, 2008). In St. Louis County, Fisher et al. (2009) utilized phone calls with 2 home- or neutral-site visits vs. usual medical care in a 2-year study. A second study in Seattle-King County evaluated the impact of adding home visits by a CHW to clinic-based nursing care compared to nurse care alone over 1 year of follow-up (Krieger, 2009). All 4 studies reported

statistically-significant positive results including decreased number of hospital admissions, less need for unscheduled/urgent medical care, and decreased number of days with symptoms or activity limitations in a 2-week period.

The initial Seattle-King County intervention (Krieger, 2002 & 2005) has received national attention for its randomized comparison of “high-intensity” (home assessment, individualized action plans, linkage to community resources, multiple visits) vs. “low-intensity” interventions (single CHW visit, general educational materials). CHWs were ethnically paired with families, lived in the community, and had personal experience with asthma. Clinical outcomes from this study are presented in Table 2 below.

Table 2. Clinical outcomes from Seattle-King County Healthy Homes Project.

Measure	<i>High-Intensity</i>		<i>Low-Intensity</i>		p-value
	Base	Exit	Base	Exit	
Days w symptoms, past 2 wks	8.0	3.2	7.8	3.9	0.138
Caregiver quality of life*	4.0	5.6	4.4	5.4	0.005
Urgent health service use, past 2 mo (%)	23.4	8.4	20.2	16.4	0.026
Days w activity limitations, past 2 wks	5.6	1.5	4.3	1.7	0.029
Days used β_2 agonist use, past 2 wks	7.5	4.0	6.9	4.0	0.781
Days used controller medication, past 2 wks	5.9	3.5	4.4	3.6	0.250
Missed school in past 2 wks—child (%)	31.1	12.2	28.4	20.3	0.105
Missed work in past 2 wks—adults (%)	13.1	11.2	21.0	13.0	0.890

Source: Krieger JW et al., *Am J Public Health* 2005;95:652-9.

*Based on 1-7 numeric rating scale; higher numbers equate to better quality of life

Improvements in caregiver quality of life (on a 1-7 numeric scale) from baseline to study exit as well as reductions in urgent health-care service use and days with activity limitations were statistically-significantly greater for the high-intensity intervention. Other measures, including use of rescue and controller medications as well as missed work or school, did not statistically differ between groups.

Hypertension

The impact of CHW interventions on blood pressure control was evaluated in 2 studies (Balcázar, 2009b; Levine, 2003). Study sites included community health centers in the Lower Valley of El Paso, TX and community-based organizations and local providers in West Baltimore, MD. One study evaluated group sessions with phone calls over a 9-week period compared with receipt of

educational materials (Balcázar, 2009b), and the other study assessed multiple home visits over a 40-month period compared with a single home visit (Levine, 2003). Positive outcomes associated with group sessions included improvement in self-reports of dietary habits (Balcázar, 2009b). No significant differences between intervention and usual care were reported in either study for clinical outcomes including blood pressure and body mass index (BMI).

An additional study examined the impact of CHWs in promoting medical follow-up in patients with hypertension who lived in low-income neighborhoods in Seattle, WA (Krieger, 1999). CHWs interacted with patients utilizing phone calls, home visits and postcards over a 3-month period. More patients completed a follow-up appointment in the CHW intervention compared to the control (65% vs. 47%, $p=.001$).

Cardiovascular Disease Risk

Two studies assessed the impact of CHWs on cardiovascular disease risk (Balcázar, 2010; Hayashi, 2010). One study across 4 health centers in Los Angeles and San Diego examined individual counseling sessions over a 12-month period vs. healthy behavior education classes with low-income, underinsured or uninsured Hispanic women (Hayashi, 2010), finding statistically-significant changes in systolic blood pressure ($p=.038$). Significant changes in self-reports of moderate and vigorous physical activity were also reported. Balcázar et al. (2010) found a statistically-significant change in diastolic blood pressure ($p<.001$) over a 4-month period in Hispanic patients attending group-based educational sessions compared to patients receiving basic materials in El Paso, TX. No significant differences were reported in other clinical measures including BMI, weight, blood glucose and cholesterol measures.

Other Conditions

Six studies evaluated the impact of CHWs in other disease states. One study assessed the impact of one-on-one meetings in patients with human immunodeficiency virus (HIV) over a 12-month period vs. usual-care control (Roth, 2012). Patients in the intervention group were more likely to have viral loads under control (<50 copies/ml) (OR 2.01, 95% CI 1.18-3.43). Another study evaluated the impact of CHWs on adherence to medical follow-up in patients newly diagnosed with tuberculosis in a homeless population in San Francisco, CA (Pilote, 1996). CHWs met with patients, assisted with paperwork, and attended follow-up appointments with patients, resulting in significantly greater adherence compared to control (75% vs. 53%, $p=.004$). In a study of patients with back pain, group classes over a 12-month period did not have a significant impact on changes in disability scores as compared to patients receiving usual care and print materials on back pain ($p=0.092$) (Von Korff, 1998). The impact of a brief motivational interview with a CHW on risk of contracting a sexually transmitted disease in intravenous drug-positive patients was evaluated at a hospital in Boston, MA (Bernstein, 2012). The study did not report significant differences at 12 months in the number of transmitted infections compared to patients receiving only standard medical care. In a study of healthy women in rural Douglas, AZ receiving a home visit by a CHW in addition to postcard

reminders, no significant differences were seen in the number of women returning for a second annual preventive exam as compared to patients receiving only postcards (Hunter, 2004).

Finally, the impact of a CHW intervention on medical care utilization by newly-released prisoners was evaluated in a single good quality study (Wang, 2012). Patients received individual case management over a 12-month period from a CHW with a personal history of incarceration, along with access to primary care and public health resources. Control patients had identical access to primary care and public health resources but no CHW interaction. Patients in the intervention group recorded significantly less use of the emergency department ($p=.04$) compared to controls.

Cancer Screening

Breast Cancer

The effect of a CHW intervention on breast cancer screening behaviors was assessed in 6 studies. Study sites included church communities in Arkansas, Colorado and California as well as rural neighborhoods in Washington. Participants varied by study and included women from ethnic or racial minorities, women with low-to-moderate incomes, and/or women in rural areas. Interventions consisted of a group presentation or group sessions, telephone calls and print materials compared with exposure to a community-based educational campaign and provision of print materials only. Three of these studies followed patients for 2 years (Suaia, 2007; Andersen, 2000; Deroose, 2000); follow-up ranged from 4-14 months in the other studies. Three studies reported statistically-significantly improved adherence with breast cancer screening associated with the CHW intervention (Nguyen, 2009; Paskett, 2006; Deroose, 2000), while the remaining three showed no significant differences (Suaia, 2007; Andersen, 2000; Erwin, 1999).

A separate meta-analysis of prospective controlled studies ($n=18$) evaluating the effects of CHW interventions on mammography screening rates reported a statistically-significant association between participation in the CHW intervention and obtaining a screening mammography; the effect was quite modest, however (Risk Ratio [RR] 1.06, 95% CI 1.02-1.11) (Wells, 2011). Stronger effects of CHW interventions were evident when patients were paired with CHWs by race or ethnicity (RR 1.58, 95% CI 1.29-1.93).

Cervical Cancer

The role of a CHW intervention on cervical cancer screening rates was evaluated in 6 studies. Two studies evaluated rural populations in Ohio Appalachia and Appalachian Kentucky (Studts, 2012; Paskett, 2011). Four studies assessed urban populations in South Philadelphia, PA (African-American women), Seattle, WA (Chinese-American women) and Santa Clara County, CA (Vietnamese-American women) (O'Brien, 2010; Taylor, 2010; Mock, 2007; Taylor 2002). Follow-up was 12 months or less for all studies. Interventions consisted of home visits, group visits, letters

and phone calls, compared to usual care and direct mailings. All studies reported at least one positive outcome associated with the CHW intervention, including a statistically-significantly greater proportion of patients receiving a Pap smear and a larger change in the number of patients ever having a Pap smear.

Colorectal Cancer and Screenings for Multiple Cancers

One 6-month study assessed the impact of phone calls made by a CHW vs. no intervention on screening practices for colorectal cancer at an inner-city primary care practice in East Harlem, NY (Jandorf, 2005). Significantly more patients in the intervention arm completed colonoscopy appointments at 6 months as compared to control (24% vs. 5%, $p=.019$). At local community sites in Phoenix, AZ, social support group sessions with CHWs targeted cancer screening rates for breast, cervical and colorectal cancer as compared to individual sessions (Larkey, 2012). Screening assessment at 3 months and maintenance assessment at 15 months demonstrated no significant differences between intervention groups. One study evaluated the impact of small group and one-on-one sessions led by a CHW vs. control on screening behaviors for breast and cervical cancer over a 4-year period in low-income areas of San Francisco, CA (Hiatt, 2008). No statistically-significant differences were seen between intervention and control groups at follow-up.

Maternal/Child Health

Pregnancy

The impact of home visits by a CHW on pregnancy-related outcomes was evaluated in 2 studies. In New England, CHWs intervened with women diagnosed with maternal phenylketonuria resulting in positive outcomes during pregnancy (shorter time to achievement of metabolic control, 8.5 vs. 16.1 weeks, $p<.05$) and at 12 months following the birth of the child (higher developmental quotient at 6-12 months of age, $p<.05$) as compared to control (St. James, 1999). Positive outcomes, including increased ratio of actual vs. expected clinic visits ($p=.007$) were also reported in women receiving CHW services at an inner-city prenatal clinic in Cleveland, OH compared to routine clinic care (Graham, 1992).

Immunizations

Two studies reported the effect of CHWs on vaccination rates in children. Positive outcomes at 6 months were associated with patients receiving home visits and phone calls from CHWs in an immigrant community in New York City (Barnes, 1999) compared with no intervention. In the other study, based in Fulton County, GA, and comparing a CHW intervention that featured phone calls, a postcard and a home visit compared with a second arm consisting of automated phone call reminders only and a control arm with no reminders, no significant effects on vaccination rates were reported in either intervention arm compared to control (Rask, 2001).

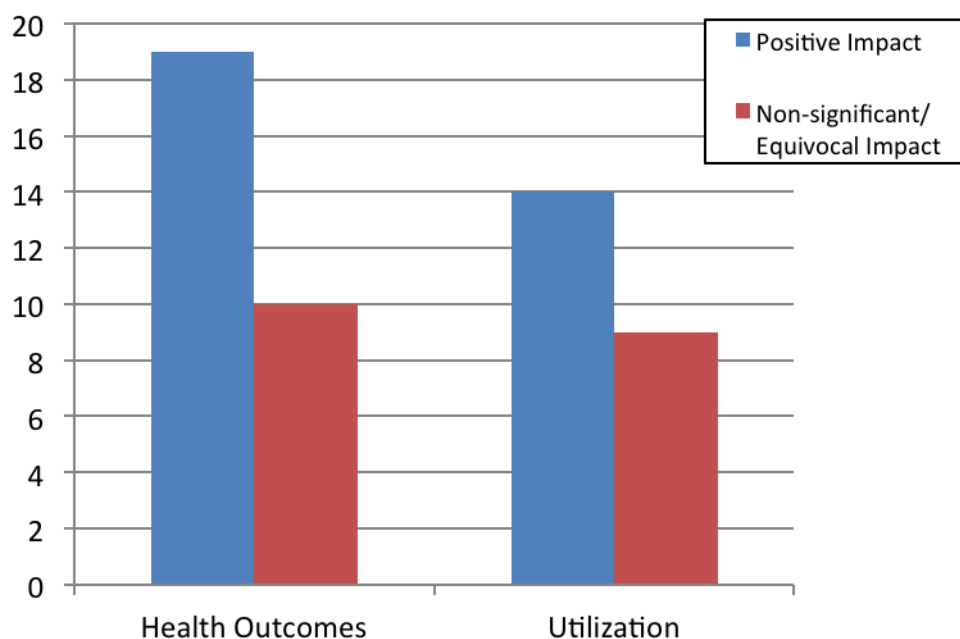
Maternal/Child Health and Development

Five additional studies evaluated the impact of CHWs on mother-child interactions (Schuler, 2000; Korfmacher, 1999) or measures of children's health (Conway, 2004; Silver, 1997; Black, 1995). CHW-based interventions consisted of repeated home visits and were compared to standard care and referrals, as well as to a nurse-led intervention (Korfmacher, 1999). Study participants varied, with the majority recruiting women and children from metropolitan health centers or university hospitals. Study participants tended to be from minority populations with low household incomes. In 2 studies (Schuler, 2000; Conway, 2004) women were drug users or smokers, respectively. CHWs were associated with improvements in motor development in children ($p=.02$) and mental health in mothers ($p=.03$) in 2 studies (Korfmacher, 1999; Black, 1995). The remaining studies showed no differences between groups.

2.2 Key Program Components & Correlation with Positive Outcomes

As described in detail in the sections above, the majority of published studies showed a positive impact of CHW-based interventions on health outcomes and/or resource utilization relative to limited interventions or usual care. Figure 1 below shows the number of studies with a positive impact on health outcomes and/or utilization versus studies reporting no between-group differences. Note that the total number of studies exceeds the number identified in Section 2.1, as some studies reported on both health and utilization outcomes.

Figure 1. Number of studies showing positive vs. no impact of CHW interventions.



In the reviewed literature, there were 33 reports identified from 32 studies describing positive findings in health outcomes and/or resource utilization from CHW interventions (one study reported positive findings for both health outcomes *and* resource utilization). Nineteen studies found no significant differences in outcomes between CHW interventions and control groups. These results should be viewed with caution given the likelihood of publication bias in favor of studies with positive results.

We attempted to compare all studies in order to identify key characteristics of CHW interventions associated with positive results. However, many study reports were missing descriptions of important aspects of CHW interventions. We opted instead to evaluate frequently-reported intervention characteristics in the 32 studies reporting positive outcomes. Program characteristics are presented in detail in Table 3 below.

Table 3. CHW intervention characteristics described in 32 studies reporting positive results.

	Element Present (% of studies)	Element Absent (% of studies)	Element Not Reported (% of studies)
CHW paid salary/stipend	66%	3%	31%
CHW paired with patient			
By Community	50%	50%	--
By Ethnicity/Race	66%	34%	--
By Disease State/Condition	31%	69%	--
Formalized training	63%	28%	9%
Study participation incentives	53%	6%	41%
Provision of care management resources	19%	41%	41%
Method of patient interaction			
Weekly Meetings	22%	34%	44%
In-person Home Visits	66%	25%	9%
Phone Calls	47%	44%	9%
Group Sessions	28%	66%	6%
Visit/Session Length ≥ 1 hour	41%	16%	44%
> 5 sessions	50%	28%	22%

Several key characteristics of CHW interventions are common among studies reporting positive results; however, many important elements were often not reported in a high percentage of reports, including CHW compensation (31%), whether study participation incentives were given (41%), provision of care management resources (41%), and the frequency and duration of CHW interactions (44%). When reported, the majority of successful interventions paid its CHWs a salary

or a stipend (66%). CHWs were paired with patients mainly based on shared ethnicity or race (66% of studies). Approximately two-thirds of successful CHW interventions used CHWs who had received formalized training based on a specific interaction theory and/or through an established training program. Interactions with patients could include weekly meetings in the clinical office, group sessions with other patients, and phone calls, but two-thirds of successful programs also had in-person meetings set up at the patient's home. Where reported, most successful programs had average visit or session lengths of at least 1 hour. Having a high number of visits or sessions, however, was not a consistent characteristic of successful interventions: only half of successful programs reported having an average of more than 5 visits with each patient.

Slightly more than half of the studies described information on study participation incentives provided to patients. Compensation for completion of baseline and/or follow-up evaluations or for patient retention were reported in 17 studies, and included monetary incentives, gift certificates to local stores, and provision of small gifts such as mugs and tote bags. Less commonly, 6 programs supplied patients with care management resources such as cleaning supplies, vacuum cleaners, pedometers, and kitchen items. Three of these were studies evaluating CHW interventions in children's asthma, and provided patients with free allergy testing, low emission vacuum cleaners, pillow and mattress covers, and household cleaning supplies (Krieger, 2009; Parker, 2008; Krieger, 2002).

Policy Comparator: Medicare's Disease Management & Care Coordination Demonstration Projects

Studies of CHW interventions have usually compared the study intervention with usual care or with some minor variant of the study intervention itself. No direct head-to-head studies exist comparing CHW interventions to interventions using nurse case managers or social workers to help patients manage their socioeconomic situation or to improve the coordination of care. Among these options, models of care coordination based on nurse case managers have received growing attention, especially when considered as part of patient centered medical home initiatives. Therefore, in order to present CEPAC with context around the policy options being considered by provider groups in New England, we present the below information from recent evaluations of nurse case manager programs that formed part of 34 Medicare disease management and care coordination demonstration projects (Nelson, 2012). These projects varied in the scope of beneficiaries included as well as the types of interventions provided, but all involved patients with one or more chronic conditions and utilized nurse care managers to educate patients, advocate for their needs, and monitor their status. Medicare paid a negotiated monthly fee between \$70 and \$225 per beneficiary to support these programs, but the stated goal was for the programs to reduce overall Medicare expenses by using improved coordination to reduce hospital admissions and other services.

With very few exceptions, hospital admissions and Medicare expenditures did not decrease at all or did not decrease by a large enough margin to offset program fees (Nelson, 2012). Among 11 programs specifically targeted at high-risk populations, only 4 demonstrated statistically significant reductions in hospitalization rates compared to control groups (Brown, 2012b). Analyses were performed to identify the program characteristics in those 4 studies that correlated with reductions in hospitalizations, and these characteristics, many of which overlap with the characteristics of successful CHW interventions, are listed below:

- *At least monthly face-to-face contact with patient*
- *Regular contact between care coordinators and patients' physicians*
- *Role as communications "hub" for all of a patient's providers (e.g., providing information across providers, updating providers on patient's condition)*
- *Use of comprehensive, evidence-based educational material, supplemented by training of care coordinators in behavior-change and motivational techniques*
- *Role overseeing comprehensive medication management, including access to pharmacists and medical directors to triage issues*
- *Development of timely and detailed transition plans for hospitalized patients*

Another conclusion drawn from the research on the Medicare demonstration projects was that programs reduced utilization only among very select "high-risk" patients (Peikes, 2012). While the programs all targeted patients with serious medical conditions, only patients who had been hospitalized in the prior 12 months and therefore had very high risk of near-term rehospitalization realized reductions in hospitalizations (Brown, 2012b). In fact, one of the highlighted programs, at Washington University Medical Center, was initially unsuccessful at reducing utilization when it targeted all of its high-risk patients. Savings were realized only after using local nurse case managers to meet face-to-face with patients at the highest risk of near-term hospitalization (Peikes, 2012). The study by Brown and colleagues also suggested that, even for programs targeting these very high-risk individuals, overall cost savings could not be achieved unless program fees were kept below approximately \$125-\$150 per member per month (Brown, 2012b).

3. Economic Impact of CHW Programs

3.1 Previously Published Evidence

A total of 14 studies (5 from the AHRQ review and 9 from our updated search) evaluated the economic impact of CHW interventions. Clinical contexts studied included asthma, diabetes, and HIV management, cancer screening, and targeted interventions for high consumers of healthcare resources or other high-risk individuals. Study designs varied, including randomized controlled trials, comparative cohort studies, assessment of the change in costs in a single cohort prior to and following CHW interventions, and simulation models.

Most of the economic evaluations adopted the perspective of a PCMH or other provider organization that would be “at risk” for all health care expenditures incurred by the target population and would also incur the incremental costs of instituting a CHW program. A smaller number of studies took the perspective of the health insurer responsible for both reimbursement of CHWs and health care services required by patients. Regardless of perspective, the majority of studies reported that CHW interventions resulted in net cost savings (i.e., cost offsets from reduced healthcare utilization were greater than the marginal costs of the intervention) over 6 months to 2 years of program follow-up relative to control groups involving limited or no intervention. For example, a recent study evaluated the impact of CHWs on Medicaid spending in dual-eligible patients in rural Arkansas (Felix, 2011). Six full-time CHWs, paired with patients by socioeconomic status and race/ethnicity, provided home and community-based outreach to 919 elderly and physically disabled adults over a 3-year period, with a focus on reducing the need for institutionalization. Medicaid expenditures were compared between the intervention group and a statistically-matched cohort (n=944) not receiving CHW services. Medicaid spending per patient increased in both groups (\$16,074 to \$19,174 vs. \$15,559 to \$20,224 for CHW and non-CHW groups, respectively). However, after multivariate adjustment, spending growth was 24% lower in the CHW group ($p < .05$), primarily as a result of lower nursing home expenditures. The program was estimated to have reduced Medicaid expenditures by \$3.5 million; after accounting for operational expenses of approximately \$900,000 for the CHW programs, it was estimated that the CHW intervention saved approximately \$3 for every dollar invested (Felix, 2011).

Exceptions to studies demonstrating cost savings included reports of CHW interventions to improve cancer screening rates (Larkey, 2012; Taylor, 2010); this is not surprising, as the outcome of interest for these interventions is an increase in appropriate utilization rather than a near-term decrease in unexpected utilization. An additional study found no cost offsets associated with a CHW intervention for medication self-management among patients with HIV over 1 year of follow-up

(Roth, 2012); again, the primary objective of this program was to promote better adherence to medication regimens rather than reductions in other healthcare expenditures.

The Seattle-King County asthma intervention described previously represents an example of a detailed economic evaluation from the provider perspective (Krieger, 2005). A total of 214 children with persistent asthma from urban, low-income households were randomized to receive a “high intensity” CHW intervention that featured an initial home environmental assessment resulting in a patient-specific action plan, 4-8 additional visits to implement action steps, educational and social support, and mitigation resources (e.g., mattress encasements, low-emission vacuums) or a low-intensity intervention consisting of a single CHW visit and limited education. As described in Section 2 and presented in Table 2 on page 16, statistically-significantly greater improvement in caregiver quality of life as well as reductions in use of urgent health care services and days with activity limitations were observed among patients receiving the high-intensity intervention in comparison to the low-intensity group (Krieger, 2005).

Health care utilization was assessed every 2 months during 1 year of follow-up. Multiple data sources were used to estimate costs; offsets from reduced use of emergent or urgent health care services were estimated to be \$57-\$80 lower per 2-month period for high-intensity vs. low-intensity patients, or \$342-\$480 annually (Krieger, 2005). Incremental program costs for the high-intensity intervention, including salary and benefits for 3 full-time CHWs, supplies, rent, travel, office expenses, and indirect expenses, were estimated to be \$1,124 per child for the program year. The authors estimate that the program would become cost-saving after 3-4 years if cost offsets were to continue after the intervention ends.

From the insurer perspective, the economic impact of a CHW intervention focused on high-risk patients was assessed in a cohort study of enrollees in a Medicaid managed care plan in New Mexico (Johnson, 2012) (*NOTE: this study is not described in Section 2, as all reported outcomes were economic in nature only*). High-risk patients were defined as those with 3 or more ED visits during a 3-month period. CHWs provided a variety of services, including frequent home visits for needs assessment, appointment support and reminders (CHWs were made aware of missed appointments through electronic reporting), health literacy and education, advocacy, and provision of equipment and supplies. A total of 6 CHWs were hired to cover 691 patients enrolled in the program; the evaluation was conducted on 448 of these patients for whom claims data were available during the 6 months before, during, and after program implementation, as well as on a matched group of 448 high-risk enrollees not participating in the program. Changes in healthcare utilization were tracked during the 12 months after program initiation (i.e., for the 6 months during the CHW intervention and the 6 months after the intervention ended).

Costs declined from pre-program period to follow-up in both groups; however, the CHW group observed significantly greater reductions in ED use, hospitalization, and both narcotic and non-

narcotic prescriptions, resulting in an annual cost offset of \$3,003 per patient relative to the non-CHW group. Total program costs were estimated to be \$559 per patient during the 12 months of follow-up, and were comprised of salaries and benefits for employees managing the CHW program as well as per member per month (PMPM) payments made to the provider groups delivering the CHW benefits (Johnson, 2012).

3.2 Budget Impact Analysis

As noted in the section above, estimates of the economic impact of CHW-based programs vary widely and are dependent on program breadth, setting, and a variety of other considerations. We elected to conduct exploratory analyses estimating the regional budgetary impact of implementing CHW-based programs; estimates focused on the Medicaid population in the 6 New England states. Given that CHW programs and their patient populations are so diverse, we did not believe it would be credible to create a single hypothetical CHW program for modeling purposes. Instead, we opted to base our modeling on the clinical and economic outcomes of two “archetypal” CHW studies: one of a disease-focused CHW intervention, and one more broadly conceived to address patients with multiple conditions. We selected the 2 studies described in detail in Section 3.1 above as sources for analyses of impact in asthma-specific (Krieger, 2005) and general “high risk” (Johnson, 2012) populations respectively, as they provided detailed information on program costs and resource allocation, services provided by CHWs during the intervention and impact on resource utilization, and health care costs over time. It should be noted, therefore, that our budget impact analysis is limited by its focus on these two studies and by many attendant assumptions, chief of which is the generalizability of the clinical and economic findings of these studies to those that might be obtained with the provider groups and patient populations in New England.

In both analyses, program costs, cost “offsets” (i.e., from reductions in unnecessary or unscheduled services), and net costs or savings were estimated for the Medicaid population in New England. We also examined the impact of varying patient caseloads and CHW salaries on program costs and net budgetary impact. For these analyses, we assumed an annual salary of \$40,000 for each full-time CHW based on the approximate midpoint of the reported range of hourly wages from the ICER New England survey (see Section 4.2), and an additional \$5,000 in program expenditures for benefits, supplies, and indirect expenses for each CHW.

Detailed descriptions of each analysis and results can be found in the sections that follow. As mentioned above, findings should be interpreted in the appropriate context—that is, an extrapolation of results from settings in specific studies to the New England Medicaid population. It is unlikely that these findings are directly generalizable to the region, given differences in the costs of goods and services, health systems, and population demographics between an urban asthma population in Seattle, a Medicaid managed care organization in New Mexico, and all of New

England Medicaid. In addition, these analyses are focused on the impact of CHW-based interventions on *direct* medical costs, and therefore do not include any estimates of impact on missed work or school, home modifications, or other benefits and costs outside the healthcare system. Nevertheless, the analyses may provide a useful platform for quantifying the potential costs and benefits of CHW interventions on a regional and per-patient basis, during a single intervention year and over time.

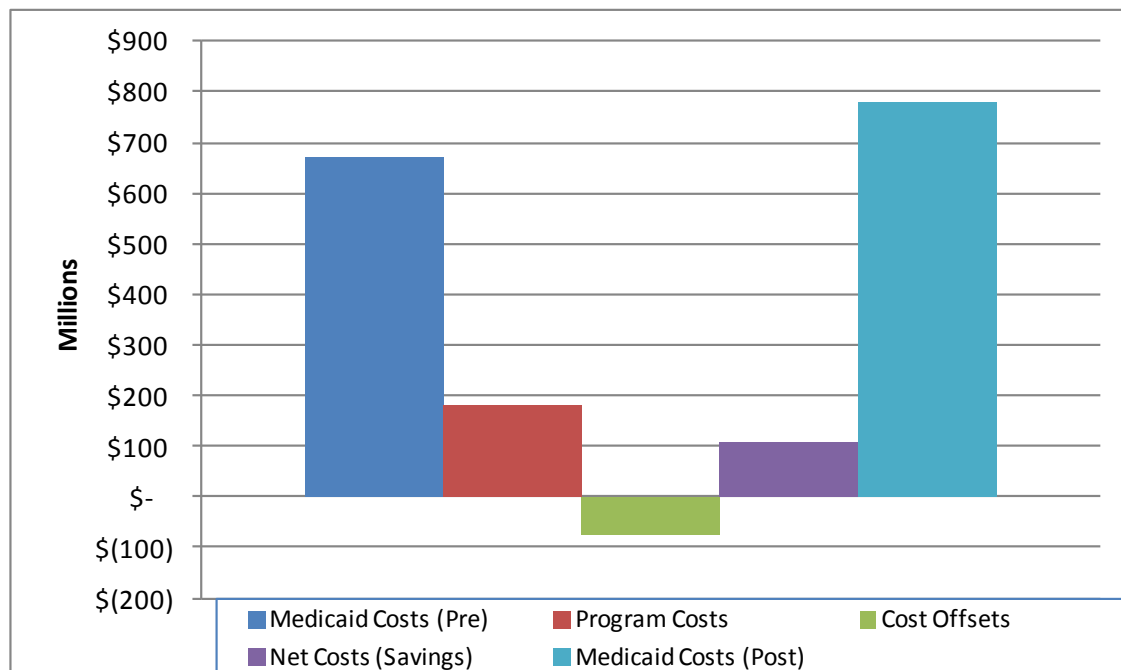
Budget Impact of a CHW Intervention for Children with Persistent Asthma

We estimated the number of New England children aged <18 receiving benefits under Medicaid to be approximately 1.2 million (Kaiser State Health Facts, 2009). The prevalence of persistent asthma in this group was estimated to be 12.7% based on data from an analysis of the National Health Interview Survey stratified by household income (Smith, 2005), yielding an estimated total of 151,914 children in Medicaid with persistent asthma across New England. We estimated the current, baseline annual cost of treating these patients to be \$4,400 per patient annually, based on a published comparison of patients with persistent asthma as compared to demographically-paired non-asthma controls (Colice, 2006). The Seattle-King County study estimated an incremental high-intensity CHW program cost to the provider (relative to a low-intensity comparator that consisted of a single CHW visit and limited educational support) of \$1,124 per participating child per year (Krieger, 2005). We assumed that this incremental cost would be somewhat higher when compared to *no* intervention, however, and therefore increased the incremental cost estimate to \$1,200. These costs were generated in a program that had a caseload of approximately 71 asthma patients per CHW (Krieger, 2005).

We estimated cost offsets based on reductions in the utilization of urgent care services (i.e., ED visits, hospitalizations, unscheduled clinic visits) for the high- vs. low-intensity groups. Offsets varied based on the method used to estimate costs; we assumed the higher end of the reported range, which equated to \$80 per patient every 2 months or \$480 of cost offset annually (Krieger, 2005). We used this higher estimate based on an assumption (as above) that cost offsets would be greater when a high-intensity intervention was compared to *no* intervention. Given the cost of the intervention (\$1,200) and the cost offset (\$480), the net added cost per patient in the first year of the intervention was approximately \$700, which represents a 16% increase over baseline annual costs.

Model results extrapolating these findings for the entire Medicaid population in New England over a 1-year period are presented in Figure 2 on the following page, showing program costs, cost offsets, and net budgetary impact.

Figure 2. Estimated program costs, cost offsets, and net budgetary impact over 1 year for a CHW-based pediatric asthma intervention.

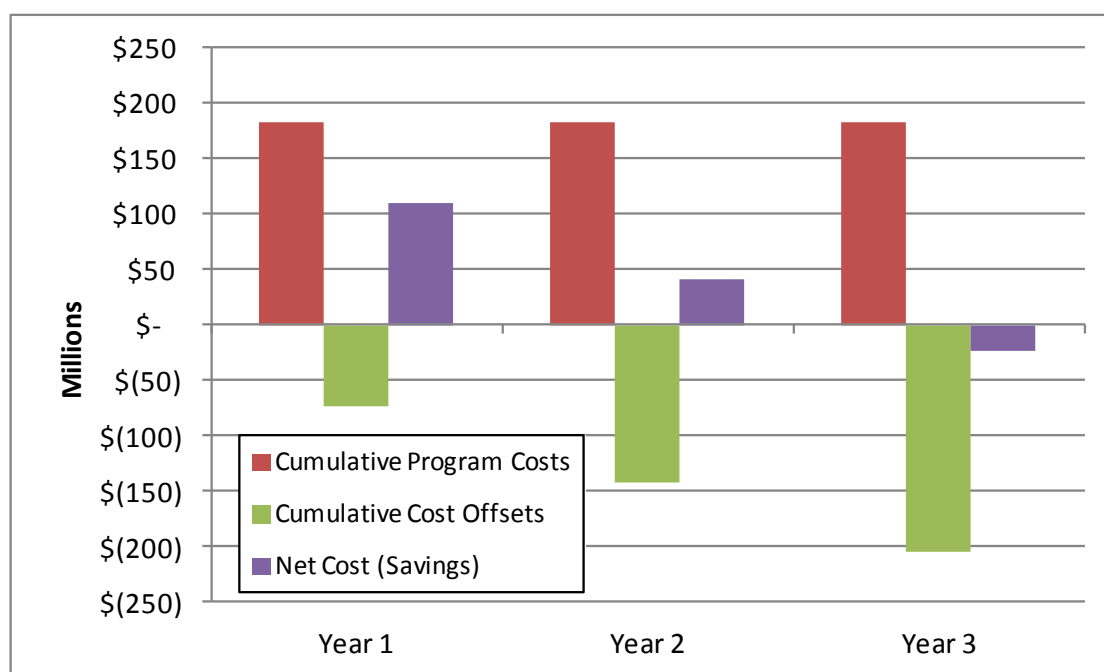


Using the caseload of 71 patients per CHW reported in the study, a total of 2,140 CHWs would be required to provide this intervention to all 151,194 children on Medicaid with persistent asthma in New England. The current baseline costs of treating persistent pediatric asthma, represented by the darker blue bar, are estimated to total \$668 million. Annual salary and other program costs (red bar) are estimated to be \$182.3 million. Cost offsets associated with reduced utilization of urgent health care services (green bar) would total approximately \$72.9 million in this population, yielding an estimated net cost to the region of \$109.4 million (purple bar). As previously noted, this represents a 16% increase in the estimated overall costs of care for Medicaid children with persistent asthma (light blue bar).

In order for this program to become cost-neutral in the first year, CHW salaries would have to be decreased by two-thirds (to \$13,200 annually). It was noted during the public comment period that CHW caseloads often exceed 100 patients annually; when we increased caseloads to these levels, however, program costs remained higher than cost offsets in the first year. For example, at a caseload of 100 patients per CHW, per-patient net cost would be approximately \$370 (vs. \$700 in the primary analysis), which represents an increase of 8.5% in total Medicaid expenditures (vs. 16% in the primary analysis). The estimated net cost to the entire region would be \$56.5 million in the first year.

In addition to varying caseload or salary, another permutation to be considered is the duration of impact on utilization of this type of CHW intervention. As mentioned previously, the authors of the study report suggested that the program may produce downstream net savings after program implementation -- if the costs are assumed to be limited to the implementation year whereas the benefits persist and accrue over time (Krieger, 2005). We therefore conducted an analysis assuming persistent benefits and cost offsets over a 3-year time horizon. Program costs were assumed to stop after year 1 while cost offsets continued to accumulate in future years. Cost offsets accruing in years 2 and 3 were discounted by 3%, consistent with generally-accepted guidelines for economic evaluations (Weinstein, 1996). Findings are summarized in Figure 3 below.

Figure 3. Estimated program costs, cost offsets, and net budgetary impact for a CHW-based pediatric asthma intervention over a 3-year time horizon (program costs in first year only).



After 1 year, program costs, cost offsets, and net cost remain as shown in Figure 2. While no program costs would accrue in years 2 and 3 under this scenario, cumulative cost offsets would increase to \$141.5 million (\$931 per patient) in year two, and would total \$205.8 million (\$1,355 per patient) by year 3. By year 3, cumulative cost offsets would exceed program costs by \$23.5 million, yielding a net savings of \$155 per Medicaid child with persistent asthma.

Budget Impact of a CHW Intervention for Adults with High Resource Utilization

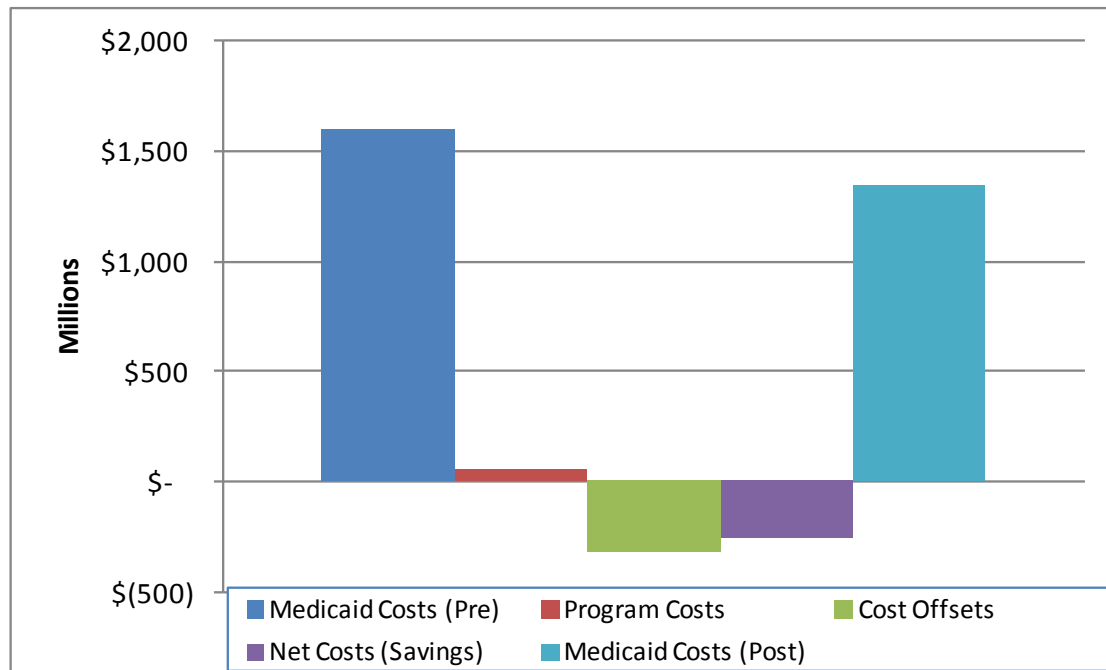
The estimated number of adults (i.e., age 18 and older) insured by Medicaid in New England totals approximately 1.1 million (Kaiser State Health Facts, 2009). We estimated the number of these individuals who would be “high utilizers” of services from a published analysis of Medicaid claims for >9 million enrollees, approximately 10% of whom demonstrated patterns of excessive prescription use, repeat ED visits, and use of multiple prescribers and pharmacies (Owens, 2010). Using this 10% figure, we estimated that the adult Medicaid population in New England with “high utilization” patterns would total 106,135 individuals. This previous publication also estimated that annual Medicaid payments for high utilizers would total \$15,100 per patient (Owens, 2010); we used this figure to estimate the baseline costs for the high utilizer population in New England.

The New Mexico CHW program targeted Medicaid managed care enrollees who had 3 or more ED visits within a 3-month timeframe (Johnson, 2012). Program costs were estimated to total \$559 per patient during the 12 months after program initiation, including employee salaries and benefits, supplies, and PMPM payments from Medicaid to provider groups administering CHW services, and were generated in a program that had approximately 115 patients for every CHW (Johnson, 2012). Unlike in the asthma model, we did not adjust estimated program cost further, as the comparison group in the New Mexico study did not receive any intervention.

The cost offset produced by the CHW intervention, due primarily to reductions in ED visits, hospitalizations, and prescription drug usage, was reported to be \$3,003 per patient for the year relative to no intervention, suggesting that overall net cost savings exceeding \$2,400 (i.e., \$3,003 - \$559) per patient could be expected (Johnson, 2012).

Extrapolation of these baseline costs, program costs, and cost offsets to the New England Medicaid population produces the results displayed in Figure 4 on the following page.

Figure 4. Estimated program costs, cost offsets, and net budgetary impact over 1 year for a CHW-based intervention targeting high utilizers of services.

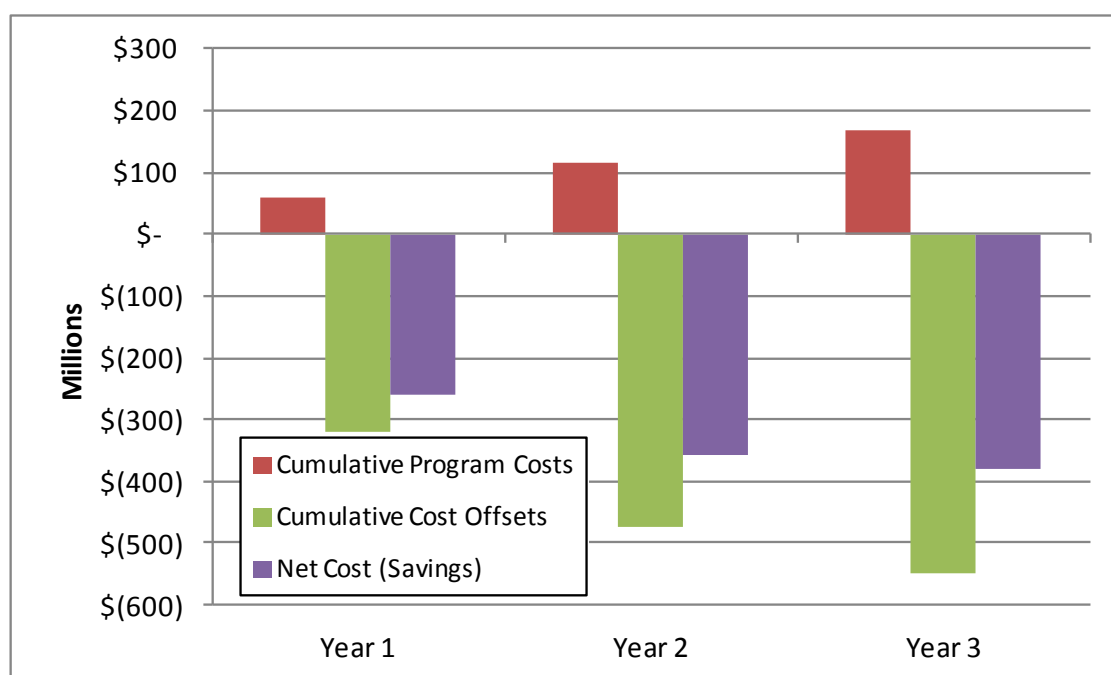


At a caseload of 115 patients per CHW, 923 CHWs would need to be deployed to implement this program across the region. Current baseline expenditures for the entire population of high-risk Medicaid patients in New England (dark blue bar) are estimated to total approximately \$1.6 billion. Program costs (red bar) would be expected to total \$59.3 million in the first year under this scenario, while cost offsets associated with reduced use of ED, inpatient, and prescription services would total approximately \$319 million (green bar), yielding net program savings of \$259.3 million (purple bar) during the program year. Total expenditures for high-risk patients would therefore be expected to decline to approximately \$1.3 billion, or \$12,656 per patient, representing a 16% decrease in the overall costs of care (light blue bar). Based on these figures, the CHW interventions would be cost-neutral even if the caseload was reduced to approximately 15 patients per CHW, or salaries increased fivefold.

It is possible that programs like the New Mexico CHW intervention that target the “worst offenders” could have reduced effectiveness over time, as work with the next tier of high utilizers may produce lower cost offsets. To explore this, we conducted a sensitivity analysis in which annual CHW program costs continued at the same level in future years while the cost offsets from the CHW intervention declined in a linear fashion over time. Specifically, we assumed that cost offsets per patient in year 2 (~\$1,500) would be half of the offset in year 1, and cost offsets in year 3

(~\$750) would be half of the offset in year 2. All costs in years 2 and 3 were discounted using a 3% rate. Findings are presented in Figure 5 below.

Figure 5. Estimated budgetary impact for a CHW-based intervention targeting high utilizers of services over a 3-year time horizon (all costs and offsets accrue over time).



Findings for program cost, cost offset, and net savings in year 1 remain as presented in Figure 4. In years 2 and 3, cost offsets are still substantial enough to outweigh cumulative program costs, with net savings of nearly \$400 million, a 10% reduction in total spending, still estimated at the end of year 3.

Additional Information from CEPAC Meeting Comments, Deliberation, & Discussion

Several points were raised during the CEPAC meeting that provided additional context to the discussion of potential budgetary impact of CHW programs. First, several public comments addressed the issue of patient caseload, given the apparent disconnect between the notion of weekly, intensive interactions between CHWs and patients and the relatively high caseloads (>100 patients) cited in many studies. Multiple individuals pointed out that, while all patients may receive intensive interaction when a program starts, intensity diminishes for patients who are better able to manage their condition. The mix of patients with greater and lesser needs may therefore exceed 100 patients for many CHWs.

Commenters also raised concerns about estimates of program cost in the studies used in the budget impact analysis. For example, costs may have included free transportation to appointments for individuals enrolled in the study, an expense that is typically covered by Medicaid for affected individuals. In addition, the care resources provided to patients in some studies (e.g., special vacuum cleaners) may be reimbursable as durable medical equipment by Medicaid and other payers.

Finally, a benefit to provider organizations that is potentially underreported is the impact that CHWs may have in reducing bad debt and/or charity care. It may be the case, for example, that many “high-risk” individuals (i.e., those with patterns of uncoordinated care) are in fact uninsured, so enrolling these patients for Medicaid or other public welfare benefits and promoting better-coordinated care may have multiplicative economic benefits to ACOs.

4. Policy Expert Perspectives

We reviewed recently published surveys of CHW experts detailing their perspectives on CHW programs. Below we present summaries of these previous surveys, followed by the results of our own unstructured interviews and brief survey of regional and national policy leaders. The goal of these efforts was to explore lessons learned, current controversies regarding the effectiveness of CHW interventions, and potential best practices to guide possible implementation of CHW programs in the future.

4.1 Historical Survey Data

Health Resources Administration Survey

In its 2007 report profiling the national CHW workforce, HRSA collected information on CHW activities in 4 key states (Arizona, Massachusetts, New York, and Texas) through a national survey (the CHW National Employer Inventory) and unstructured interviews with CHWs and employers (HRSA, 2007). The study's major findings are described by survey/interview domain below.

Demographics

While CHW demographics and population characteristics differed by state, CHWs tended to mirror the communities they served. In many situations, employers required CHWs to live in the target communities. CHWs in these selected states and nationwide were more likely to be female and between the ages of 30 and 50. Educational attainment differed somewhat by state – in Massachusetts and New York, most CHWs had some college training, while in Arizona and Texas, a high school diploma or GED was most common. CHWs most commonly served uninsured, immigrant, and homeless populations; programs involved rural communities in only about one-third of cases.

Activities

CHW activities were tabulated for New York, Texas, and nationwide (Massachusetts and Arizona respondents were too small in number). The top 3 activities in both states and nationwide involved: 1) assistance in gaining access to medical services and programs; 2) provision of culturally appropriate health promotion and education; and 3) assistance in gaining access to *non-medical* services or programs. The most common health problem consistently addressed in both states and nationwide was nutrition, followed by women's health concerns. Other problems were specific to locality, such as HIV/AIDS in New York (77%) and diabetes in Texas (60%).

Consistently across geographic locations, the most important skill sets deemed to be a requirement at hire included communications skills, interpersonal skills, and commitment to confidentiality. Interestingly, advocacy skills and service coordination abilities were deemed important by only 50-60% of respondents.

University of Utah Survey

A more recent survey of health care organizations that employ CHWs was conducted by a workgroup at the University of Utah Center for Public Policy and Administration (McCormick, 2012). The survey was directed both at employers of CHWs nationwide (covering 10 states) and in Utah specifically. Major findings of the assessment are described in further detail below.

National Assessment

The most common types of organizations that engaged CHWs included community-based organizations, public health departments, community health centers, faith-based organizations, and hospitals. Insurers had direct involvement with CHWs in only half of the states surveyed. Of note, as of 2012, there were 27 national, state, or regional CHW associations that are listed with the American Public Health Association (APHA) and APHA has a distinct CHW Section that meets regularly (APHA, 2013).

CHW organizations reported financing efforts primarily through time-limited grant funding, mostly from private sources. Federal grant funding, when available, has come primarily from HRSA and the National Institutes of Health. Other than for Minnesota and Alaska Medicaid, insurance funding was not yet widespread, and was limited to specific private insurers or disease-related programs, such as a cancer-based patient navigator program in Georgia. Some states also reported program funding by providers from core operating budgets, such as the Prevention and Access to Care and Treatment (PACT) program.

Certification and training requirements varied across states. Seven of the 10 states surveyed have no formal certification requirements (including Massachusetts, which has not yet finalized its requirements). Of the 3 states with formal requirements (Kentucky, Minnesota, and Texas), all are conditional. For example, Minnesota requires that CHWs who bill Medicaid for services receive formal training, but CHWs may still work under other funding conditions. Kentucky requires certification only for individuals working in the Homeplace program. CHW training programs were available in 9 of the 10 states surveyed, and most often offered through a broad curriculum in a community college setting.

The Utah assessment inquired about core roles. The most common roles included 1) providing culturally appropriate health education and information, 2) providing cultural mediation between

communities and the health/social services system, and 3) advocating for individual and community needs.

As with the national assessment, CHW funding in Utah was primarily grant-based. However, two-thirds of respondents stated that funding came at least in part from federal categorical grant sources, while 29% received Medicaid or state funding and 24% were funded by private foundations. Only one-third of respondents paid for CHWs out of a core operating budget. In Utah, approximately half of organizations engaged CHWs as paid employees, while the remaining groups used either volunteers/AmeriCorps workers or independent contractors. Among organizations employing CHWs, employment was relatively evenly mixed between full-time and part-time status. Salaries ranged widely between \$11 and \$20 per hour at these institutions. Most full-time CHWs also received benefits in addition to salary. Training of CHWs in Utah is performed primarily on an “in-house” basis rather than in programs offered by educational institutions.

4.2 ICER New England Survey

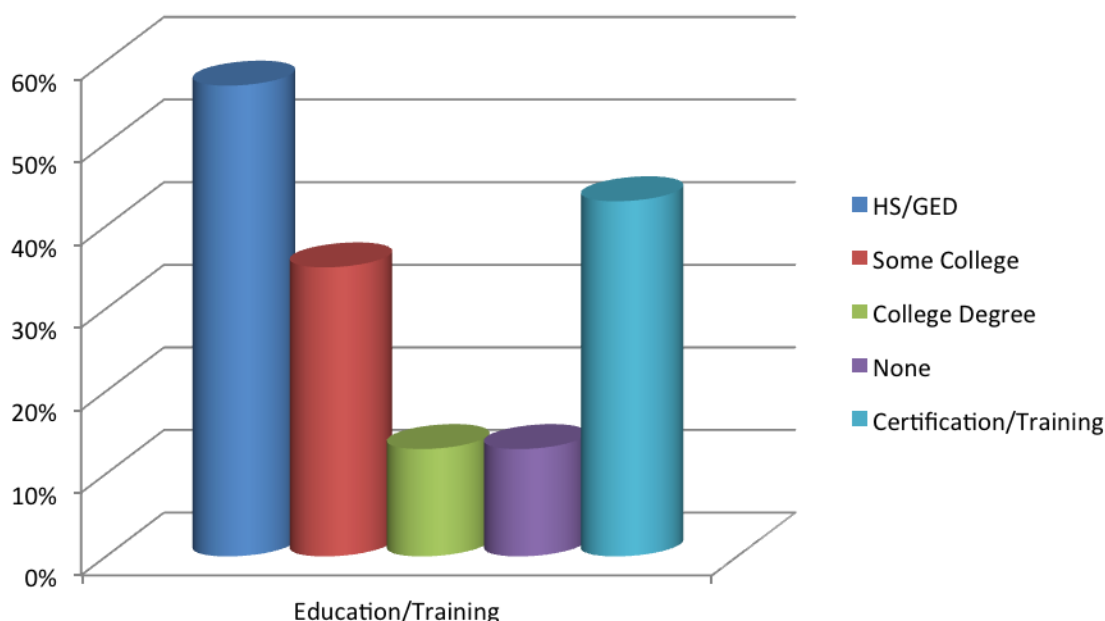
ICER developed its own survey instrument, based in part on those summarized above, in order to get a profile of CHW engagement and activity in New England. A total of 23 respondents completed the 25-item instrument, of which 44% came from Massachusetts, 17% from Connecticut, 13% from Maine, 13% from New Hampshire, and 9% from Rhode Island. No one from Vermont completed the survey, and one respondent came from outside the New England area. Findings are reported by survey domain in the sections that follow.

CHW Workforce

Two-thirds of respondents were from community health centers, hospitals, or integrated health systems, while the remaining were not-for-profit organizations, CHW associations, or local government agencies. A large percentage (48%) of organizations using CHWs recruited them through advertisements in local newspapers, followed by postings at community health centers (22%) and medical clinics (17%). A variety of other approaches to find CHWs were also used, including job fairs, social media, community outreach, job search sites, and word of mouth.

Minimum educational and training requirements for CHWs are presented in Figure 6 on the following page. Organizations were more likely to require a high school diploma or GED than to require college-level education. Prior medical knowledge or experience was not a common requirement, but participation in a formal training and/or certification program was required by over 40% of responding organizations. Other stated qualifications included English literacy as well as life experience and commitment to the service community.

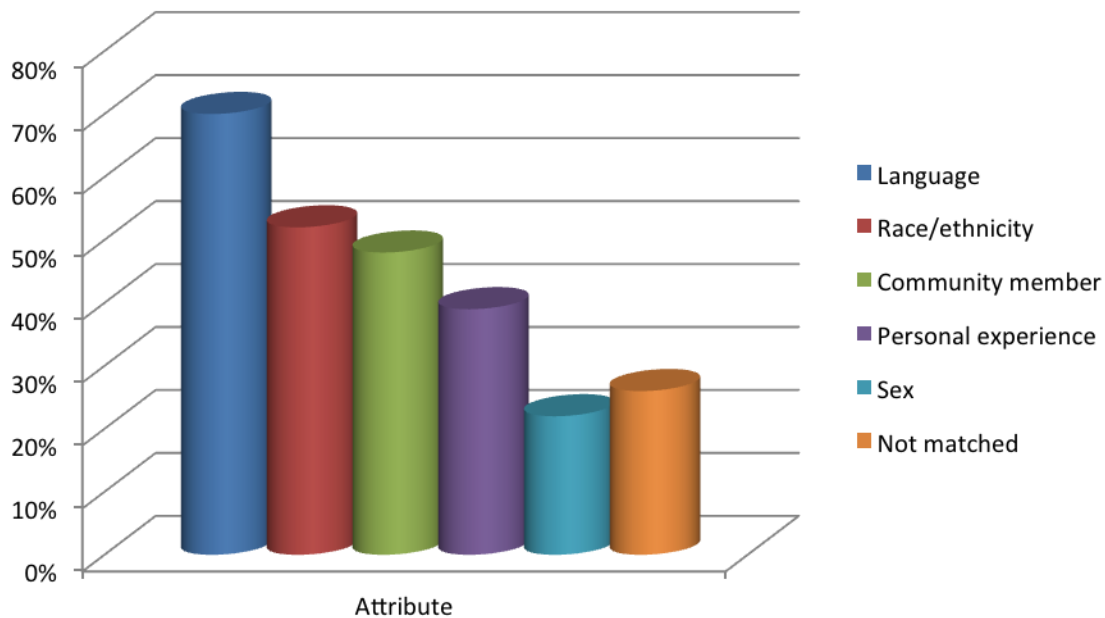
Figure 6. Minimum educational and training requirements for Community Health Workers in New England.



Approximately 60% of organizations that have hired CHWs maintain their own CHW training program. These training programs focus on CHW core competencies, motivational interviewing skills, process competencies, legal and ethical responsibilities, cultural sensitivities, and disease-specific training. Some organizations provide standardized training while others indicated that flexible training is given depending on program intent. Organizations conducting research on their CHW programs also train CHWs in basic data collection and evaluation techniques. Training is relatively intensive, as two-thirds of respondents require 40 or more hours of training; the remaining one-third require less than 20 hours.

Nearly three-quarters of organizations using CHWs pair CHWs with individual patients. Figure 7 on the following page provides a ranking of the most common attributes used to pair CHWs with patients. Pairing was most commonly performed based on primary language, followed by race or ethnicity and residence in the community. Seventy percent of organizations reported pairing using at least one of these attributes. Of these, two-thirds used all 3 attributes for pairing, while most of the remaining respondents paired based on primary language only. One respondent reported using both language and race/ethnicity to pair CHWs and patients. Other attributes cited included occupation (for a farmworker program) and same or similar culture.

Figure 7. Attributes used to pair Community Health Workers with patients in New England.



Program/Populations

Approximately half of respondents stated that their CHW program was based on an existing model. Models cited included the Partners in Health Accompaniment Model in Haiti, the City College of San Francisco Capacitation Center, the Prevention and Access to Care and Treatment (PACT) program initiated at Brigham & Women's Hospital in Boston, and the guidelines described in the CMS Innovations grant program (<http://innovation.cms.gov/>).

The types of individuals served by CHW programs in New England are listed in Table 4 on the following page. Findings suggest that most CHW programs in the region are multi-faceted and cover multiple at-risk groups. Programs less commonly served the military and veterans, migrant workers, and rural populations; low rates for the latter two categories may be due in part to the demographics of the region (i.e., no major influx of migrant workers, majority of populations near urban or suburban locations).

Table 4. Types of individuals served by Community Health Worker programs in New England.

Type of Individual Served	Percentage of Programs
Racial and ethnic minorities	83%
Specific diseases or conditions	83%
Pregnant women	74%
Older adults or seniors	74%
Individuals with disabilities	70%
Infants and children	70%
Adolescents	65%
Homeless individuals	61%
Individuals with substance abuse disorders	61%
Income eligible individuals	57%
Refugees	57%
Migrant workers	35%
Military/veterans	35%
Rural populations	26%

Of those programs focused on racial and ethnic minorities, 89% reported working with Hispanics/Latinos and 84% with Blacks/African Americans. Approximately 60% of programs work with Asian Americans. Programs were less commonly involved with Native Americans or Pacific Islanders. Other groups reported to be foci of New England CHW programs included Afro-Caribbeans, Eastern Europeans, Iraqis, and Asian immigrants (e.g., Cambodia, Burma, Bhutan).

Programs focused on specific diseases or conditions were also quite diverse. Approximately two-thirds of programs with such a focus targeted asthma, diabetes, HIV/AIDS, and mental health, while slightly more than half focused on obesity/nutrition. Some respondents stated that their focus was on “high risk” populations defined by multiple comorbidities as well as non-medical concerns such as sexual assault, domestic violence, and physical environmental factors such as lead exposure.

Prominent CHW activities are displayed in rank order in Table 5 on the following page. The most common activities included outreach and education, referral for medical and social services, and health promotion. Less common were language interpretation, insurance and benefits enrollment, informal counseling, and health screening. It is important to note here that language or medical interpretation requires a specific skill set different to that of a CHW, and that just because a CHW speaks the same language as their patient, does not necessarily mean that he or she has the skills to

be an interpreter. Equally important, not all language or medical interpreters possess the skill set to be a CHW, and therefore interpreters and CHWs should not be perceived as being equal roles.

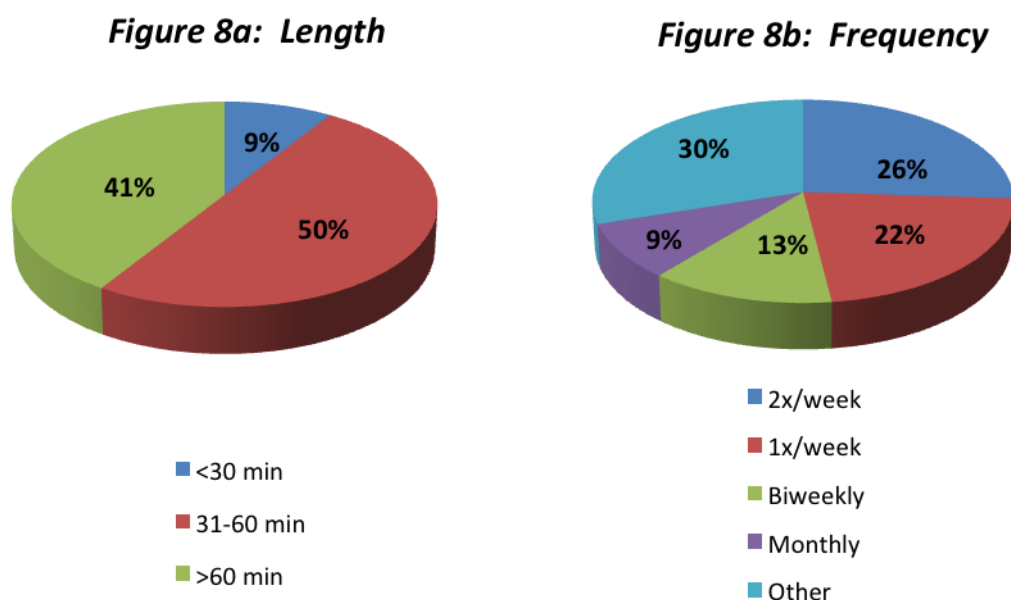
Table 5. Involvement in key activities among Community Health Worker programs in New England.

Type of CHW Activity	Percentage of Programs
Outreach and education	96%
Referral for medical/social services	91%
Health promotion	87%
Patient advocacy	83%
Insurance and benefits enrollment	61%
Language interpretation	61%
Informal counseling	61%
Health screening	48%

Nearly all respondents stated that their CHWs interact with patients face-to-face in the home as well as over the telephone. Sixty-one percent reported one-on-one clinic visits with patients, and 52% were involved in group sessions. Other forms of contact included accompaniment to medical appointments and e-mail contact.

As shown in Figure 8a on the following page interactions typically lasted over 30 minutes in over 90% of programs, and were approximately split between 31-60 minutes and over 1 hour. Figure 8b depicts interaction frequency, which is distributed relatively evenly. In many cases, however, interactions occur on an “as-needed” basis depending on client need.

Figure 8. Distribution of visit length and frequency among Community Health Worker programs in New England.



As with interaction frequency, the duration of the relationship was most frequently reported as “indefinite” and variable depending on the needs of the patient and family. Respondents also noted that the ability to have indefinite relationships is subject to continuation of funding.

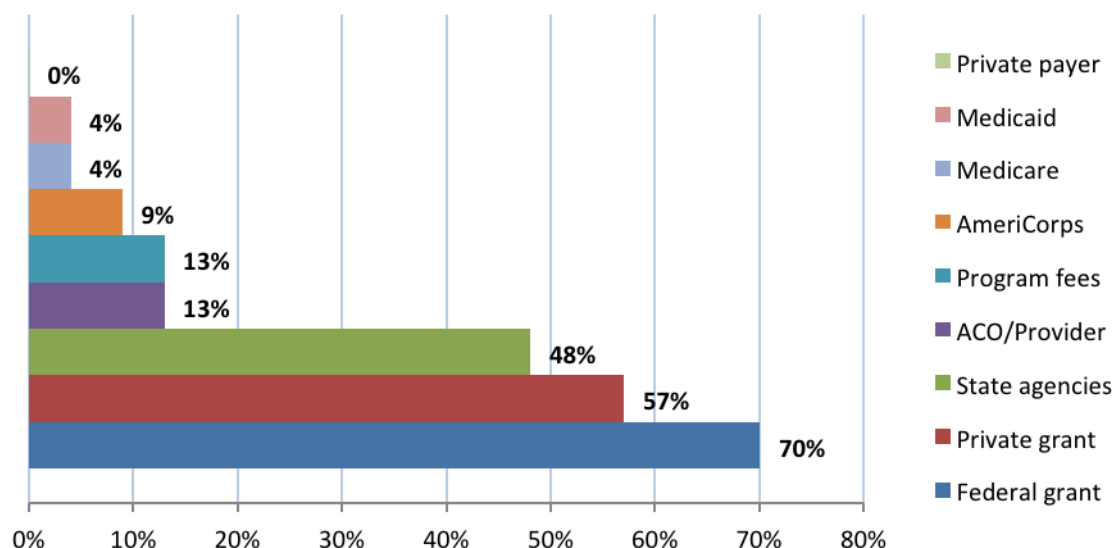
Follow-up and monitoring of patients was most often reported in the form of phone calls (91%) or home visits (83%). Clinic visits were reported as a means of follow-up by 57% of respondents. Postcard (22%) and e-mail (17%) follow-up was relatively infrequent.

Patient incentives for participation in CHW programs were provided by only 30% of respondents. When provided, incentives most frequently took the form of a merchant gift card.

Operations/Logistics

Funding sources for CHW programs in New England are presented in Figure 9 on the following page. As with the other surveys discussed, funding is provided primarily by federal/state grants and private foundations. Respondents indicated that little to no reimbursement is provided in New England from public or private payers, including Medicaid.

Figure 9. Funding sources for Community Health Worker programs in New England.



State support is provided in multiple forms, including target funds from departments of public health, social services, and labor, the attorney general's office, block grants, and state appropriations through the CDC and CMS. The small number of respondents that indicated receipt of third-party reimbursement indicated that reimbursement came entirely as a proportion of bundled or global payment rather than on a fee-for-service basis.

Eighty-seven percent of respondents indicated that CHWs were paid employees, while approximately one-quarter also made use of volunteers and/or interns or students. Relatively few respondents engaged independent contractors or AmeriCorps/Vista workers as CHWs. Hourly wages for paid CHWs ranged widely, from \$13-\$35 per hour. Higher wage rates tended to apply to workers with another form of advanced training, such as medical interpreters or group facilitators.

One-third of respondents indicated that they formally evaluated individual CHW performance annually; smaller percentages evaluated their CHWs every 6 months or monthly. However, several respondents indicated that, while formal evaluations occur every 6-12 months, CHWs meet regularly with supervisors to discuss case load, triage issues, and address any performance issues. These meetings may occur weekly, every 2 weeks, or monthly.

Nearly all respondents indicated that they evaluated the overall outcomes of their CHW programs. Outcome measurement varied substantially, from simple process measures such as numbers of contacts and visits to adherence measures (e.g., screenings performed, insurance applications processed) to patient outcomes (e.g., CD4 counts, ER visits/hospitalizations). One respondent

indicated that 2 RCTs had been performed evaluating the outcomes of peer counseling interventions in 2 distinct clinical areas.

Two-thirds of respondents indicated that there is evidence that their CHW programs are cost-saving or cost-neutral, and a majority of those that answered “neither” to this question felt that their programs had potential to be cost-saving.

5. CEPAC Votes, Discussion, and Best Practice Recommendations

5.1 CEPAC Votes and Deliberation on the Evidence

Comparative Effectiveness

CEPAC was asked to rank the likely contribution that each component of a community health worker program has for improved health outcomes, based on their understanding of the evidence and information presented to them during the meeting and in the draft report. Their votes and deliberation are summarized below.

Ranking Scale

- 1** = Not at all likely to contribute to improved health outcomes
- 2** = Unlikely to contribute to improved health outcomes
- 3** = Somewhat likely to contribute to improved health outcomes
- 4** = Likely to contribute to improved health outcomes
- 5** = Highly likely to contribute to improved health outcomes

1. Training (40+ hours focused on development of core competencies and/or specialized, condition-specific curriculum).

CEPAC Vote:

0	0	2	7	5
Not at all likely	Unlikely	Somewhat likely	Likely	Highly likely

2. Interaction includes in-person visits in the patient's own home or environment.

CEPAC Vote:

0	0	0	9	5
Not at all likely	Unlikely	Somewhat likely	Likely	Highly likely

3. In-person interaction is at least 60 minutes in duration.

CEPAC Vote:

0	0	4	6	4
Not at all likely	Unlikely	Somewhat likely	Likely	Highly likely

4. CHWs are matched to patients by a shared community, ethnicity/race, or disease/condition.

CEPAC Vote:

0	0	0	3	11
Not at all likely	Unlikely	Somewhat likely	Likely	Highly likely

Note: The voting question related to patient participation incentives was removed during the meeting based on CEPAC's discussion that participation incentives may be important for study settings in terms of program completion and evaluation, but may not have the same application to a real world setting. CEPAC also had concerns that the nature of the patient participation incentives varies significantly and that these distinctions are important, namely that resource incentives to support a participant's success in the program (e.g. free transportation, healthy food vouchers, etc.) may have a different impact than pure financial incentives (e.g. cash rewards, gift cards, etc.).

Comparative Value

CEPAC was presented with evidence-based CHW interventions that detail impact on patient outcomes and costs (Section 3; pgs 24 – 32). When voting, CEPAC was asked to take the perspective of a state Medicaid agency or Accountable Care Organization (ACO) deploying the program statewide. CEPAC was asked to vote on whether the program represents a high, reasonable, or low value:

1. Does the budget impact analysis of the Asthma CHW program (Krieger, 2005) suggest that a community health worker program with these outcomes and costs represents:

CEPAC Vote:

1	3	7	3
Abstain	Low value	Reasonable Value	High value

Comments:

CEPAC members who voted “high” value emphasized the program’s potential to have an impact beyond clinical outcomes, arguing that productivity and other societal factors may improve and therefore increase the program’s value. Other CEPAC members felt that the clinical benefits observed in the study seemed worthy of the additional cost. Some CEPAC members also felt that the results of the Krieger study were likely to show durability of effect and last over time, therefore achieving cost-savings in the long run.

CEPAC members who voted that the program had “low” value felt that from the perspective of a Medicaid program, it would be difficult to say that this program represented “reasonable” or “high” value without being given a direct comparison, as other programs with comparable effectiveness may have higher returns on investment. CEPAC members who voted that the intervention based on the Krieger study had “low” value emphasized that in no way should this vote be interpreted as suggesting that CHW asthma programs do not work or are not worthy of investment, but that based on a program with similar costs and outcomes, higher returns on investment could be achieved through a different program with similar effectiveness.

The CEPAC member that abstained from voting felt concerned with how this vote may be interpreted, and feared that a vote on value for a specific program may be misconstrued as a judgment of the value of all CHW programs collectively.

2. Does the budget impact analysis of the High Resource Utilization program (Johnson, 2012) suggest that a community health worker program with these outcomes and costs represents:

CEPAC Vote:

1	0	0	13
Abstain	Low value	Reasonable value	High value

Comments:

The CEPAC member that abstained from voting felt that the analysis could not be easily applied to New England due to significant differences in salary and other input costs.

5.2 CEPAC Best Practice Recommendations

Before the CEPAC public meeting, in addition to the structured survey questionnaire, ICER staff conducted unstructured interviews with 11 regional and national policy experts representing CHW associations, health centers and hospitals, state agencies, and academic institutions. The results from the survey and unstructured interviews were used to frame a draft set of “best practice”

recommendations for CHW initiatives. This draft set of recommendations was discussed during the CEPAC meeting by CEPAC members and a “policy expert” panel composed of 2 representatives from regional health insurers, 1 representative from the clinical community, and 3 CHW policy experts. The updated recommendations presented below reflect this deliberation and public comment on the draft report. The Council has endorsed these recommendations as providing key lessons supported by a large majority of policy experts.

1. Certification: States and policy makers should encourage certification as a means to standardize and improve the training and the skills of all CHWs. Certification is important for increasing recognition of CHWs and to demonstrate standards to payers in order to promote a sustainable model for reimbursement. However, as the CHW workforce expands from its roots, states should work to develop certification processes that recognize the past experience of long-time CHWs and that, in general, do not pose such a high barrier to entry that ideal CHW candidates are deterred from the workforce.

Most experts believe that certification represents an important milestone in the evolution of CHWs from ad hoc, un- or undertrained health care workers into full members of care teams with their own professional status. Some experts believe that certification may become less important under global payment schemes where the restrictions for billable versus non-billable providers under fee-for-service reimbursement may not apply. Certification, if made too high a bar to entry, could have the unintended consequence of excluding the recruitment of some outstanding CHWs and should therefore involve a process that is low cost, easily accessible, and written with the local community in mind. States and policy makers should always work closely with current CHWs to get their guidance in designing effective approaches to certification.

2. Recruitment: Employers should seek CHWs from the community they will serve.

Recruitment is a major challenge for large organizations, and the qualities that are important for the position of CHW are often difficult to capture using the tools that many employers and human resource departments conventionally use. Some stakeholders suggest that organizations wanting to start working with CHWs partner with community-based organizations such as local aid groups and religious or cultural organizations. These organizations are particularly well-placed to recruit CHWs themselves or hire technical assistants to manage recruitment to ensure that appropriate individuals are selected for the job.

3. Training: A training curriculum should focus on the development of core competencies and skills that translate across disease areas or conditions, and be community-based in nature, highlighting local issues and the local environment in which CHWs work.

Despite the focus of many CHW interventions in the published literature on specific, single diseases or conditions, most policy experts believe that CHWs should receive training in core skills that can translate across conditions and even potentially across multiple patient communities. The American Public Health Association (APHA) endorses standardized training curricula that focus on the development of core competencies (American Public Health Association, 2009). There are some notable examples of this kind of training. The Southwestern Connecticut AHEC bases its core competency training on the City College of San Francisco CHW certification program, whose curriculum includes health education and promotion, community building and advocacy, and working with underserved and/or linguistically isolated communities (City College of San Francisco, 2013). Southwestern Connecticut AHEC programs also include a specialized or disease-specific component; for example, in the past, programs have collaborated with the state Department of Social Services to include specific training on Medicaid and other social benefits. A typical training program through Southwestern Connecticut AHEC includes 48 hours of training in 5 – 6 different areas and 50 competencies, in combination with 8 hours of field work assessment.

The Boston Public Health Commission has developed a community health education training that also combines education on core competencies and condition-specific specialized modules that has provided a relatively standardized training curriculum for CHWs across Massachusetts (BPHC.org, 2013). The program requires a total of 54.5 hours of training. Core competency items focus on developing skills around leadership, cross-cultural communication, community organizing, public health, outreach education, and assessment techniques. Specialized training includes condition-specific health information and local referral resources. Advanced comprehensive outreach certification is also available and includes 13 sessions over 55 hours and centers around the development of communication skills to help CHWs more effectively work with clients and other agency professionals. Specific modules include advanced leadership development, client advocacy, professional writing skills, and boundary setting. Advanced health modules are available in the form of 1-day sessions that provide more in-depth training for a variety of health topics.

Though specialist and condition-specific training is important to many CHW roles, a majority of policy experts believe that generalist curricula hold greater importance since CHWs must be able to address a range of issues within any given topic area, making the development of core competencies essential. Generalist training should include skills in managing mental/behavioral health issues, for it is widely acknowledged that many vulnerable patients, especially those with chronic health conditions, have overlapping physical, emotional, and social difficulties that must be addressed together.

4. Care Team Integration: There must be a clear plan for the integration of CHWs into the health care team that includes role definition of all team members, allows CHWs to participate in creation of the care plan, and provides the power necessary for CHWs to marshal care team resources as needed for the patient.

Policy experts underscore the challenge as well as the importance of effectively integrating CHWs within health care teams. Many care organizations do not fully appreciate the potential of CHWs, hiring them to fill a narrow role and missing the chance to derive much greater benefit if the scope of their role were expanded. A clear, concrete role for the CHW, even if that role eventually expands, helps signal to the rest of the care team on how to make use of their position.

Clinical supervisors may have little prior experience working with CHWs and may not understand how to maximize their potential on the clinical team. Training is therefore needed not only for the CHW, but for the entire care team on how to effectively work with CHWs. Training for ground-level supervisors of CHWs is essential, and members of the clinical care team should be prepared to learn from CHWs what they are observing or gathering from patients to help them better understand the broader context impacting a patient's health.

CHWs need excellent access to care team members and cannot be left to function in an isolated manner with patients in the community. Social workers, nurses, and clinicians should be available to CHWs for clinical and social management “backup” at all times. Importantly, CHWs should also be integrated into the care team with the ability to call upon care team resources, such as same-day appointments, as needed. Fully integrating CHWs into the care team in this way will have important and positive effects on patient experience and the utilization of services.

5. Pairing Community Health Workers with Individual Patients: CHWs must gain the respect of the community by demonstrating an understanding of the patient's cultural and socioeconomic environment. While CHWs should possess certain core competencies that make them effective with a wide range of patients, it is ideal to pair CHWs with patients based on shared life experiences.

CHWs are experts in the social determinants of health, and personal knowledge of the patient's specific condition or disease is less important than a deep understanding and connection with the environmental and social context of the patient's community. There are differing opinions on the relative importance of pairing CHWs with patients of the same racial, ethnic, and linguistic background. Certainly, the historical roots of CHWs lie in a tradition of drawing CHWs directly from the same community as the patients to be served. But looking forward many policy experts and experienced CHWs believe that skills in empathetic listening and in motivation are critical to the success of any CHW, and that an overemphasis on pairing by race and ethnicity may unnecessarily limit the effective use of CHWs.

6. Interaction with Patients: The structure of the interaction of CHWs with their patients should include: 1) Significant, extended face-time with patients, and often, families; 2) Individual visits in the home or clinic; and 3) Active engagement with patients to plan for future care.

The amount of one-to-one patient or one-to-one family time is extremely important to the success of any CHW intervention. Oftentimes, CHWs are the only member of the clinical care team able to spend significant face time with the patient, which can support the uptake of health messaging and adherence to treatment.

One best practice approach to patient interaction is found at the PACT Program at Brigham and Women's Hospital. There, to help CHWs monitor activity intensity and support CHW's interactions with patients with HIV/AIDS, they made use of a "CHW Facilitator's Guide," which includes numerous modules and sample conversations and scripts that CHWs can use when having conversations with patients to ensure that the visit is a meaningful interaction and achieves the appropriate level of intensity (Heidi Behforouz, MD, personal communication, July 2013).¹ In addition, in the PACT program CHWs tracked and documented what they did during each interaction on a handheld data system for in-field data sharing in order to develop a better sense of intensity level and distinguish between insignificant and meaningful interactions.

For socially isolated and geographically dispersed populations where in-person interactions may not be feasible with every patient, some programs are making use of telemedicine to connect patients to resources. For example, a partnership between academic, clinical, and community partners in Connecticut and California collaborated to provide geographically dispersed older Cambodian-Americans with linguistically appropriate medication therapy management by utilizing videoconferencing and a care team of pharmacists and CHWs (Center for Technology and Aging, 2011). During this intervention CHWs performed home visits and completed a web-based medication assessment to document the patient's condition, medication status, and drug therapy problems, which achieved significant time-savings for the pharmacist. The CHW then operated the teleconferencing software and provided medical interpretation services during the pharmacist's remote consultation. CHWs can help patients prioritize what to discuss with healthcare professionals who are pressed for time. Individual visits help make the intervention more patient-centered and lead to an individualized plan or course of treatment based on the patient's unique needs and goals.

For populations whose interactions with the health system are made most difficult by stark differences in language and culture, an individualized approach can prove crucial to improving the patient's experience and adherence to treatment. Khmer Health Advocates uses CHWs to serve older Cambodian-Americans, many of whom are refugees and victims of torture and trauma, by immersing themselves in the community and gaining a comprehensive understanding of each patient's individual situation (Khmer Health Advocates, 2013). Under this model, CHWs accompany

¹ For more information email Dr. Heidi Behforouz at HBEHFOROUZ@PCHI.PARTNERS.ORG

patients to physician appointments, perform home visits, and complete regular check-ins in order to catch issues early on before they develop into a more complex or life-threatening situation.

7. Program Funding: Payers and provider organizations should work together to develop and maintain stable mechanisms for paying for CHW initiatives. New models for funding CHWs should be explored through the creative restructuring of existing budgets for home visits and case management.

Financially sustaining CHW initiatives is one of the most significant challenges faced by organizations engaged in CHW interventions. The majority of funding remains through grants that expire and are disruptive to a program's impact. Grant funding also makes it difficult to fully integrate CHWs on care teams or expand the generalist model for CHWs. Grant funding tends to be disease- or condition-specific, so developing a CHW's core competencies and role on a care team that works across conditions often conflicts with funding models. The temporary nature of grant support also makes data collection inconsistent, as programs often have to change focus or innovate to secure additional funding, making it difficult to document the long-term impact of CHWs and specific interventions.

One policy approach to creating a more sustainable model is to include a clear expectation that CHWs should be included in new care models being developed as part of large delivery system innovations. In Oregon, for example, legislative language requires that CHWs be included in the care delivered by new Coordinated Care Organizations (CCOs), the delivery system unit through which funding will flow under the state's evolving health care reform initiative. Requiring that CHWs be included by provider organizations receiving global capitation budgets is one way to provide for relatively stable funding, at least in the short term.

Short of formal requirements of this type, other creative mechanisms need to be developed in order to shift CHWs off the traditional grant cycle treadmill. CHWs are rarely eligible for fee-for-service reimbursement through health insurers, and of the programs that have sought reimbursement in this way most have confronted obstacles due to the rigid nature of the billing structure and the lack of codes for CHWs and supportive services through existing fee-for-service mechanisms. New mechanisms are therefore needed, and if policy experts are divided on optimal configurations, it is nearly universally agreed that funding for CHWs in the current health care environment will need to be cost-neutral or cost-saving. This is why more robust evidence on clinical and economic outcomes is so essential to move the field forward. It is also why creative approaches to budgeting are needed, such as re-examination of entire budgets for home care services, visiting nursing, and case management, along with novel approaches to blending payment through global budgets and quality incentives from payers to provider groups. Nevertheless, policy experts believe that reimbursement through cost-neutral bundled payment by itself will not be the

only answer, and that for the foreseeable future funding through additional grant opportunities and private-public partnerships will continue to serve an important role.

8. Evaluation: CHW programs should continue to evaluate their impact on patient health outcomes and on health care utilization and overall costs. Evaluations should include comparisons with relevant control or “comparison” groups to avoid the limitations of case studies and single arm cohort studies. Studies should focus on patient-reported and other patient-centered outcomes, and highlight whether CHWs can reduce specific gaps in care that lead to increased health care spending.

The evidence base supporting the effectiveness and value of CHW interventions has significant limitations and all CHW programs should attempt to evaluate their impact, not just to help improve the services they are providing to patients but to contribute new evidence to guide policy considerations.

Future comparisons need not be randomized controlled trials, but should involve direct comparison to a demographically- and clinically-comparable group of patients not receiving CHW services. Studies should also clearly document the costs associated with administering the CHW programs, and should realistically portray the true marginal costs of these programs. For example, provision of care resources such as low emission vacuum cleaners was described in some studies as a program cost, but in fact may represent a resource for which a durable medical equipment claim can be submitted and reimbursed.

Outcomes of interest in future studies should include standard objective clinical measures of interest for the particular therapeutic area, but should be complemented by additional patient-centric measures such as patient (and caregiver, if appropriate) health-related quality of life, patient satisfaction, and productivity losses (i.e., missed work, missed school). Patient-centered outcomes may better capture patient quality of life, productivity, and other measures important for understanding the full scope of CHW impact. The durability of any impact on patient outcomes or costs should be measured, either by extending the duration of follow-up for a comparative study or at a minimum conducting an “extension” study of patients receiving the CHW intervention. The purpose of either of these designs would be to assess whether clinical and functional benefits continue at the same rate over time, and to ascertain whether programs continue to produce reliable estimates of cost-offset and potential savings to the provider and/or payer.

9. Getting Started: States or organizations wishing to begin engaging with CHWs may choose a comprehensive or incremental approach to implementation.

For states, a comprehensive approach requires the adoption of supportive legislative language to set the expectation that patients must have access to CHWs through the health or social systems.

This has been the approach adopted by Oregon, where recent legislative reforms have set the precedent that patients will have access to CHWs through Oregon's CCO network, and that CHWs will be reimbursed through Medicaid when certified by meeting certain training standards. The state is simultaneously working to develop the training standards required for reimbursement while also coordinating a registry of certified CHWs from which CCOs can recruit and refer patients.

If acting incrementally, states or organizations may choose to partner with a state professional association of CHWs, local Area Health Education Centers (AHECs), community-based organizations, and/or federally qualified health centers (FQHCs) to recruit and deploy CHWs. It is also important to leverage support from and align efforts with State Public Health Departments and other local public health agencies to implement CHW initiatives statewide. This has mainly been the approach in New England, where states have partnered with community organizations and public agencies to help deploy CHWs. For instance written communication from the Director of the Minority Health Program in Maine indicates that there are efforts to implement the fairly robust CHW network in Southern Maine statewide by partnering with the State Office of Health Equity and by consulting with other local state agencies and organizations to implement the initiative in their regions (Kolawole Bankole, MD, MS, written communication, June 2013).

For care organizations such as ACOs or patient-centered medical homes, a comprehensive approach to incorporating CHWs into the care process must begin with a well-developed set of role definitions and associated training programs to ensure that CHWs and all other members of care teams understand how the new model of teamwork will function. The scope of CHW engagement can be structured as quite broad, encompassing multiple patient conditions and communities. Good examples of a comprehensive approach can be modeled upon the experience of Vermont, where patient-centered medical homes have been established across the state that make use of multi-disciplinary Community Health Teams (CHTs) to improve coordination of care and more effectively link patients to available supportive services. CHTs are available to all patients in practice, with no requirements for eligibility, referral, prior-authorization, or co-payments. The Vermont Blueprint for Health established a clear implementation manual with guidance in place for local community workgroups designing CHTs, including specifics on staffing, primary care integration, and strategies for coordination of services (Department of Vermont Health Access, 2010; Department of Vermont Health Access, 2012). These local workgroups are responsible for planning CHT composition and operations to meet local needs, and include leadership from clinicians and primary care staff, hospital administrators, community organizations, local Department of Health offices, among other stakeholders.

Care organizations opting to begin working with CHWs in a more incremental approach are likely to begin by working with an external source of CHWs rather than hiring them into the organization as full-time or even part-time employees. As noted earlier, partnering with existing state or local organizations as a source for CHWs may be a useful way to begin. Targeting CHW services to a

more focused patient condition or community also would be part of a more incremental approach. In this case, experts recommend beginning with the frail, disabled, and/or dual eligibles, or in other words, those at the highest risk of expensive medical treatment whose successful care will very likely require outreach and assistance from health care workers who know the community and can reach these patients in ways that traditional health care teams often cannot.

All states and care organizations looking to integrate CHWs into the care process, whether they are considering doing so in a comprehensive or an incremental approach, should seek to capitalize on the opportunity CHWs offer to create better links between mental and behavioral health services and clinical care. The long experience and the infrastructure associated with peer support specialists who work with patients recovering from mental health conditions or substance abuse disorders can serve as a bridge or a partner to CHW outreach. Although we are unaware of specific experience with formal linkages between CHWs and peer support specialist programs, policy experts recognize the underlying similarities in the skills and goals of these health care workers, and many believe that the optimal benefits of CHWs will only be realized when the structure and process of care reflect the central relevance of mental and behavioral health issues to patient outcomes.

References

1. Adair R, Christianson J, Wholey DR, et al. Care Guides. Employing nonclinical laypersons to help primary care teams manage chronic disease. *J Ambulatory Care Manage*. 2012;35(1):27-37.
2. AHRQ Health Care Innovations Exchange. State legislation supports professional development of community health workers, leading to greater professional recognition, enhancements in training, and funding, 2013. <http://www.innovations.ahrq.gov/content.aspx?id=3744>. Accessed May, 2013.
3. Agency for Healthcare Research and Quality (AHRQ). National Healthcare Disparities Report, 2007. Rockville (MD): U.S. Department of Health and Human Services, 2008; 08-0041.
4. Alvisurez J, Clopper B, Felix C, Gibson C, Harpe J. Funding community health workers: best practices and the way forward. New Haven (CT): Yale University, unpublished manuscript, 2013.
5. American Public Health Association (APHA). <http://www.apha.org/>. Accessed May, 2013.
6. American Public Health Association (APHA). Support for community health workers to increase health access and reduce health inequities, Policy Number 20091, 2009. <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1393>. Accessed, July 2013.
7. Andersen MR, Hager M, Meischke H, Shaw C, Yasui Y, Urban N. Recruitment, Retention, and activity of volunteers promoting mammography use in rural communities. *Health Promot Pract*. 2000;1(4):341-350.
8. Andersen MR, Hager M, Su C, Urban N. Analysis of the cost-effectiveness of mammography promotion by volunteers in rural communities. *Health Educ Behav*. 2002;29(6):755-770.
9. Andersen MR, Yasui Y, Meischke H, Kuniyuki A, Etzioni R, Urban N. The effectiveness of mammography promotion by volunteers in rural communities. *Am J Prev Med*. 2000;18(3):199-207.
10. Anthony S, Gowler R, Hirsch G, Wilkinson G. Community health workers in Massachusetts: improving health care and public health. Boston (MA): Massachusetts Department of Public Health, 2009. Available at <http://www.mass.gov/eohhs/docs/dph/com-health/com-health-workers/legislature-report.pdf>. Accessed May, 2013.

11. Arizona Department of Health Services. Office of Women's Health. Health Start Program. <http://www.azdhs.gov/phs/owch/women/healthstart.htm>. Accessed May, 2013.
12. Auslander W, Haire-Joshu D, Houston C, Rhee C-W, Williams, JH. A controlled evaluation of staging dietary patterns to reduce the risk of diabetes in African-American women. *Diabetes Care*. 2002;25(5):809-814.
13. Babamoto KS, Sey KA, Camilleri AJ, Karlan VJ, Catalasan J, Morisky DE. Improving diabetes care and health measures among Hispanics using community health workers: results from a randomized controlled trial. *Health Educ Behav*. 2009;36(1):113-126.
14. Balcázar HG (a), Alvarado M, Cantu F, Pedregon V, Fulwood R. A *Promotora de Salud* model for addressing cardiovascular disease risk factors in the US-Mexico border region. *Prev Chronic Dis*. 2009;6(1):A02.
15. Balcázar HG (b), Byrd TL, Ortiz M, Tondapu SR, Chavez M. A randomized community intervention to improve hypertension control among Mexican Americans: using the *Promotoras de Salud* community outreach model. *J Health Care Poor Underserved*. 2009;20(4):1079-1094.
16. Balcázar HG, de Heer H, Rosenthal L, et al. A *Promotores de Salud* intervention to reduce cardiovascular disease risk in a high-risk Hispanic border population, 2005-2008. *Prev Chronic Dis*. 2010;7(2):A28.
17. Balcázar HG (c), Rosenthal L, de Heer H, et al. Use of community-based participatory research to disseminate baseline results from a cardiovascular disease randomized community trial for Mexican Americans living in a U.S.-Mexico border community. *Educ Health*. 2009;22(3):279.
18. Ballester G. Community health workers: essential to improving health in Massachusetts. Findings from the Massachusetts community health survey. Boston (MA): Massachusetts Department of Public Health, 2005. <http://www.mass.gov/eohhs/docs/dph/com-health/com-health-workers/comm-health-workers-narrative.pdf>. Accessed June, 2013.
19. Barnes K, Friedman SM, Namerow PB, Honig J. Impact of community volunteers on immunization rates of children younger than 2 years. *Arch Pediatr Adolesc Med*. 1999;153(5):518-524.
20. Batts ML, Gary TL, Huss K, Hill MN, Bone L, Brancati FL. Patient priorities and needs for diabetes care among urban African American adults. *Diabetes Educat*. 2001;27(3):405-412.
21. Beckham S, Bradley S, Washburn A, Taumua. Diabetes management: utilizing community health workers in a Hawaiian/Samoan population. *J Health Care Poor Underserved*. 2008;19(2):416-427.
22. Bernstein E, Ashong D, Heeren T, et al. The impact of a brief motivational intervention on unprotected sex and sex while high among drug-positive emergency department patients who

receive STI/HIV VC/T and drug treatment referral as standard of care. *AIDS Behav.* 2012;16(5):1203-1216.

23. Bielaszka-DuVernay, C. Vermont's blueprint for medical homes, community health teams, and better health at lower cost. *Health Aff.* 2011;30(3):383–386.
24. Black MM, Dubowitz H, Hutcheson J, Berenson-Howard J, Starr RH. A randomized clinical trial of home intervention for children with failure to thrive. *Pediatrics.* 1995;95(6):807-814.
25. Blackwell CS, Foster KA, Isom S, et al. Healthy Living Partnerships to Prevent Diabetes: recruitment and baseline characteristics. *Contemp Clin Trials.* 2011;32(1):40-49.
26. Boston Public Health Commission (BPHC). Community Health Education Center (CHEC). <http://www.bphc.org/programs/chec/Pages/Home.aspx>. Accessed May, 2013.
27. Brown HS 3rd (a), Wilson KJ, Pagán JA, et al. Cost-effectiveness analysis of a community health worker intervention for low-income Hispanic adults with diabetes. *Prev Chronic Dis.* 2012;9:E140.
28. Brown RS (b), Peikes D, Peterson G, Schore J, Razafindrakoto CM. Six features of Medicare Coordinated Care Demonstration Programs that cut hospital admissions of high-risk patients. *Health Aff.* 2012;31(6):1156-1166.
29. Burke NJ, Jackson JC, Lam DH, et al. Good health for New Years: development of a cervical cancer control outreach program for Vietnamese immigrants. *J Cancer Educ.* 2004;19(4):244-250.
30. Cauffman JG, Wingert WA, Friedman DB, et al. Community health aides: how effective are they? *Am J Public Health Nations Health.* 1970;60(10):1904-1909.
31. Center for Technology and Aging. Eliminating barriers to care: using technology to provide medication therapy management to the underserved – a Center for Technology and Aging Grant Program, 2011. http://www.techandaging.org/eMTM_Connecticut_Pharmacists_Foundation_Case_Study.pdf Accessed May, 2013.
32. Centers for Medicare and Medicaid Services (CMS). Health Care Innovation Award Project Profiles, 2012. <http://innovation.cms.gov/Files/x/HCIA-Project-Profiles.pdf>. Accessed April, 2013.
33. Children's Defense Fund. Improving children's health: understanding children's health disparities and promising approaches to address them, 2006. <http://www.childrensdefense.org/child-research-data-publications/data/Childrens-Health-Disparities-Report-2006.pdf>. Accessed May, 2013.

34. City College of San Francisco (CCSF). Community Health Worker Certificates. <https://www.ccsf.edu/NEW/en/educational-programs/school-and-departments/school-of-health-and-physical-education/health-education-and-community-health-studies0/CommunityHealthWorkerCertificate.html>. Accessed May, 2013.
35. Coburn KD, Marcantonio S, Lazansky R, Keller M, Davis N. Effect of a community-based nursing intervention on mortality in chronically ill older adults: a randomized controlled trial. *PLoS Med*. 2012;9(7):e1001265.
36. Coleman KJ, Farrell MA, Rocha DA, et al. Readiness to be physically active and self-reported physical activity in low-income Latinas, California WISEWOMAN, 2006-2007. *Prev Chronic Dis*. 2012;9:E87.
37. Colice G, Wu EQ, Birnbaum H, Daher M, Marynchenko MB, Varghese S. Healthcare and workloss costs associated with patients with persistent asthma in a privately insured population. *J Occup Environ Med*. 2006;48(8):794-802.
38. The Commonwealth of Massachusetts: the 188th General Court. Massachusetts laws, Session Laws. Acts, 2010, Chapter 322. <http://malegislature.gov/Laws/SessionLaws/Acts/2010/Chapter322>. Accessed May, 2013.
39. Conway TL, Woodruff SI, Edwards CC, Hovell MF, Klein J. Intervention to reduce environmental tobacco smoke exposure in Latino children: null effects on hair biomarkers and parent reports. *Tobac Contr*. 2004;13(1):90-92.
40. Department of Vermont Health Access. Vermont Blueprint for Health Implementation Manual, 2010. <http://hcr.vermont.gov/sites/hcr/files/printforhealthimplementationmanual2010-11-17.pdf>. Accessed July, 2013.
41. Department of Vermont Health Access. Vermont Blueprint for Health 2011 Annual Report, 2012. http://hcr.vermont.gov/sites/hcr/files/Blueprint%20Annual%20Report%20Final%2001%2026%2012%20_Final_.pdf. Accessed July, 2013.
42. Deroose KP, Fox SA, Reigadas E, Hawes-Dawson J. Church-based telephone mammography counseling with peer counselors. *J Health Commun*. 2000;5(2):175-188.
43. Duan N, Fox SA, Deroose KP, Carson S. Maintaining mammography adherence through telephone counseling in a church-based trial. *Am J Public Health*. 2000;90(9):1468-1471.
44. Elder JP, Ayala GX, Campbell NR, et al. Interpersonal and print nutrition communication for a Spanish-dominant Latino population: *Secretos de la Buena Vida*. *Health Psychol*. 2005;24(1):49-57.

45. Erwin DO, Spatz TS, Stotts RC, Hollenberg JA. Increasing mammography practice by African American women. *Canc Pract*. 1999;7(2):78-85.
46. Faridi Z, Shuval K, Njike VY, et al. and the PREDICT Project Working Group. Partners reducing effects of diabetes (PREDICT): a diabetes prevention physical activity and dietary intervention through African-American churches. *Health Educ Res*. 2010;25(2):306-315.
47. Farrell MA, Hayashi T, Loo RK, et al. Clinic-based nutrition and lifestyle counseling for Hispanic women delivered by community health workers: design of the California WISEWOMAN Study. *J Womens Health*. 2009;18(5):733-739.
48. Felix HC, Mays GP, Stewart MK, Cottoms N, Olson M. Medicaid savings resulted when community health workers matched those with needs to home and community care. *Health Aff*. 2011;30(7):1366-1374.
49. Fernández ME, Gonzalez A, Tortolero-Luna G, et al. Effectiveness of *Cultivando La Salud*: a breast and cervical cancer screening promotion program for low-income Hispanic women. *Am J Public Health*. 2009;99(5):936-943.
50. Fernández ME, Gonzalez A, Tortolero-Luna G, Partida S, Bartholomew LK. Using intervention mapping to develop a breast and cervical cancer screening program for Hispanic farmworkers: Cultivando La Salud. *Health Promot Pract*. 2005;6(4):394-404.
51. Fisher EB, Strunk RC, Highstein GR, et al. A randomized controlled evaluation of the effect of community health workers on hospitalization for asthma. The Asthma Coach. *Arch Pediatr Adolesc Med*. 2009;163(3):225-232.
52. Fox SA, Pitkin K, Paul C, Carson S, Duan N. Breast cancer screening adherence: does church attendance matter? *Health Educ Behav*. 1998;25(6):742-758.
53. Gary TL, Bone LR, Hill MN, et al. Randomized trial of the effects of nurse case manager and community health worker interventions on risk factors for diabetes-related complications in urban African Americans. *Prev Med*. 2003;37(1):23-32.
54. Gary TL, Crum RM, Cooper-Patrick L, Ford D, Brancati FL. Depressive symptoms and metabolic control in African-Americans with type 2 diabetes. *Diabetes Care*. 2000;23(1):23-29.
55. Gary TL, Hill-Briggs F, Batts-Turner M, Brancati FL. Translational research principles of an effectiveness trial for diabetes care in an urban African American population. *Diabetes Educat*. 2005;31(6):880-889.
56. Gessert CE, Smith DR. The national AHEC program: review of its progress and considerations for the 1980s. *Public Health Rep*. 1981;96(2):116-120.
57. Goldsmith J. The road to meaningful reform: a conversation with Oregon's John Kitzhaber. *Health Aff*. 2003;22(1):114-124.

58. Graham AV, Frank SH, Zyzanski SJ, Kitson GC, Reeb KG. A clinical trial to reduce the rate of low birth weight in an inner-city Black population. *Fam Med*. 1992;24(6):439-446.
59. Hargraves JL, Ferguson WJ, Lemay CA, Pernice J. Community health workers assisting patients with diabetes in self-management. *J Ambulatory Care Manage*. 2012;35(1):15-26.
60. Hayashi T, Farrell MA, Chaput LA, Rocha DA, Hernandez M. Lifestyle intervention, behavioral changes, and improvement in cardiovascular risk profiles in the California WISEWOMAN Project. *J Womens Health*. 2010;19(6):1129-1138.
61. Hiatt RA, Pasick RJ, Stewart S, et al. Cancer screening for underserved women: the Breast and Cervical Cancer Intervention Study. *Cancer Epidemiol Biomarkers Prev*. 2008;17(8):1945-1949.
62. Hiatt RA, Pasick RJ, Stewart S, et al. Community-based cancer screening for underserved women: design and baseline findings from the Breast and Cervical Cancer Intervention Study. *Prev Med*. 2001;33(3):190-203.
63. Hunter JB, de Zapien JG, Papenfuss M, Fernandez ML, Meister J, Giuliano AR. The impact of a promotora on increasing routine chronic disease prevention among women aged 40 and older at the U.S.-Mexico border. *Health Educ Behav*. 2004;31(4):18s-28s.
64. Hutcheson JJ, Black MM, Talley M, et al. Risk status and home intervention among children with failure-to-thrive: follow-up at age 4. *J Pediatr Psychol*. 22(5):651-668.
65. Indian Health Service. Community Health Representative. General CHR Information. <http://www.ihs.gov/chr/index.cfm?module=history>. Accessed July, 2013.
66. Jandorf L, Gutierrez Y, Lopez J, Christie J, Itzkowitz SH. Use of a patient navigator to increase colorectal cancer screening in an urban neighborhood health clinic. *J Urban Health*. 2005;82(2):216-224.
67. Johnson D, Saavedra P, Sun E, et al. Community health workers and Medicaid managed care in New Mexico. *J Community Health*. 2012;37(3):563-571.
68. Johnson K. Experiment in Oregon gives Medicaid very local roots. New York Times. April 12, 2013: <http://www.nytimes.com/2013/04/13/us/oregon-experiments-with-localized-medicaid.html?pagewanted=all&r=1&>.
69. Kaiser Family Foundation. State Health Facts. Medicaid & CHIP, Medicaid Beneficiaries. Distribution of Medicaid enrollees by enrollment group, 2009. <http://kff.org/medicaid/state-indicator/distribution-by-enrollment-group-fy2009/>. Accessed May, 2013.
70. Katula JA, Vitolins MZ, Morgan TM, et al. The Healthy Living Partnerships to Prevent Diabetes Study. 2-year outcomes of a randomized controlled trial. *Am J Prev*. 2013;44(4S4):S324-S332.

71. Katula JA, Vitolins MZ, Rosenberger EL, et al. Healthy Living Partnerships to Prevent Diabetes (HELP PD): design and methods. *Contemp Clin Trials*. 2010;31(1):71-81.
72. Katz ML, Tatum CM, Degraffinreid CR, Dickinson S, Paskett ED. Do cervical cancer screening rates increase in association with an intervention designed to increase mammography usage. *J Womens Health*. 2007;16(1):24-35.
73. Khmer Health Advocates. About KHA. <http://www.khmerhealthadvocates.org/about.asp>. Accessed May, 2013.
74. Korfmacher J, O'Brien R, Hiatt S, Olds D. Differences in program implementation between nurses and paraprofessionals providing home visits during pregnancy and infancy: a randomized trial. *Am J Public Health*. 1999;89(12):1847-1851.
75. Krieger J, Collier C, Song L, Martin D. Linking community-based blood pressure measurement to clinical care: a randomized controlled trial of outreach and tracking by community health workers. *Am J Public Health*. 1999;89(6):856-861.
76. Krieger J, Takaro TK, Allen C, et al. The Seattle-King County Healthy Homes Project: implementation of a comprehensive approach to improving indoor environmental quality for low-income children with asthma. *Environ Health Perspect*. 2002;110(suppl. 2):311-322.
77. Krieger J, Takaro TK, Song L, Beaudet N, Edwards K. A randomized controlled trial of asthma self-management support comparing clinic-based nurses and in-home community health workers. *Arch Pediatr Adolesc Med*. 2009;163(2):141-149.
78. Krieger JW, Takaro TK, Song L, Weaver M. The Seattle-King County Health Homes Project: a randomized, controlled trial of a community health worker intervention to decrease exposure to indoor asthma triggers. *Am J Public Health*. 2005;95(4):652-659.
79. Larkey LK, Gonzalez JA, Mar LE, Glantz N. Latina recruitment for cancer prevention education via community based participatory research strategies. *Contemp Clin Trials*. 2009;30(1):47-54.
80. Larkey LK, Herman PM, Roe DJ, et al. A cancer screening intervention for underserved Latina women by lay educators. *J Womens Health*. 2012;21(5):557-566.
81. Lawlor MS, Blackwell CS, Isom SP, et al. Cost of a group translation of the Diabetes Prevention Program. Healthy Living Partnerships to Prevent Diabetes. *Am J Prev Med*. 2013;44(4S4):S381-S389.
82. LeBaron CW, Starnes DM, Rask KJ. The impact of reminder-recall interventions on low vaccination coverage in an inner-city population. *Arch Pediatr Adolesc Med*. 2004;158(3):255-261.

83. Lemay CA, Beagan BM, Ferguson WJ, Hargraves JL. Lessons learned from a collaborative to improve care for patients with diabetes in 17 community health centers, Massachusetts, 2006. *Prev Chronic Dis.* 2010;7(4):A83.
84. Lemay CA, Ferguson WJ, Hargraves JL. Community health worker encounter forms: a tool to guide and document patient visits and worker performance. *Am J Public Health.* 2012;102(7):e70-e75.
85. Levine DM, Bone LR, Hill MN, et al. The effectiveness of a community/academic health center partnership in decreasing the level of blood pressure in an urban African-American population. *Ethn Dis.* 2003;13(3):354-361.
86. Love MB, Legion V, Shim JK, et al. CHWs get credit: a 10-year history of the first college-credit certificate for community health workers in the United States. *Health Promot Pract.* 2004;5(4):418-428.
87. Lujan J, Ostwald SK, Ortiz M. Promotora diabetes intervention for Mexican Americans. *Diabetes Educat.* 2007;33(4):660-670.
88. Maine Quality Counts. Maine Patient-Centered Medical Home Pilot – Community Care Teams. <http://www.mainequalitycounts.org/page/896-654/community-care-teams>. Accessed April, 2013.
89. Margellos-Anast, H, Gutierrez MA, Whitman S. Improving asthma management among African-American children via a community health worker model: findings from a Chicago-based pilot intervention. *J Asthma.* 2012;49(4):380-389.
90. May ML, Kash B, Contreras R. Southwest Rural Health Research Center: community health worker (CHW) certification and training – a national survey of regionally and state-based programs. Office of Rural Health Policy, Health Services and Resources Administration, U.S. Department of Health and Human Services, 2005.
91. McCormick S, Glaubitz K, McIlvenne M, Mader E. Community health workers in Utah: an assessment of the role of CHWs in Utah and the national health care system, 2012. Salt Lake City (UT): University of Utah, Center for Public Policy and Administration.
92. Meister JS, Warrick LH, de Zapién JG, Wood AH. Using lay health workers: a case study of a community-based prenatal intervention. *J Community Health.* 1992;17(1):37-51.
93. Minnesota Community Health Worker Alliance. <http://www.mnchwalliance.org/>. Accessed May, 2013.
94. Minnesota Department of Human Services. MHCP Provider Manual. Community Health Worker. http://www.dhs.state.mn.us/main/idcplg?IdcService=GET_DYNAMIC_CONVERSION&Revision

[SelectionMethod=LatestReleased&dDocName=dhs16_140357#P82_3449](#). Accessed July, 2013.

95. Mock J, McPhee SJ, Nguyen T, et al. Effective lay health worker outreach and media-based education for promoting cervical cancer screening among Vietnamese American women. *Am J Public Health*. 2007;97(9):1693-1700.
96. Monaghan PF, Forst LS, Tovar-Aguilar JA, et al. Preventing eye injuries among citrus harvesters: the community health worker model. *Am J Public Health*. 2011;101(12):2269-2274.
97. Nelson L. Congressional Budget Office. Health and Human Resources Division. Lessons from Medicare's Demonstration Projects on disease management and care coordination, 2012. http://www.cbo.gov/sites/default/files/cbofiles/attachments/WP2012-01_Nelson_Medicare_DMCC_Demonstrations.pdf. Accessed May, 2013.
98. Nguyen TT, Le G, Nguyen T, et al. Breast cancer screening among Vietnamese Americans. A randomized controlled trial of lay health worker outreach. *Am J Prev Med*. 2009;37(4):306-313.
99. Northwest Regional Primary Care Association (NRPCA). <http://www.nwrpca.org/>. Accessed May, 2013.
100. O'Brien MJ, Halbert CH, Bixby R, Pimentel S, Shea JA. Community health worker intervention to decrease cervical cancer disparities in Hispanic women. *J Gen Intern Med*. 2010;25(11):1186-1192.
101. O'Brien MJ, Squires AP, Bixby RA, Larson SC. Role development of community health workers. An examination of selection and training processes in the intervention literature. *Am J Prev Med*. 2009;37(6S1):S262-S269.
102. Office of Management and Budget. Standard Occupational Classification (SOC) – policy recommendations for the 2010 SOC; notice, 2008. Available at <http://www.bls.gov/soc/soc2010.pdf>. Accessed May, 2013.
103. Olds DL, Robinson J, O'Brien R, et al. Home visiting by paraprofessionals and by nurses: a randomized, controlled trial. *Pediatrics*. 2002;110(3):486-496.
104. Olds DL, Robinson J, Pettitt L, et al. Effects of home visits by paraprofessionals and by nurses: age 4 follow-up results of a randomized trial. *Pediatrics*. 2004;114(6):1560-1568.
105. Oregon.gov. Official Oregon State website. Oregon health policy and research. State innovation model grant. <http://www.oregon.gov/oha/OHPR/Pages/sim/index.aspx>. Accessed May, 2013.

106. OregonLaws.org. 2011 ORS, Vol. 10, Chapter 414. (Coordinated Care Organizations) 414.620. <http://www.oregonlaws.org/ors/414.620>. Accessed May, 2013.
107. Oregon State Legislature. 76th Oregon legislative assembly, House Bill 3311, 2011. <http://www.leg.state.or.us/11reg/measures/hb3300.dir/hb3311.en.html>. Accessed May, 2013.
108. Owens MK. Resources: Identifying and quantifying the cost of uncoordinated care: opportunities for savings and improved outcomes. *Southeastern Consultants, Inc.* 2010. Available at <http://www.sec-rx.com/resources>. Accessed May, 2013.
109. Parker EA, Israel BA, Robins TG, et al. Evaluation of Community Action Against Asthma: a community health worker intervention to improve children's asthma-related health by reducing household environmental triggers for asthma. *Health Educ Behav.* 2008;35(3):376-395.
110. Paskett ED, McLaughlin JM, Lehman AM, Katz ML, Tatum CM, Oliveri JM. Evaluating the efficacy of lay health advisors for increasing risk-appropriate Pap test screening: a randomized controlled trial among Ohio Appalachian women. *Cancer Epidemiol Biomarkers Prev.* 2011;20(5):835-843.
111. Paskett E, Tatum C, Rushing J, et al. Randomized trial of an intervention to improve mammography utilization among a triracial rural population of women. *J Natl Cancer Inst.* 2006;98(17):1226-1237.
112. Patient Protection and Affordable Care Act (PPACA), Pub. L. No. 111-148, §2702, 124 Stat. 119, 318-319, 2010. Available from: <http://www.gpo.gov/fdsys/pkg/BILLS-111hr3590enr/pdf/BILLS-111hr3590enr.pdf>.
113. Peikes D, Peterson G, Brown RS, Graff S, Lynch JP. How changes in Washington University's Medicare Coordinated Care Demonstration Pilot ultimately achieved savings. *Health Aff.* 2012;31(6):1216-1226.
114. Perez LM, Martinez J. Community health workers: social justice and policy advocates for community health and well-being. *Am J Pub Health.* 2008;98(1):11-14.
115. Pilote L, Tulskey JP, Zolopa AR, Hahn JA, Schecter GF, Moss AR. Tuberculosis prophylaxis in the homeless: a trial to improve adherence to referral. *Arch Intern Med.* 1996;156(2):161-165.
116. Portland Maine Public Health Division. Minority Health Program. MHP's Current Initiatives. [http://www.portlandmaine.gov/hhs/phminority.asp#MHP's Current Initiatives](http://www.portlandmaine.gov/hhs/phminority.asp#MHP's_Current_Initiatives). Accessed, July 2013.
117. Rask KJ, LeBaron CW, Starnes DM. The costs of registry-based immunization interventions. *Am J Prev Med.* 2001;21(4):267-271.

118. Rhode Island Department of Labor and Training. Community health workers in Rhode Island. Cranston (RI): Rhode Island Department of Labor and Training, 2009. Available from: <http://www.dlt.ri.gov/lmi/pdf/communityhealth.pdf>
119. Rorie JL, Smith A, Evans T, et al. Using resident health advocates to improve public health screening and follow-up among public housing residents, Boston, 2007-2008. *Prev Chronic Dis.* 2011;8(1):A15.
120. Rosenthal EL, Brownstein JN, Rush CH, et al. Community health workers: part of the solution. *Health Aff.* 2010;29(7):1338-1342.
121. Rosenthal EL, Wiggins N, Brownstein JN, et al. The final report of the National Community Health Advisor Study: weaving the future. Tucson (AZ): Mel and Enid Zuckerman College of Public Health, University of Arizona; 1998.
122. Roth AM, Holmes AM, Stump TE, et al. Can lay health workers promote better medical self-management by persons living with HIV? An evaluation of the Positive Choices program. *Patient Educ Couns.* 2012;89(1):184-190.
123. Sauaia A, Min S, Lack D, et al. Church-based breast cancer screening education: impact of two approaches on Latinas enrolled in public and private health insurance plans. *Prev Chronic Dis.* 2007;4(4):A99.
124. Schuler ME, Nair P, Black MM, Kettinger L. Mother-infant interaction: effects of a home intervention and ongoing maternal drug use. *J Clin Child Psychol.* 2000;29(3):424-431.
125. Scoggins JF, Ramsey SD, Jackson JC, Taylor VM. Cost effectiveness of a program to promote screening for cervical cancer in the Vietnamese-American population. *Asian Pac J Cancer Prev.* 2010;11(3):717-722.
126. Shea-Delaney E. NASMHPD: Peer Support Services Survey. Presented at: Pillars of Peer Support Services Summit II, October 18-19, 2010. <http://www.nasmhpd.org/docs/FMDPeerSupportServices31011.pdf>. Accessed July, 2013.
127. Silver EJ, Ireys HT, Bauman LJ, Stein REK. Psychological outcomes of a support intervention in mothers of children with ongoing health conditions: the Parent-to-Parent Network. *J Community Psychol.* 1997;25(3):249-264.
128. Sixta CS, Ostwald S. Texas-Mexico border intervention by promotores for patients with type 2 diabetes. *Diabetes Educ.* 2008;34(2):299-309.
129. Smedley BD. Joint Center Health Policy Institute. Addressing racial and ethnic health care disparities: testimony to the House Energy and Commerce Committee, Health Subcommittee, 2009. http://democrats.energycommerce.house.gov/Press_111/20090324/testimony_smedley.pdf. Accessed May, 2013.

130. Smedley BD, Stith AY, Nelson AR, eds. Unequal treatment: confronting racial and ethnic disparities in health care. Washington (DC) Institute of Medicine: National Academies Press; 2003.
131. Smith LA, Hatcher-Ross JL, Wertheimer R, Kahn RS. Rethinking race/ethnicity, income, and childhood asthma: racial/ethnic disparities concentrated among the very poor. *Public Health Rep.* 2005;120(2):109-116.
132. Spencer MS, Rosland A-M, Kieffer EC, et al. Effectiveness of a community health worker intervention among African Americans and Latino adults with type 2 diabetes: a randomized controlled trial. *Am J Public Health.* 2011;101(12):2253-2260.
133. St. James PS, Shapiro E, Waisbren SE. The Resource Mothers Program for maternal phenylketonuria. *Am J Public Health.* 1999;89(5):762-764.
134. Studts CR, Tarasenko YN, Schoenberg NE, Shelton BJ, Hatcher-Keller J, Dignan MB. A community-based randomized trial of a faith-placed intervention to reduce cervical cancer burden in Appalachia. *Prev Med.* 2012;54(6):408-414.
135. Taylor VM, Hislop TG, Jackson JC, et al. A randomized controlled trial of interventions to promote cervical cancer screening among Chinese women in North America. *J Natl Cancer Inst.* 2002;94(9):670-677.
136. Taylor VM, Jackson JC, Yasui Y, et al. Evaluation of a cervical cancer control intervention using lay health workers for Vietnamese American women. *Am J Public Health.* 2010;100(10):1924-1929.
137. Texas Department of State Health Services. Community health workers – training information. <http://www.dshs.state.tx.us/layouts/contentpage.aspx?pageid=29479&id=2539&terms=community+health+worker>. Accessed May, 2013.
138. Texas Department of State Health Services/Health and Human Services Commission. Texas community health worker study: report to the Texas legislature, 2012. <http://www.dshs.state.tx.us/mch/chw.shtm>. Accessed May, 2013.
139. Turnbull N. Health Affairs blog. The release of Massachusetts health reform 2.0, 2012. <http://healthaffairs.org/blog/2012/08/13/the-release-of-massachusetts-health-reform-2-0/>. Accessed May, 2013.
140. Two Feathers J, Kieffer EC, Palmisano G, et al. The development, implementation, and process evaluation of the REACH Detroit Partnership's diabetes lifestyle intervention. *Diabetes Educ.* 2007;33(3):509-520.

141. Two Feathers J, Kieffer EC, Palmisano G, et al. Racial and Ethnic Approaches to Community Health (REACH) Detroit Partnership: improving diabetes-related outcomes among African Americans and Latino adults. *Am J Public Health*. 2005;95(9):1552-1560.
142. University of Kentucky. Center of Excellence in Rural Health. Kentucky Homeplace. <http://ruralhealth.med.uky.edu/cerh-homeplace>. Accessed May, 2013.
143. University of New England. UNE and community partners to launch 'CHANNELS' to better prepare health professionals for delivery of services to immigrants and refugees, 2013. <http://www.une.edu/news/2013/channels.cfm>. Accessed July, 2013.
144. U.S. Department of Health and Human Services. Health Resources and Services Administration, Bureau of Health Professionals. Community health worker National Workforce Study, 2007. <http://bhpr.hrsa.gov/healthworkforce/reports/chwstudy2007.pdf>. Accessed May, 2013.
145. U.S. Department of Labor, Bureau of Labor Statistics. Occupational employment and wages, May 2012, 21-094 Community health workers. <http://www.bls.gov/oes/current/oes211094.htm>. Accessed May, 2013.
146. U.S. Department of Labor, Bureau of Labor Statistics. Standard occupational classification, 21-094 Community health workers, 2010. <http://www.bls.gov/soc/2010/soc211094.htm>. Accessed May, 2013.
147. VanLandeghem K, Schor EL. The Commonwealth Fund and the Association of Maternal and Child Health Programs (AMCHP). New Opportunities for Integrating and Improving Health Care for Women, Children, and Their Families, 2012. <http://www.commonwealthfund.org/Publications/Issue-Briefs/2012/Feb/New-Opportunities-for-Integrating-Health-Care-for-Women.aspx>. Accessed May, 2013.
148. Vetter MJ, Bristow L, Ahrens J. A model for home care clinician and home health aide collaboration. *Home Healthc Nurse*. 2004;22(9):645-648.
149. Viswanathan M, Kraschnewski J, Nishkawa B, et al. Outcomes of community health worker interventions. Evidence report/technology assessment no. 181, prepared by the RTI International – University of North Carolina Evidence-based Practice Center. Rockville, MD: Agency for Healthcare Research and Quality; 2009;09-E014.
150. Von Korff M, Moore JE, Lorig K, et al. A randomized trial of a lay person-led self-management group intervention for back pain patients in primary care. *Spine*. 1998;23(23):2608-2615.
151. Waitzkin H, Getrich C, Heying S, et al. *Promotoras* as mental health practitioners in primary care: a multi-method study of an intervention to address contextual sources of depression. *J Community Health*. 2011;36(2):316-331.

152. Waitzkin H, Yager J, Parker T, Duran B. Mentoring partnerships for minority faculty and graduate students in mental health services research. *Acad Psychiatry*. 2006;30(3):205-217.
153. Wang EA, Hong CS, Samuels L, Shavit S, Sanders R, Kushel M. Transitions Clinic: creating a community-based model of health care for recently released California prisoners. *Public Health Rep*. 2010;125(2):171-177.
154. Wang EA, Hong CS, Shavit S, Sanders R, Kessell E, Kushel MB. Engaging individuals recently released from prison into primary care: a randomized trial. *Am J Public Health*. 2012;102(9):e22-e29.
155. Weinstein MC, Siegel JE, Gold MR, Kamlet MS, Russell LB. Recommendations of the Panel on Cost-effectiveness in Health and Medicine. *JAMA*. 1996;276(15):1253-1258.
156. Wells KJ, Luque JS, Miladinovic B, et al. Do community health worker interventions improve rates of screening mammography in the United States? A systematic review. *Cancer Epidemiol Biomarkers Prev*. 2011;20(8):1580-1598.
157. Welsh AL, Sauaia A, Jacobellis J, Min S, Byers T. The effect of two church-based interventions on breast cancer screening rates among Medicaid-insured Latinas. *Prev Chronic Dis*. 2005;2(4):A07.
158. Wiggins N, Borbon A. Core roles and competencies of community health advisors. In: Rosenthal EL, Wiggins N, Brownstein JN, et al. The final report of the National Community Health Advisor Study: weaving the future. Tucson (AZ): Mel and Enid Zuckerman College of Public Health, University of Arizona; 1998.
159. Wilkinson DY. Indigenous community health workers in the 1960s and beyond. In: Braithwaite RL, Taylor SE, eds. Health issues in the black community. San Francisco (CA): Jossey-Bass, Inc.;1992:255-266.
160. Wolff N, Helminiak TW, Morse GA, et al. Cost-effectiveness evaluation of three approaches to case management for homeless mentally ill clients. *Am J Psychiatry*. 1997;154(3):341-348