

Community Health Workers to Increase Cancer Screening: 3 Community Guide Systematic Reviews



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ventive Services Task Force

Introduction: Many in the U.S. are not up to date with cancer screening. This systematic review examined the effectiveness of interventions engaging community health workers to increase breast, cervical, and colorectal cancer screening.

Methods: Authors identified relevant publications from previous Community Guide systematic reviews of interventions to increase cancer screening (1966 through 2013) and from an update search (January 2014–November 2021). Studies written in English and published in peer-reviewed journals were included if they assessed interventions implemented in high-income countries; reported screening for breast, cervical, or colorectal cancer; and engaged community health workers to implement part or all of the interventions. Community health workers needed to come from or have close knowledge of the intervention community.

Results: The review included 76 studies. Interventions engaging community health workers increased screening use for breast (median increase=11.5 percentage points, interquartile interval=5.5–23.5), cervical (median increase=12.8 percentage points, interquartile interval=6.4–21.0), and colorectal cancers (median increase=10.5 percentage points, interquartile interval=4.5–17.5). Interventions were effective whether community health workers worked alone or as part of a team. Interventions increased cancer screening independent of race or ethnicity, income, or insurance status.

Discussion: Interventions engaging community health workers are recommended by the Community Preventive Services Task Force to increase cancer screening. These interventions are typically implemented in communities where people are underserved to improve health and can enhance health equity. Further training and financial support for community health workers should be considered to increase cancer screening uptake.

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INTRODUCTION

Breast, cervical, and colorectal cancers accounted for >419,000 new cancer diagnosis and 98,000 deaths in 2019.¹ The U.S. Preventive Services Task Force recommends screening for these cancers among age- and sex-appropriate populations at regular intervals.^{2–4} Screening, with appropriate follow-up for abnormal test results, reduces cancer-related morbidity and mortality.^{2–4} Screening rates in 2018⁵ were below *Healthy People 2020* targets,⁶ especially for people from some racial and ethnic groups and people with lower incomes or who are uninsured.⁷ Disparities in screening can lead to increases in late-stage cancer diagnoses and mortality among these populations.^{8,9}

Interventions engaging community health workers (CHWs) have increasingly been used to provide culturally and linguistically appropriate healthcare services to under-resourced communities.^{10,11} CHWs are trained frontline health workers who serve as a bridge between communities where people are underserved and healthcare systems. They are from or have a close understanding of the community served.¹² They often receive on-the-job training and work without professional degrees or titles.¹³ CHWs may be paid or serve as volunteers,¹⁴ and they may work independently or as part of a team that includes other healthcare professionals.¹⁵

Interventions engaging CHWs have shown effectiveness in improving health outcomes across a variety of other health conditions, including asthma,¹⁶ diabetes,¹⁷ and HIV infection.¹⁸ Several systematic reviews have shown these interventions to be effective in increasing cancer screening; however, they are limited to specific populations,^{19,20} focus only on breast cancer screening,^{21,22} or report broadly across various disease topics.^{20,23} This systematic review is a comprehensive assessment of interventions engaging CHWs to increase screening for breast, cervical, and colorectal cancer across settings and populations, whether implemented alone or in a team of public health professionals. Extensive stratified analyses were conducted to identify the characteristics of effective interventions engaging CHWs.

METHODS

Guide to Community Preventive Services (Community Guide) methods were used.^{24–26} The search for evidence included 2 steps. First, reviewers identified relevant publications from studies

included in previous Community Guide systematic reviews of interventions to increase breast, cervical, or colorectal cancer screening (including studies published from 1966 through 2013).^{27–30} Next, Centers for Disease Control and Prevention (CDC) librarians conducted an updated search for papers published between January 1, 201, and November 5, 2021 evaluating interventions to promote cancer screening. Databases for this review included PubMed, Medline, Embase, PsycINFO, Cochrane, and CINAHL. The detailed search strategy is available from www.thecommunityguide.org/topic/cancer.

Studies were included if they evaluated interventions engaging CHWs to increase breast, cervical, or colorectal cancer screening; engaged CHWs to implement part or all the intervention; recruited and trained CHWs who were from or had close knowledge of the targeted community; reported 1 or more outcomes of interest; and were conducted in a World Bank–designated high-income economy³¹ and published in English. Community Guide methods allow for an array of study designs to assess the effectiveness of public health interventions. Studies were excluded if they were single-group pre–post studies where the study population was not up to date (UTD) with the screening at baseline because these studies would only provide favorable results and potentially bias the review finding.

Two review team members independently screened search results and abstracted qualifying studies. Differences were reconciled first by the 2 abstractors, with unresolved differences brought to full review team. Reviewers considered the following when assessing study quality of execution^{25,26}: description of the intervention, population, and sampling frame; assessment of intervention exposure and outcome reliability; description and use of appropriate analytic methods; attrition (i.e., whether >20% of the study population was lost to follow-up); and ability to control for confounding or biasing factors. For RCTs, reviewers also assessed the reporting of the randomization process,^{25,26} accounting for missing outcome data due to loss to follow-up and controlling for cross-contamination bias. Reviewers described studies as having good (0–1 limitation), fair (2–4), or limited (>4) quality of execution. Studies with limited quality of execution were excluded from the analyses.^{24,25}

Primary outcomes of interest were recent^{2–4} or repeat screenings for breast (mammography), cervical (Pap test), or colorectal (colonoscopy, fecal occult blood test [FOBT], fecal immunochemical test [FIT], sigmoidoscopy) cancers. *Repeat screenings* were defined as the completion of 2 or more consecutive, on-time tests.

Changes in recent or repeat screenings compared with no intervention were calculated separately for breast, cervical, and colorectal cancer screening (UTD with any colorectal cancer test, colonoscopy, FOBT or FIT, or sigmoidoscopy based on the recommended frequency). For studies with a comparison group and reporting baseline data, the net differences in pre-to-post-intervention screening use were calculated. If baseline data were unavailable, differences in postintervention screening use were calculated. For studies without a comparison group, changes in

pre-to-post-intervention screening use were calculated. Screening at the longest follow-up was used to determine postintervention screening use. Participants lost to follow-up were imputed and treated as not UTD with screening whenever possible.

Outcomes were stratified on the basis of whether CHWs delivered all or part of the intervention. CHW alone indicates that CHWs independently delivered the entire intervention. Some studies with multiple study arms evaluated the effect of adding CHWs on cancer screening, such as comparing CHW-delivered one-on-one education plus small media (videos and printed materials such as letters, brochures, and newsletters) with small media alone.³² For these studies, CHW added was used to indicate that CHWs delivered the intervention as part of a team of public health or healthcare professionals and that the effect of adding CHWs can be determined. CHW in a team indicates that CHWs worked in a team and that only overall effectiveness could be determined.

For summary measures, medians and interquartile intervals (IQIs) were calculated for outcomes with >4 data points. For study arms where CHWs delivered part of the intervention and when both CHW added and CHW in a team can be determined, CHW added was used in summary measure calculations. For study arms that reported on multiple colorectal cancer screening tests, only 1 test result was used in summary measure calculations, and tests were chosen in the following order: UTD with any colorectal cancer test, colonoscopy, FOBT or FIT, or sigmoidoscopy. In addition, analyses were performed for each cancer type on the basis of whether CHWs delivered all or part of the intervention. Stratified analyses were performed using all included studies to examine the influence of settings, population characteristics, intervention characteristics, and CHW-specific characteristics on intervention effectiveness.

RESULTS

Search Yield

The review team identified 101 potentially relevant publications from previous Community Guide systematic reviews.^{27–30} The updated search identified 73,578 publications, of which 437 underwent full-text screening. Overall, 76 studies^{32–107} met the inclusion criteria, with 39 studies reporting breast cancer screening,^{32,34–39,42,43,47–49,52–57,60,62–64,71,75,76,78,80,83,85,87–93,95,104,106}

33 studies reporting cervical cancer screening,^{36,38,39,41,46,47,49,51,52,56,59,68,72,73,77,78,81,83,84,86,87,93–,100,103,104,106,107}

and 24 studies reporting colorectal cancer screening^{33,36,39,40,44,45,49,50,53,58,61,62,65–,67,69,70,74,79,82,101,}

^{102,104,105} (Figure 1). The main reasons for exclusion among the 361 studies excluded during full-text screening included reporting on interventions that did not engage CHWs, not reporting recent or repeat cancer screening outcomes, and duplicate studies included in previous Community Guide reviews. Summaries of included studies are available on The Community Guide website.^{108–110}

Quality of Execution Assessment

Included studies were individual RCTs,^{33,34,37,39,41,44,46,53,58,60,63–,65,68,75,77,80,84–,86,90,93–,95,97,99,100,102,107}

group RCTs,^{32,45,49,51,52,56,57,66,69,73,74,76,78,79,82,87,91,96,98,101,105}

pre-post design with comparison group,^{38,42,43,47,48,50,55,67,72,81,103} or pre-post only.^{35,36,40,54,59,61,62,70,71,83,88,89,92,104,106}

Ten included studies had a good quality of execution^{40,43,44,47,55,76,85,90–,100,107}; the remaining studies had a fair quality of execution.^{32–,39,41,42,45,46,48–,54,56–,75,77–,84,86–,89,91–,99,101–,106}

The most commonly assigned limitations were convenience sampling,^{32,35–,37,40–,42,44–,46,49,52,54,56–,58,61–,66,68,69,71–,75,77–,82,87–,95,98,}

^{99,101,102,104–,107} use of self-reported data without verification,^{32,33,36–,39,42,45,46,48,49,51,54,56,57,61–,63,66–,69,71,}

^{72,75–,83,86,87,91,93,94,96–,98,101,102,104,106} and lack of description for CHWs or the study population.^{32,34,35,38,39,41,42,46,48,50–,53,55,57–,60,62–,65,67,69–,71,73,74,81,84,86,87,89,92,97–,99,103,105,106}

Study and Intervention Characteristics

A detailed description of CHW work and intervention characteristics can be found in Table 1 and Appendix Table 1 (available online). Studies were mostly conducted in the U.S.,^{32–,46,48–,54,56–,58,61–,96,98–,106} with 1 each in Australia,⁵⁹ Belgium,⁵⁵ Canada,⁴⁷ Hong Kong, China,¹⁰⁷ and the United Kingdom.⁶⁰ One study evaluated an intervention implemented in both the U.S. and Canada.⁹⁷ Most interventions were offered in urban settings.^{32,36–,38,42,44,47,49,50,53,56,60,65,66,68,70,75–,82,84,87–,92,}

^{95,97–,99,101–,103,106}

Interventions engaged CHWs to increase screening for breast,^{32,34,35,37,42,43,48,54,55,57,60,63,64,71,75,76,80,85,88–,92} cervical,^{41,46,51,59,68,72,73,77,81,84,86,94,96–,100,103,107}

colorectal,^{33,}^{40,44,45,50,58,61,65–,67,69,70,74,79,82,101,102,105} or multiple cancer types.^{36,38,39,47,49,52,53,56,62,78,83,87,93,95,104,106}

Most interventions engaged CHWs to deliver all^{33,35,39,41,43,45,47,49,50,52,54,57,61,62,66,70–,73,75,76,78,79,82–,86,88,89,91,95,96,99}

^{–,101,103,}

^{104,107} or a major part^{32,34,36–,38,40,46,48,53,55,56,60,63,65,67–,69,74,77,80,90,92–,94,97,98,102}

of the intervention. CHWs increased the demand for screening services through one-on-one^{32–,37,39,41,43,44,46,48–,50,52,54–,58,60,63–,65,69,75,82,}

^{85–,91,93–,95,97–,102,104}

and group^{35,36,38,40,42,45,47–,49,51,56,59,}

^{61,62,66–,69,71–,74,76–,84,87,89,92,96,98,101,103,105,107} education, client reminders,^{39,44,47,53,66,70,88,89,100} and small media

distribution.^{67,73,86,88,90,103} CHWs increased clients'

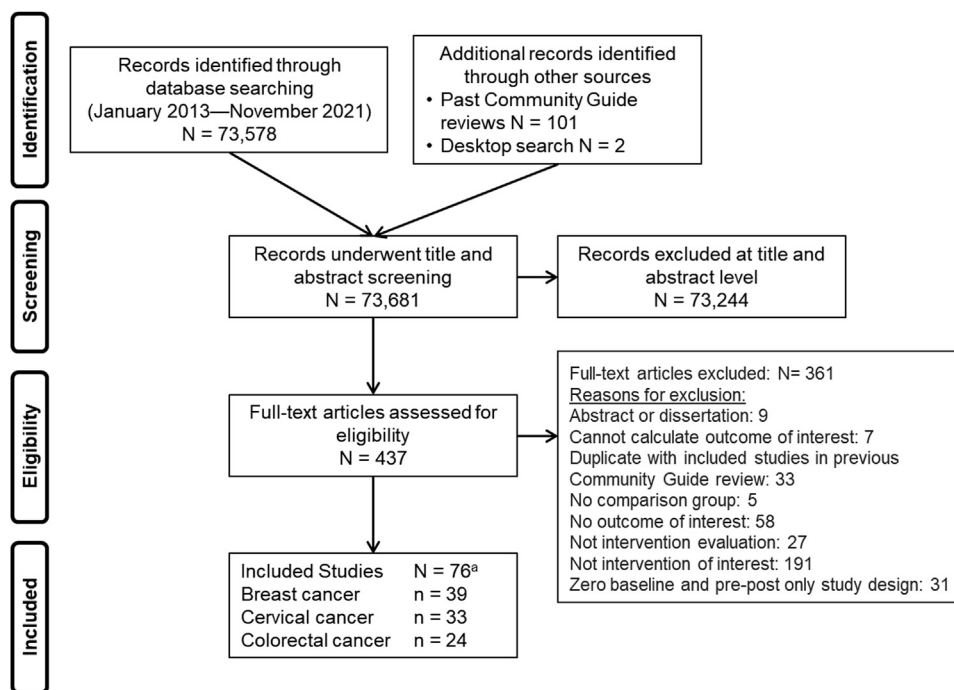


Figure 1. Search process and results.

^aSome interventions focused on more than one cancer type.

access to services by assisting with appointment scheduling,^{35,37,39,47,49,50,68,70,71,73,75,77,79,80,85,88–,90,97,98,100,103,104,106,107} providing translation,^{47,73,97,103} arranging transportation,^{35,47,73,88–,90,97,98,103} or child care,³⁹ and reducing administrative barriers by completing paperwork and accompanying participants to appointments when needed.^{39,40,47,49,50,53,75,79,88,89,98,104,107}

CHW Work Characteristics

The Community Health Worker Core Consensus Project recommends 10 core roles frequently performed by CHWs that can improve community health.¹¹¹ CHWs often performed several of these core roles in combination, such as providing cultural mediation among individuals, communities, and health and social service systems^{32–,41,43–,49,52,56,58,59,61–,64,66–,69,71–,80,82,83,85–,91,93–,104,107}; providing culturally appropriate education and information^{32–,52,55,56,58–,66,68,69,71–,105,107}; providing coaching and social support^{32–,41,43,44,47–,50,52,54,56,57,61–,72,75–,80,82,83,85–,95,97,98,100,102–,105,107}; and building individual and community capacity^{32–,45,47–,52,54–,59,61–,80,82–,92,94–,103,105–,107} (Table 1). In roughly half of the interventions, CHWs conducted outreach^{32–,35,39,41–,49,52,54,56,57,60,66,71,72,77–,82,85,86,89,91,93–,95,97,98,100,101,104,106} and provided care coordination, case

management, and system navigation services.^{34–,37,39,47,49–,54,58,65,66,68,70,71,73–,77,80,85,88–,90,93,95,97–,100,103,104,106,107} In very few studies, CHWs advocated for individuals and communities⁸⁰ or implemented individual and community assessment and participated in evaluation and research.¹⁰⁴ No CHWs provided direct services because all cancer screenings need to be delivered in healthcare settings. In most interventions, CHWs performed 4 or more core roles.^{32–,41,43–,2–,41,43}

Nearly all included studies reported that CHWs were matched to the community in which they served.^{33–,58,60–,69,71–,86,88–,107} Many studies did not report on the educational background of CHWs; however, most studies reported that CHWs received formal training,^{32–,36,38,39,41,43–,50,52–,58,60–,73,75–,80,82,83,85,86,88–,96,98–,105,107} approximately half reported that CHWs received the supervision of their performance, and several reported that CHWs received some form of reimbursement for their services.^{35,36,38,49,54,64,66,68,77,79,80,82,85,90,91,101,105}

Demographic Characteristics of Participants in Included Studies

Detailed information on the demographic characteristics of study participants can be found in Table 2. Study participants had a median age of 54 years.^{32–,34,36,37,39,42,46,47,51,56–,58,60,61,63–,66,68–,72,74,76–,78,80–,86,88}

Table 1. CHW Work Characteristics of Included Studies

Characteristics	Number of studies reporting	Citations
Level of involvement in intervention delivery		
Implemented everything	39	33, 35, 39, 41, 43, 45, 47, 49, 50, 52, 54, 57, 61, 62, 66, 70–73, 75, 76, 78, 79, 82–86, 88, 89, 91, 95, 96, 99–101, 103, 104, 107
Implemented majority of components	27	32, 34, 36–38, 40, 46, 48, 53, 55, 56, 60, 63, 65, 67–69, 74, 77, 80, 90, 92–94, 97, 98, 102
Implemented a minority of components	10	42, 44, 51, 58, 59, 64, 81, 87, 105, 106
Received formal training		
Yes	65	32–36, 38, 39, 41, 43–50, 52–58, 60–73, 75–80, 82, 83, 85, 86, 88–96, 98–105, 107
Not reported	11	37, 40, 42, 51, 59, 74, 81, 84, 87, 97, 106
Supervision of CHW performance		
Yes	31	33, 35, 36, 38, 39, 46, 47, 52, 53, 55, 63, 65, 67, 69, 71, 75, 76, 78, 82–91, 94, 95, 102
Not reported	45	32, 34, 37, 40–45, 48–51, 54, 56–62, 64, 66, 68, 70, 72–74, 77, 79–81, 92, 93, 96–101, 103–107
CHWs matched to the community		
Yes	72	33–58, 60–69, 71–86, 88–107
Not reported	4	32, 59, 70, 87
Reimbursement		
Yes	19	35, 36, 38, 45, 49, 54, 62, 64, 66, 68, 77, 79, 80, 82, 85, 90, 91, 101, 105
Not reported	57	32–34, 37, 39–44, 46–48, 50–53, 55–61, 63, 65, 67, 69–76, 78, 81, 83, 84, 86–89, 92–100, 102–104, 106, 107
Core roles ¹¹¹		
Cultural mediation among individuals, communities, and health and social service systems	61	32–41, 43–49, 52, 56, 58, 59, 61–64, 66–69, 71–80, 82, 83, 85–91, 93–104, 107
Providing culturally appropriate education and information	70	32–52, 55, 56, 58–66, 68, 69, 71–105, 107
Care coordination, case management, and system navigation	38	34–37, 39, 47, 49–54, 58, 65, 66, 68, 70, 71, 73–77, 80, 85, 88–90, 93, 95, 97–100, 103, 104, 106, 107
Providing coaching and social support	59	32–41, 43, 44, 47–50, 52, 54, 56, 57, 61–72, 75–80, 82, 83, 85–95, 97, 98, 100, 102–105, 107
Advocating for individuals and communities	1	80
Building individual and community capacity	70	32–45, 47–52, 54–59, 61–80, 82–92, 94–103, 105–107
Providing direct services	0	
Implementing individual and community assessments	1	104
Conducting outreach	41	32–35, 39, 41–49, 52, 54, 56, 57, 60, 66, 71, 72, 77–82, 85, 86, 89, 91, 93–95, 97, 98, 100, 101, 104, 106
Participating in evaluation and research	1	104

CHW, community health worker.

–91,93,100–,103,105,107 Across studies evaluating interventions to increase colorectal cancer screening, a median of 68% of participants were female.^{33,39,40,44,45,50,53,58,61,65,66,69,70,74,79,82,101,102,104,105} Thirty^{36–,38,42,43,46,48,49,52,53,57,61,}

72,74–,76,78,79,82,83,90,92–,95,101,102,104,105,107 of the included studies reported a majority of participants with annual household incomes <\$40,000, and 5 studies^{33,47,65,87,106}

focused on low-income communities. Three quarters of participants had a high school education or less.^{36–,39,42,43,46,48,51,56,57,61,63,66,67,69,73,75,76,83–,87,91,94,95,100,102,103,105}

Fifty-two^{32,35,36,38,41–,46,48,49,51,52,54,56–,58,61,62,66,68,69,}

72–,84,88–,93,95–,101,103,104,106 of the 71 U.S. studies implemented interventions among racial and ethnic minority populations. Among the other U.S. studies, a

Table 2. Population Characteristics of Study Participants

Characteristics	Number of studies reporting	Citation	Distribution median (IQI)
Age			
Reported in years	46	32–,34, 36, 37, 39, 42, 46, 47, 51, 56–,58, 60, 61, 63–,66, 68–,72, 74, 76–,78, 80–,86, 88–,91, 93, 100–,103, 105, 107	54 years (46–60 years)
Reported in ranges	25	35, 38, 43–,45, 48–,50, 52, 53, 59, 67, 73, 75, 79, 87, 92, 94–,99, 104, 106	Not applicable
Not reported	5	40, 41, 54, 55, 62	Not applicable
Sex^a			
Female	20	33, 39, 40, 44, 45, 50, 53, 58, 61, 65, 66, 69, 70, 74, 79, 82, 101, 102, 104, 105	68% (57%–76%)
Male	20	33, 39, 40, 44, 45, 50, 53, 58, 61, 65, 66, 69, 70, 74, 79, 82, 101, 102, 104, 105	32% (24%–43%)
100% female	2	36, 67	Not applicable
Not reported	1	62	Not applicable
Race and ethnicity, U.S. only (71 studies)			
American Indian/Alaska Native	1	85	42%
Asian American	4	39, 50, 65, 102	29% (9%–46%)
Black or African American	10	34, 37, 50, 53, 65, 67, 85, 87, 94, 105	33% (27%–50%)
Hispanic/Latino	7	34, 37, 40, 42, 50, 65, 102	45% (12%–58%)
White	12	33, 34, 40, 50, 53, 64, 65, 67, 85, 86, 94, 105	50% (22%–85%)
Recruited specific populations			
100% American Indian/Alaska Native	2	46, 58	Not applicable
100% Asian American	18	38, 45, 51, 56, 66, 68, 73, 74, 77, 79–,82, 97–,99, 101, 103	Not applicable
100% Black or African American	12	32, 42, 48, 54, 57, 61, 62, 69, 75, 90, 91, 95	Not applicable
100% Hawaiian and Pacific Islander	3	35, 76, 96	Not applicable
100% Hispanic/Latino	15	36, 41, 43, 44, 49, 52, 72, 78, 83, 84, 92, 93, 100, 104, 106	Not applicable
100% Serbo-Croatian	2	88, 89	Not applicable
Not reported	3	63, 70, 71	Not applicable
Employment status			
Employed	36	36, 38, 42, 43, 45, 49, 51, 54, 56, 61, 63, 66–,68, 72–,74, 76–,84, 86, 87, 90, 94–,96, 101, 102, 104, 107	48% (27%–58%)
Not reported	40	32–,35, 37, 39–,41, 44, 46–,48, 50, 52, 53, 55, 57–,60, 62, 64, 65, 69–,71, 75, 85, 88, 89, 91–,93, 97–,100, 103,105,106	Not applicable
Income^b			
≥50% with annual household income < \$40,000	30	36–,38, 42, 43, 46, 48, 49, 52, 53, 57, 61, 72, 74–,76, 78, 79, 82, 83, 90, 92–,95, 101, 102, 104, 105, 107	Not applicable
Focused on low-income communities ^c	5	33, 47, 65, 87, 106	Not applicable
Not reported	34	34, 35, 39–,41, 44, 50, 51, 54–,56, 58–,60, 62, 64, 67, 68, 70, 71, 73, 77, 80, 84, 85, 88, 89, 91, 96–,100, 103	Not applicable
Education			
Less than high school education	37	33, 36, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, 61, 66–,69, 73–,75, 77–,82, 85–,87, 89, 94, 95, 99, 100, 103, 104, 106	41% (28%–64%)
High school graduate or equivalent	25	33, 36, 39, 42, 43, 45, 46, 51, 54, 61, 66, 67, 69, 73–75, 79, 85–,87, 94, 95, 97, 100, 103	31% (25%–36%)
More than high school education	33	33, 36, 37, 39, 42, 43, 45, 46, 51, 56, 57, 61, 63, 66, 67, 69, 73–,76, 79, 83–,86, 91, 94, 95, 100, 102, 103, 105, 107	32% (16%–55%)
Not reported	18	34, 35, 41, 44, 47, 50, 53, 55, 58–,60, 62, 64, 65, 70, 88, 92, 96	Not applicable

(continued on next page)

Table 2. Population Characteristics of Study Participants (*continued*)

Characteristics	Number of studies reporting	Citation	Distribution median (IQI)
Insurance status			
Insured	46	32, 33, 36–38, 40, 42, 43, 45, 46, 48–54, 56, 57, 65–67, 70–72, 74, 76, 78–86, 90, 93, 94, 96, 100, 101, 103, 104, 106, 107	67% (46%–81%)
100% insured	8	34, 39, 47, 55, 59, 60, 88, 92	Not applicable
Not reported	20	35, 41, 44, 58, 61–64, 68, 69, 73, 77, 87, 91, 95, 97–99, 102, 105	Not applicable

^aOnly studies examining intervention impact on colorectal cancer screening.

^bSeven studies provided income data measured in various ways and could not be summarized.

^cStudy authors stated that interventions were implemented in communities with low income, but no specific numbers were provided. IQI, interquartile interval.

median of 50% of participants self-identified as White,^{33,34,40,50,53,64,65,67,85,86,94,105} 33% self-identified as Black or African American,^{34,37,50,53,65,67,85,87,94,105} 29% self-identified as Asian American,^{39,50,65,102} 45% self-identified as Hispanic or Latino,^{34,37,40,42,50,65,102} and 1 study reported that 42% of participants were American Indian/Alaska Native.⁸⁵

Changes in Breast Cancer Screening

Interventions engaging CHWs increased recent breast cancer screening by a median of 11.5 percentage points (PCT pts) (IQI=5.5–23.5; 16 study arms had 0% baseline)^{32,34–39,42,43,47–49,52–56,60,62–64,71,75,76,78,80,83,85,87–93,95,104,106} (Table 3). Interventions increased screening when stratified by CHW alone, CHW added, and CHW in a team, with CHW in a team showing the greatest increase (Table 3). One study⁵⁷ provided narrative results and reported no change in mammography screening rates. Two studies^{38,62} provided results on repeated screening and reported a 1.2 PCT pts decrease in mammography maintenance among intervention participants (range= –7.6 to 22.0).

Changes in Cervical Cancer Screening

Interventions increased recent cervical cancer screening by a median of 12.8 PCT pts (IQI=6.4–21.0; 14 study arms had 0% baseline).^{36,38,39,41,47,49,51,52,56,68,72,73,77,78,81,83,84,86,87,93–100,103,104,106,107} Interventions increased screening when stratified by CHW alone, CHW added, and CHW in a team, with CHW in a team showing the greatest increase (Table 3). Two studies provided narrative results and reported increased Pap test use.^{46,59} One study³⁸ provided results on repeated screening and reported a 22.0 PCT pts increase in Pap test maintenance among intervention participants.

Changes in Colorectal Cancer Screening

Interventions engaging CHWs increased colorectal cancer screening overall using colonoscopy, FOBT, FIT, or sigmoidoscopy by a median of 10.5 PCT pts (IQI=4.5–17.5; 7 study arms had 0% baseline).^{33,36,39,40,44,45,49,53,58,61,62,65,66,69,70,74,79,82,101,102,104,105}

Interventions increased screening when stratified by CHW alone, CHW added, and CHW in a team, with CHW in a team showing the greatest increase (Table 3). Colorectal cancer screening increased whether using colonoscopy (median increase of 10.5 PCT pts; IQI=7.1–13.0; 0 study arms had 0% baseline)^{39,61,62,70,104} or FOBT or FIT (median increase of 7.8 PCT pts; IQI=5.2–16.5; 2 study arms had 0% baseline).^{39,40,44,45,49,58,61,62,66,70,101,102,104,105} A small increase in screening was observed when sigmoidoscopy was used alone (median increase of 3.5 PCT pts; IQI= –2.3 to 58.5; 0 study arms had 0% baseline).^{61,62,104} Four studies reported an increase in screening using either colonoscopy or sigmoidoscopy (range=3.7–8.6 PCT pts; 0 study arms had 0% baseline).^{45,49,66,101} Two studies provided narrative results and reported increases in colorectal cancer screening using any test.^{50,67} No studies provided results on repeated screening.

Stratified Analysis Based on Intervention Characteristics

Single-factor stratified analyses were performed across all the 76 included studies. Detailed results can be found in Appendix Table 2 (available online). Interventions engaging CHWs produced similar increases in cancer screening whether inside^{32–45,48,49,51–54,56,58,61–66,68–89,91–96,98–106} or outside^{47,55,60,107} the U.S. Interventions that were designed to increase demand for and access to cancer screening services^{35,37,39,40,47,49,53,68,70,71,73,75,77,79,80,85,88–90,97,98,100,103,104,107} resulted in larger increases in screening than interventions increasing demand alone.^{32–34,36,38,41–45,48,51,52,54–56,58,60–66,69,}

Table 3. Impact of Interventions Engaging CHWs on Breast, Cervical, and Colorectal Cancer Screening

Cancer type/screening test/effect of CHW	Citations	Median increase (IQR), PCT pts
Breast cancer		
Mammography		
Overall (42 study arms)	32, 34–39, 42,43, 47–49, 52–56, 60, 62–64, 71, 75, 76, 78, 80, 83, 85, 87–93, 95, 104, 106	11.5 (5.5–23.5)
CHW alone (21 study arms)	35, 39, 43, 47, 49, 52, 54, 55, 62, 71, 75, 76, 78, 83, 85, 88, 89, 91, 95, 104	9.2 (4.7–22.8)
CHW added (6 study arms)	32, 34, 43, 48, 60, 80	11.0 (2.3–13.5)
CHW in a team (17 study arms)	34, 36–38, 42, 43, 48, 53, 55, 56, 63, 64, 87, 92, 93, 106	13.7 (9.1–29.7)
Cervical cancer		
Pap test		
Overall (31 study arms)	36, 38, 39, 41, 47, 49, 51, 52, 56, 68, 72, 73, 77, 78, 81, 83, 84, 86, 87, 93–100, 103, 104, 106, 107	12.8 (6.4–21.0)
CHW alone (18 study arms)	39, 41, 47, 49, 52, 72, 73, 78, 83, 84, 86, 95, 96, 99, 100, 103, 104, 107	13.7 (7.6–20.2)
CHW added (3 study arms)	68, 77, 94	11.0 (range=6.4–16.8)
CHW in a team (10 study arms)	36, 38, 51, 56, 81, 87, 93, 97, 98, 106	15.4 (3.0–34.0)
Colorectal cancer		
Colonoscopy, FOBT/FIT, or sigmoidoscopy		
Overall (25 study arms)	33, 36, 39, 40, 44, 45, 49, 53, 58, 61, 62, 65, 66, 69, 70, 74, 79, 82, 101, 102, 104, 105	10.5 (4.5–17.5)
CHW alone (15 study arms)	33, 39, 40, 45, 49, 61, 62, 66, 70, 79, 82, 101, 104	10.5 (4.0–13.0)
CHW added (4 study arms)	44, 102, 105	6.5 (5.1–29.7)
CHW in a team (8 study arms)	33, 40, 45, 58, 62, 74, 93, 96, 104, 107	16.1 (4.4–27.3)
Colonoscopy		
CHW alone (7 study arms)	39, 61, 62, 70, 104	10.5 (7.1–13.0)
FOBT/FIT		
Overall (17 study arms)	39, 40, 44, 45, 49, 58, 61, 62, 66, 70, 101, 102, 104, 105	7.8 (5.2–16.5)
CHW alone (12 study arms)	39, 40, 45, 49, 61, 62, 66, 70, 101, 104	7.7 (3.7–17.9)
CHW added (4 study arms)	44, 102, 105	6.8 (5.1–29.8)
CHW in a team (3 study arms)	44, 58, 102	13.5 (range=12.5–28.6)
Sigmoidoscopy		
CHW alone (5 study arms)	61, 62, 104	3.5 (–2.3, 58.5)
Colonoscopy or sigmoidoscopy		
CHW alone (4 study arms)	45, 49, 66, 101	6.6 (4.3, 8.2)

CHW, community health worker; FIT, fecal immunochemical test; FOBT, fecal occult blood test; IQR, interquartile interval; PCT pt, percentage point.

72,74,76,78,81–,84,86,87,91–,96,99,101,102,105 Only 1 study¹⁰⁶ was designed to improve access to services alone.

Screening increased regardless of the number of intervention components, but larger increases were observed when CHWs implemented 4 or more components.^{35,39,47,49,73,88–,90,97,98,103} Greater increases in screening were reported for interventions that provided group education^{35,36,38,40,42,45,47–,49,51,56,61,62, 66,68,69,71–,74,76–,84,87,89,96,98,101,103,105,107} than for those that provided one-on-one education.^{32–,34,36,37,39, 41,43,44,48,49,52,54–,56,58,60,64,65,69,75,82,85–,91,93–,95,97–,102,104}

Among interventions that increased access to services, the largest increases were observed when CHWs assisted with translation^{47,73,97,103} or addressed transportation barriers.^{35,47,73,88–,90,97,98,103}

Interventions were effective whether CHWs delivered services face to face,^{34,35,38,40–,42,45,48,51,60–,63,68,71, 72,76,78,81,83,84,87,91,92,94–,96,98,103,105,106} remotely,^{37,53,55,64, 65,70,102} or a combination of the 1,^{33,36,39,43,44,47, 49,52,54,56,58,66,69,73–,75,77,79,80,82,85,86,88–,90,93,97,99 –,101,104,107} with slightly larger increases in screening reported when both methods were used. Interventions were effective across different levels of intensity because similar increases were reported when CHWs met with study participants one^{34,35,41,47,60,63,71,72,88,97,99,105,106} or more times.^{32,33,36,40,42,43,45,49,51–,56,61,62,64–,66,68–,70,75 –,80,82–,86,}

^{89–,91,93–,96,98,100,101,103,104,107} The duration of interventions with multiple sessions ranged from half a month to 60 months (median=4 months). Although interventions

were effective across durations, slightly larger effects were reported by studies with longer intervention durations.^{34,36–,38,49,51,54,56,58,81,83,85–,89}

Stratified Analysis Based on Community Health Workers' Work Characteristics

Detailed results can be found in [Appendix Table 3](#) (available online). Interventions were effective across the 9 types of core roles CHWs performed in the included studies, although interventions where CHWs provided care coordination, case management, and system navigation^{34–,37,39,47,49,51–,54,58,65,66,68,70,71,73–,77,80,85,88–,90,93,95,97–,100,103,104,106,107} or focused on building individual and community capacity^{32–,45,47–,49,51,52,54–,56,58,61–,66,68–,80,82–,92,94–,103,105–,107} reported the largest increases. No clear pattern was observed across the number of core roles CHWs performed.

Stratified Analysis Based on Demographic Characteristics

Detailed results can be found in [Appendix Table 4](#) (available online). Interventions were effective for age-appropriate populations with different racial, ethnic, and socioeconomic backgrounds. Interventions engaging CHWs were effective across the racial and ethnic groups examined; however, a larger increase was observed among Asian American populations (median increase of 12.1 PCT pts; IQI=6.1–45.3)^{38,45,51,56,66,68,73,74,77,79–,82,97–,99,103} than among Black or African American (median increase of 7.8 PCT pts; IQI=2.2–14.0)^{32,42,48,54,61,62,69,75,91,95} or Hispanic or Latino populations (median increase of 8.6 PCT pts; IQI=1.4–14.0).^{36,41,43,44,49,52,72,78,83,84,92,93,100,101,104,106} Even though only a few studies recruited exclusively from American Indian Alaskan Native⁵⁸ or Pacific Islanders,^{35,76,96} large increases in screening use were observed. Screening use increased for populations with different educational, employment, insurance, and income levels, with the largest increase observed among low-income communities.^{47,65,87,106} Interventions were effective regardless of whether participants had a regular source of health care.

Interventions implemented among populations with baseline screening rates of 0%^{33,34,37,41,43,44,47,51–,53,55,56,58,60,64,65,72–,74,76,79,85,86,90,93,94,96,100,103,107} or below 50%^{35,38,39,45,48,49,61,62,66,70,77,78,83,87,89,91,95,97–,99,101,102,104,106} reported greater increases than those implemented among populations with higher baseline screening rates, although screening use increased across baseline levels.

DISCUSSION

This systematic review found that interventions engaging CHWs increased breast, cervical, and colorectal cancer screening use. Findings from this review served as the basis for Community Preventive Services Task Force recommendations to use these interventions to increase screening for breast cancer by mammography,¹⁰⁸ cervical cancer by Pap test,¹⁰⁹ and colorectal cancer by colonoscopy or FOBT.¹¹⁰ Currently, there are approximately 67,000 CHWs employed in the U.S., and this number is expected to grow by 16% from 2021 to 2031.¹⁰

Downstream health benefits from increases in breast, cervical, and colorectal cancer screening could include earlier diagnosis and treatment and reduced cancer-related morbidity.^{2–,4,112} Interventions produced similar results whether inside or outside the U.S. They were effective across different settings with different population and intervention characteristics, suggesting that intervention composition can be flexible. CHWs worked alone or as part of a team and implemented interventions with a heterogeneous mixture of components, duration, and intensity. This suggests that decision makers have flexibility in considering the local population, needs, and context when designing interventions and determining the optimal extent of CHW involvement.

Interventions where CHWs delivered the intervention with other team members (CHW in a team) were more effective at increasing screening than those where CHWs independently delivered the entire intervention (CHW alone). One possible explanation is that interventions engaging CHWs as part of a team tend to deliver more intervention components (median of 4 components) than interventions in which CHWs deliver services alone (median of 1 component). Both the current review and the previous Community Guide reviews on multicomponent interventions^{27–,29} found that cancer screening increased with the number of intervention components.

Interventions engaging CHWs were more effective when designed to increase both demand for and access to cancer screening services, as found in previous Community Guide reviews.^{27–,29} Nearly all studies included in this review provided either group or one-on-one education. Interventions where CHWs provided group education reported larger increases in cancer screening than those with one-on-one education. Similar findings were reported by Seven et al., who compared the effects of group education with that of individually delivered education on breast cancer screening.¹¹³ These findings may suggest that social norms and modeling play an important role in motivating participants to obtain screening because seeing others such as themselves overcome

similar barriers to receive cancer screening could influence participants' decision to receive screening.¹¹⁴ Studies have shown that group education resulted in similar cancer screening rates,^{115,116} knowledge,¹¹⁵ or satisfaction with care¹¹⁷ to individual education while costing less.¹¹⁶

For interventions offering multiple sessions, those spanning 6 months or longer were more effective than those with shorter durations. This might suggest that extending the overall duration of interventions might lead to a greater increase in cancer screening. Programs may choose to retain CHWs once trained and continue offering services on a recurring basis.

Several core roles were either not reported or not performed by CHWs included in this review. These roles include advocating for individuals and communities, implementing individual and community assessment, providing direct services, and participating in evaluation and research. Interventions engaging CHWs already apply many elements of community-based participatory research to assess community needs. Involving CHWs in needs assessment could ensure that the community's needs are understood and addressed. CHWs can also provide valuable input from intervention conceptualization through evaluation.

Most studies did not report on CHW reimbursement, the review team cannot determine whether CHWs received payments for their services, and no conclusions could be made on whether providing reimbursement could improve intervention effectiveness. Policies regarding payment from insurance payers vary by state, with only 7 authorizing Medicaid or other insurer reimbursement for CHW services.¹¹⁸ In other countries, CHWs such as social prescribing link workers¹¹⁹ in the United Kingdom and Aboriginal and Torres Strait Islander Health Workers in Australia¹²⁰ are paid positions.

Several interventions reported additional benefits of engaging CHWs in the delivery of services. CHWs reported satisfaction with their work^{55,105} and that the experience had a positive impact on their personal development.⁴⁷ CHWs in 1 study expressed an interest to continue their work.⁶⁶ Participants expressed gratitude to CHWs,³⁵ and some reported wishing to participate as CHWs in the future.⁶⁸ One study reported an increase in check-up appointments in the intervention city, possibly indicating the intervention increased general health-care usage in addition to increasing screening.³⁸

Interventions were effective when implemented among uninsured and low-income populations and when focusing on specific racial and ethnic groups. This is particularly important because in 2018, people without health insurance or with incomes below 139% of the

federal poverty level had lower cancer screening use than their counterparts.⁵ Asian American persons, American Indian persons, and Alaska Native persons also had lower cervical and colorectal cancer screening rates than other racial and ethnic groups. Foreign-born persons are less likely to be screened for breast, cervical, and colorectal cancers than those born in the U.S.¹²¹ Interventions where CHWs provided language translation services^{47,73,97,103} reported large increases in screening, suggesting that language is an important barrier faced by non-English-speaking populations. CHWs often closely identify with the populations they serve and can be especially effective at addressing the existing disparities and improving health equity.

Advances in technology have led to a rapidly changing healthcare industry and provide opportunities for CHWs to utilize different intervention delivery methods. Video conferencing technologies allow for face-to-face communication through a remote connection, potentially expanding the reach of one-on-one or group education, especially for those in rural areas or with transportation barriers. As medical facilities continue to integrate telemedicine and adopt new technologies, there may be increased opportunities for streamlining appointment scheduling, allowing CHWs to better serve their clients.

Additional research and evaluation are needed to fill the remaining gaps in the evidence base. The impact of interventions engaging CHWs on repeat screening could not be determined, and few studies included American Indian/Alaska Native populations. In addition, more evidence is needed to determine whether intervention effectiveness is influenced by the supervision, training, or compensation of CHWs or by involving CHWs in research and evaluations.

Limitations

This review has several limitations. Over half of the included studies provided a limited description of interventions or populations, and many relied on convenience sampling. Some studies relied on self-reported screening results without verification. However, although self-reported breast, cervical, and colorectal screening outcomes are often overestimated, these measures are still considered reasonably valid.^{122–125} Finally, publication bias cannot be ruled out, and it is possible that studies with null results are missing from the data set.

CONCLUSIONS

The Community Preventive Services Task Force also recommends interventions engaging CHWs to increase

breast,¹⁰⁸ cervical,¹⁰⁹ and colorectal cancer screening¹¹⁰; improve cardiovascular disease management¹²⁶; improve diabetes prevention¹²⁷; and improve diabetes management.¹²⁸ The findings that provided the basis for those recommendations, combined with findings from this review, suggest that interventions engaging CHWs are effective in preventing and managing multiple chronic conditions. A systematic review of the economic evidence found that interventions engaging CHWs to increase cervical and colorectal cancer screening use are cost-effective and that interventions to increase colonoscopy use are associated with net healthcare cost savings.¹²⁹ As of June 2016, 6 states had enacted laws to authorize a certification process for CHWs, 5 of which authorized the creation of standardized curricula on the basis of core competencies.¹¹¹ In addition, 7 states authorized Medicaid or other insurer reimbursement for services performed by CHWs.¹¹⁸ Standardizing the role of CHWs and providing certification opportunities could ensure CHW proficiency and increase their credibility. Allowing for reimbursement could also encourage more people to become CHWs, reduce attrition, and enable more decision makers to fund interventions that engage CHWs.

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SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at <https://doi.org/10.1016/j.amepre.2022.10.016>.

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