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Systematic Literature Review

The Cost-Effectiveness of Community Health Workers in Primary Health Care: A Systematic Review

Tijs Van Iseghem, MSc, Laura Vroonen, MSc, Emilie Op de Beeck, MSc, Annick Meertens, MSc, Caroline Masquillier, PhD, Edwin Wouters, PhD, Nick Verhaeghe, PhD

ABSTRACT

Objectives: Global interest in community health worker (CHW) programs in primary health care (PHC) is rising because of their potential to advance universal health coverage and other global health goals. This systematic review examines the evidence on the cost-effectiveness of CHW interventions worldwide, with a focus on vulnerable populations in PHC settings.

Methods: A systematic review was conducted using the PubMed, Embase, Web of Science Core Collection, SCOPUS, and EconLit databases. The search was last updated on May 13, 2025. Two reviewers independently selected articles, rated their quality, and extracted relevant data. Included articles had to be full economic evaluations comparing CHW interventions to usual care without CHWs, focusing on vulnerable populations in PHC. A standardized data extraction template was used, and the reporting quality was assessed using the Consolidated Health Economic Evaluation Reporting Standards checklist.

Results: A total of 50 articles were included, originating from 25 countries. All but 1 of the economic evaluations were disease-specific, focusing mainly on maternal, newborn and child health, type 2 diabetes mellitus, tuberculosis, cardiovascular disease, mental health, and HIV. Most articles (n = 35, 70%) indicated that CHW interventions were (potentially) cost-effective. Fourteen out of these 35 articles can substantiate their findings with a probabilistic sensitivity analysis.

Conclusions: This review found that CHWs can be cost-effective across multiple health domains, both in low-and middle-income countries and high-income countries. The lack of probabilistic sensitivity analysis, together with heterogeneity in contexts, interventions, and methods used to assess the cost-effectiveness of the CHW interventions makes it difficult to draw general conclusions about the value for money of CHWs in PHC.

Keywords: community health workers, cost-effectiveness, primary health care.

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Highlights

- A previous review found that using community health workers (CHWs) in primary health care (PHC) programmes can be a cost-effective intervention in low-and middle-income countries (LMICs). With numerous new economic evaluations published since 2015, including from high-income countries (HICs), a comprehensive review of the latest evidence was warranted.
- This review found that involving CHWs can be cost-effective, mainly for MNCH, TB, HIV, and mental health in LMICs, but also for T2DM and CVD management in LMICs and HICs.
- This systematic overview of evidence is crucial to guide funders, policy makers, and researchers in strengthening PHC trough CHW programs. Strong conclusions about the cost-effectiveness of CHWs are not possible because of the heterogeneity in context, activities, and methods used.

Introduction

Primary healthcare (PHC) systems across the globe are experiencing mounting pressure due to demographic shifts,[1] resource constraints,[2] and workforce shortages.[3] Population aging and the growing burden of noncommunicable diseases have escalated the demand for healthcare services,[4] both in PHC and specialized services.[5] Additionally, the COVID-19 pandemic has exposed the fragility of PHC, highlighting the need for resilient PHC systems.[6] As the first point of contact for individuals within national health systems, PHC plays a vital role in ensuring accessible and equitable services.[7] Its sustainability—defined as the capacity to consistently deliver high-quality care while efficiently utilizing resources is—essential. However, the growing strain on PHC threatens both accessibility and quality of care, highlighting the need for reforms to strengthen PHC systems worldwide.[8]

Community Health Workers (CHWs) have been recognized as one potential solution to address these growing challenges.[9] CHWs are often the first point of contact in resource constrained countries.[10] They are trusted community members who serve as intermediaries between healthcare consumers and providers,[11] promoting health in underserved groups (ie, indigenous ethnic groups, immigrants and (other) socially excluded populations) that have traditionally lacked adequate access to care.[12] CHWs have a close understanding of the communities they serve, often sharing ethnicity, socioeconomic status, life experiences, or language.[11,13] CHWs offer culturally appropriate health-related services, including preventive, health promoting, and sometimes curative care,[14] making them a vital resource for improving health outcomes in low-income, underserved populations.[15]

Research on the effectiveness of CHWs has expanded across multiple health domains. CHWs have been effective not only in increasing uptake of cancer screening,[16] managing hypertension,[17] and controlling diabetes[18] but also in enhancing maternal and child health, improving immunization rates, and combating infectious diseases.[19] They have contributed to improving access to care for rural populations[20] and reducing health inequities.[21] CHWs can thereby generate positive outcomes in diverse settings, reinforcing their value in supporting PHC systems.[12,21]

There is a large body of literature that provides evidence supporting the effectiveness of CHW interventions. CHWs potential to address PHC challenges also, however, depends on costs given increasing health needs and limited resources for health. Therefore, a comprehensive review of the cost-effectiveness of these initiatives is necessary. Building on a 2015 review,[22] assessment of the cost-effectiveness of CHW interventions can help in evaluating (long-term) outcomes and the scalability of CHW interventions. This review is particularly relevant because CHWs are increasingly seen as being critical to achieving universal health coverage.[23,24]

This review adds to current literature by providing a comprehensive examination of economic evaluations of CHWs in PHC globally, with a focus on vulnerable populations in PHC settings. The research question of this systematic review is: "What is the evidence on the cost-effectiveness of CHW interventions in primary healthcare?" By extracting and analyzing methodological and outcome data, the study aims to clarify how CHW interventions are evaluated on their cost-effectiveness relative to usual care. This evidence is crucial to inform policy makers and researchers about the potential of CHW programs to strengthen PHC and achieve sustainable development goals.

Methods

This review was performed in line with the Preferred Reporting Items for Systematic reviews and Meta-Analyses guidelines for systematic reviews.[25] The protocol can be found on the International Prospective Register of Systematic Reviews, ID CRD42023404876.

Eligibility Criteria

Table 1 depicts a detailed overview of the specific elements of the research question using the Population, Intervention, Comparison, Outcomes, and Study (PICOS) framework,[28] together with the inclusion and exclusion criteria. The population was defined as vulnerable populations or socioeconomically disadvantaged groups, the typical focus of CHW interventions. Within the intervention component, the following definitions were used for CHWs and PHC. We defined a CHW based on the work of Rosenthal et al,[29] as well as the World Health Organization (WHO) definition[26]: "*A community health worker (CHW) helps to reduce health inequalities. He/she is a trusted member of the community in which he/she works and acts as a liaison between health and welfare services and the community in vulnerable neighborhoods. This facilitates access to services and improves service quality. The CHW deploys activities such as health education, informal counseling, social support and advocacy.*" Defining PHC, this review made use of the Alma-Ata Declaration: "*Primary healthcare is the first level of contact for individuals and the community with the national health system and addresses the main health problems in the community, providing health promotion, preventive, curative and rehabilitative services accordingly.*"[7] Full economic evaluations were the only eligible study design, with outcomes typically expressed as cost-effect, cost-utility, or cost-benefit. Studies written in any other language than English were translated using DeepL Translator (DeepL SE, Cologne, Germany).

Information Sources

The following 5 databases were searched for peer-reviewed articles[27]: PubMed (via Ovid MEDLINE), Embase, Web of Science Core Collection, SCOPUS, and EconLit. In addition to the databases, backward citation tracking was applied by screening the reference lists of included articles.

Table 1. PICOS framework with inclusion and exclusion criteria.

PICOS	Inclusion criteria	Exclusion criteria
Population	Vulnerable populations or socioeconomically disadvantaged populations groups—generally defined as those with low socioeconomic status, low income, low educational attainment, or from areas defined as socioeconomically disadvantaged (often characterized by low-income levels)[26]	Not applicable
Intervention	CHW interventions in PHC. See Appendix File 3 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.09.004 for all the included synonyms of CHWs.	Other interventions
Comparison	Usual care (= without CHWs)	Usual care which involved CHWs
Outcome	Cost-effectiveness, both in terms of costs and consequences: cost-effect, cost-utility, cost-benefit.	Other outcomes (eg, only costs or only effects)
Study design	Full economic evaluations as defined by Drummond: "the comparative analysis of alternative courses of action in terms of both their cost and consequences,"[27] meaning articles should (1) compare 2 or more alternatives; and (2) examine both costs (inputs) and consequences (outputs) of the alternative. ie, Cost-effectiveness analysis, cost-utility, cost-benefit analysis, cost-minimization analysis	Other study designs, such as partial economic evaluations, cost-of-illness studies, reviews, meta-analyses, commentary, protocol, congress abstract, or report

CHW indicates community health worker; PHC, primary healthcare.

Search Strategy

Combining all the elements of the PICOS framework resulted in a too narrow search strategy, potentially excluding many relevant articles. The authors, in collaboration with a university librarian, therefore opted to develop the search strings based on 3 key concepts: CHWs, PHC, and cost-effectiveness. The original search string for PubMed was built in Ovid MEDLINE (see Appendix File 1 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.09.004) following the PRESS checklist,[30] and this search string was then adapted to the requirements of the other databases. For the concept of CHWs, the authors performed a preliminary literature search looking for alternative terminology on CHWs. All included terms can be found in Appendix File 1 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.09.004. For the purposes of this review, terms that could be classified as health professionals according to the WHO mapping definition of the profession (eg, nurses) were excluded.[31] Validated search strings were used for economic evaluations[32] and for PHC.[33] The validated PHC search string was translated for use in Ovid MEDLINE and complemented with additional synonyms. The final search strings were first launched in the databases on the February 17, 2023. Email alerts were activated on all databases to receive updates on relevant articles after this date. The search was last updated on May 13, 2025.

Conducting the Search and Selection of the Studies

All identified articles were collected in Rayyan.[34] After the removal of duplicates, the identified articles were first screened on title and abstract, on preestablished inclusion and exclusion criteria (Table 1). The retaining records on title and abstract were then assessed on full text. Reasons for exclusion during the full-text screening were tabulated and included in the Preferred Reporting Items for Systematic reviews and Meta-Analyses flow diagram.[25] Both screening phases were performed by 3 independent researchers (T.V.I., L.V., and E.O.d.B.). After a piloting phase to harmonize the reasons for exclusion, articles were divided among the 3 researchers so that each article was screened by 2 of them (ie, each researcher screened two-thirds of the articles). Discrepancies between researchers in the first screening phase were solved by transferring the article to the second screening phase. In case of discrepancies in the second phase, a fourth researcher (N.V.) was consulted to cast an independent vote to conclude inclusion or exclusion. Included articles after full-text screening were subjected to the quality assessment and data extraction. Articles identified through the backward citation tracking were also added into Rayyan and underwent the same process. Rayyan was utilized primarily to assist in the initial title and abstract screening phase and later in the full-text screening phase. Human oversight was maintained at all stages. Researchers did not rely on AI recommendations for inclusion/exclusion decisions. AI ranking was used only to streamline the order of review, not to make final determinations.

Data Extraction and Data Items

Data from the included articles were extracted by 2 researchers (T.V.I. and N.V.) using a standardized data extraction template[35,36] in Microsoft Excel. This template included the general study characteristics: first author; year of publication; country; target population; healthcare domain; type of intervention; and comparator. Further data extracted included the study methods of interest: type of economic evaluation; analytic approach; study perspective; time horizon; discounting; thresholds; intervention costs; data sources; effects; and sensitivity analysis, and finally, information on the (incremental) analyses and the author's conclusion.

Reporting Quality Assessment of Selected Studies

To assess the reporting quality, the included studies were subjected to a double-blind reporting quality assessment using the Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022).[37] This reporting guideline was specifically developed for economic evaluations of health interventions to ensure that health economic evaluations are identifiable, interpretable, and useful for decision making. Studies were not removed based on their reporting quality but the score distribution (Yes, No, and Not Applicable) was taken into consideration. "Yes" was given when an item was reported, "No" was given when an item was not reported. "Not applicable" was given when studies could not report on an item. Item 16, for example, is only relevant for modeling studies. The quality assessment was performed by 2 independent researchers (T.V.I. and A.M.). Each researcher reviewed and scored the studies independently. Once both assessments were completed, results were compared, and any discrepancies were discussed and resolved through consensus or with the involvement of a third reviewer (N.V.). Because there is a lack of generally accepted method for critically assessing economic assessments, discussions on study quality were guided using the number of reported CHEERS items and the criteria listed by Henrikson and Skelly.[38]

Data Processing

A narrative synthesis of the results was performed for the main elements of the data extraction template. The findings of each study were analyzed and described in detail, considering similarities and differences in context, outcome, and methodological quality. A nuanced overview of the available knowledge was therefore obtained despite the diversity in studies. To compare cost-effectiveness data, incremental cost-effectiveness ratios (ICERs) and incremental cost-utility ratios (ICURs) were converted to 2024 US Dollars (https://eppi.ioe.ac.uk/costconversion/). Meta-analysis was not possible because of heterogeneity of the included articles.

Results

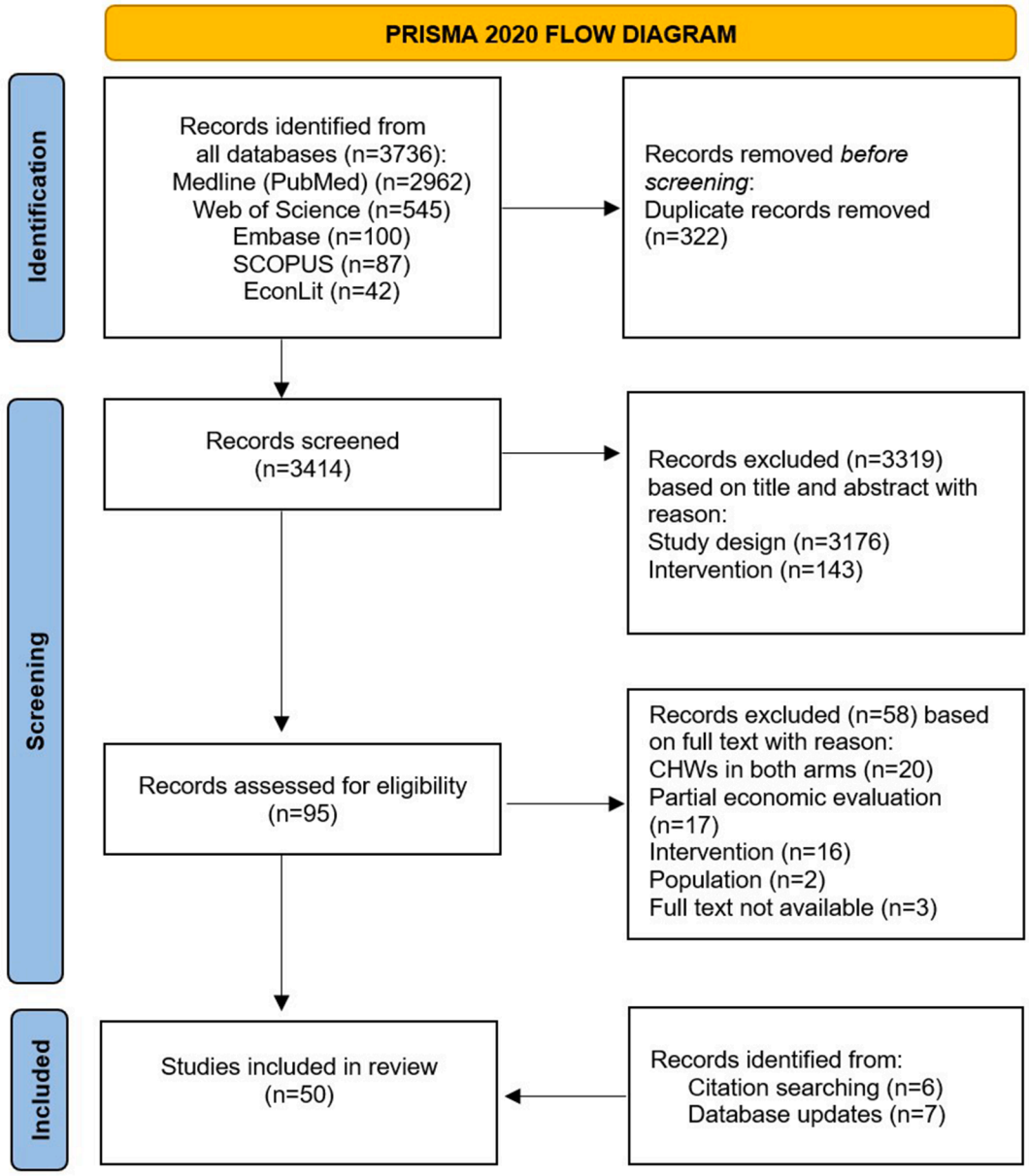
Study Selection

The combined search of selected databases resulted in 3736 records. After duplicates were removed, 3414 records remained. During the first screening on title and abstract, 3319 were excluded, largely because they were not full economic evaluations or did not involve CHWs. In the second screening of the full texts, 58 studies were excluded, mainly because of CHWs being included in both control and comparison arms. Another thirteen studies were included after searching the reference lists of included studies and through database updates. Three articles were excluded as the full texts of the articles were unavailable; the study team had attempted to find texts via multiple channels, including sending personal requests to the authors. After both screening phases, including additional cross-references, 50 studies were included (Fig. 1).

Study Characteristics

The publication year of the 50 included studies ranged from 1984 to 2025 with 15 studies published since 2020. This review

Figure 1. PRISMA flow diagram.



identified evidence from the following countries: Argentina,[39] Australia,[40] Bangladesh,[41,42] Burundi,[43] Chile,[44] Ecuador,[45] Ethiopia,[46,47] Ghana,[48,49] India,[50-56] Kenya,[57-59] Mali,[60] Mexico,[61] Nepal,[62,63] Niger,[64] Pakistan,[65,66] South Africa,[67-71] Uganda,[72] United States,[73-81], Zambia,[82] and 5 multicountry studies.[83-88]

Synthesis of Results

Tables 3 and 4 provide an overview of the main elements of the included articles. A narrative synthesis of the main findings can be found below.

Context and activities

The interventions carried out by the CHWs varied depending on the national context, the national or local PHC system in which the interventions were integrated, and the healthcare domain in which the CHWs were active. Although the contexts of the studies demonstrate limited variability, because they predominantly focus on low- and middle-income countries (LMICs), there is significant heterogeneity in the range of activities performed by CHWs across these settings. All but 1 of the economic evaluations were disease-specific, focusing mainly on maternal, newborn and child health (MNCH) (n = 13, 26%), type 2 diabetes mellitus (T2DM) (n = 10, 20%), cardiovascular disease (CVD) (n = 6, 12%), mental health (n = 5, 10%), tuberculosis (TB) (n = 6, 12%), and HIV (n = 4, 8%). Other domains were covered by 2 or fewer included articles: epilepsy, asthma education, cancer screening and control of mosquito-borne diseases. One article[58] that had a broader scope focused on extending and improving access to primary healthcare in Kenya's Western Province, with CHWs acting as first contact providers for basic health needs. The study reported the project was viable and offered a cheaper approach to providing minimal access to PHC.[58] For T2DM, CHWs provided

culturally tailored education,[71,74,75] general support in disease management[40,61,79,81] and lifestyle interventions.[51,77] In mental healthcare, CHWs principally performed contextually adapted psychological treatment and/or counseling.[50,52-54,56] In TB care, CHWs were mainly involved in directly observed therapy (DOT).[46,65,69] In HIV care, testing[59,82] and patient support[68,70] were seen. Other articles reported that CHWs performed pregnancy surveillance[42] and triage,[83] offered support in goal setting[79] and (chronic) disease management,[40] and engaged in health promotion,[82] (psycho)education or counseling,[53,62] among others.

Methodological aspects

Methodological heterogeneity was observed throughout the included articles. This could be seen in the applied types of economic evaluations, analytical approaches, and perspectives. Table 2 provides an overview of the main methodological aspects of the included economic evaluations. The comparator (ie, the strategy with which the CHW intervention was compared) included mostly usual care, enhanced usual care, or a waitlisted control group that received the intervention after a certain amount of time. Enhanced usual care was reported in 5 articles[50,52,53,56,79] and implied supporting the control group with additional information through brochures and information sessions but without involving CHWs. Although usual care was reported as the comparator in most articles (n = 35, 70%), information about what this entailed exactly was often lacking. Within the 18 model-based approaches, 11 Markov models were used: Archimedes model,[74,77] CDC Diabetes model,[75] Michigan model,[79] or a self-developed Markov model.[43,55,61,67,71,76,80] Other model-based approaches were decision analytical trees,[57,72,87] decision analytical networks,[64] a mathematical model,[59] a compartmental model,[82] and an adapted HIV Synthesis Model.[88] Figure 2 displays an alluvial diagram, linking the articles' countries with the corresponding healthcare domains and type of economic evaluation. This plot once again shows the heterogeneity in included articles but also displays some key trends. First, the diagram shows that articles on mental healthcare all originated from India and were evaluated through cost-effectiveness analyses (CEAs) and cost-utility analyses (CUAs). Second, the articles on T2DM came from the United States and were evaluated through CUAs. Third, articles on MNCH originated from a variety of low-income countries and were evaluated through CEAs.

Cost-effectiveness outcomes

Comparing the CEAs was not possible because of variability in how the outcomes—in terms of ICERs—were expressed. ICERs were study specific and expressed as cost per additional screening, cost per patient treated, cost per case/infection averted, cost per event avoided, cost per death averted, cost per life-year saved, cost per vaccinated child, cost per prevented repeated birth, cost per mmHg reduced, cost per mean reduction in HbA1c level, cost per point lower on Goldberg's questionnaire, etc. This made data aggregation and generalization of the CEA impossible.

Within the CUAs, large ranges of ICURs were observed, with the costs per quality-adjusted life-year (QALY) gained ranging from −$2217.44 to $46 735, with a median of $3966.5 (2024 US$). The costs per disability-adjusted life-year (DALY) averted ranged from −$1409 to $39 952, with a median of $703 (2024 US$). Furthermore, these ICURs require comparison with a threshold to determine cost-effectiveness. Five CUAs studies did not report a threshold. From the remaining CUAs, most articles (n = 12, 24%) followed the WHO-CHOICE guidelines[89] using national global domestic product (GDP): below 3 times the national GDP is considered cost-effective, below 1 time the GPD is considered very cost-effective.

Bringing together the ICERs, ICURs and thresholds described earlier, 35 out of the 50 included articles reported that the CHW intervention was cost-effective compared with usual care. However, only 14[42,43,47,48,54,57,61,63,64,66,74,75,82,87] out of these 35 articles performed probabilistic sensitivity analysis (PSA) to give further vital information regarding the robustness of the estimates.

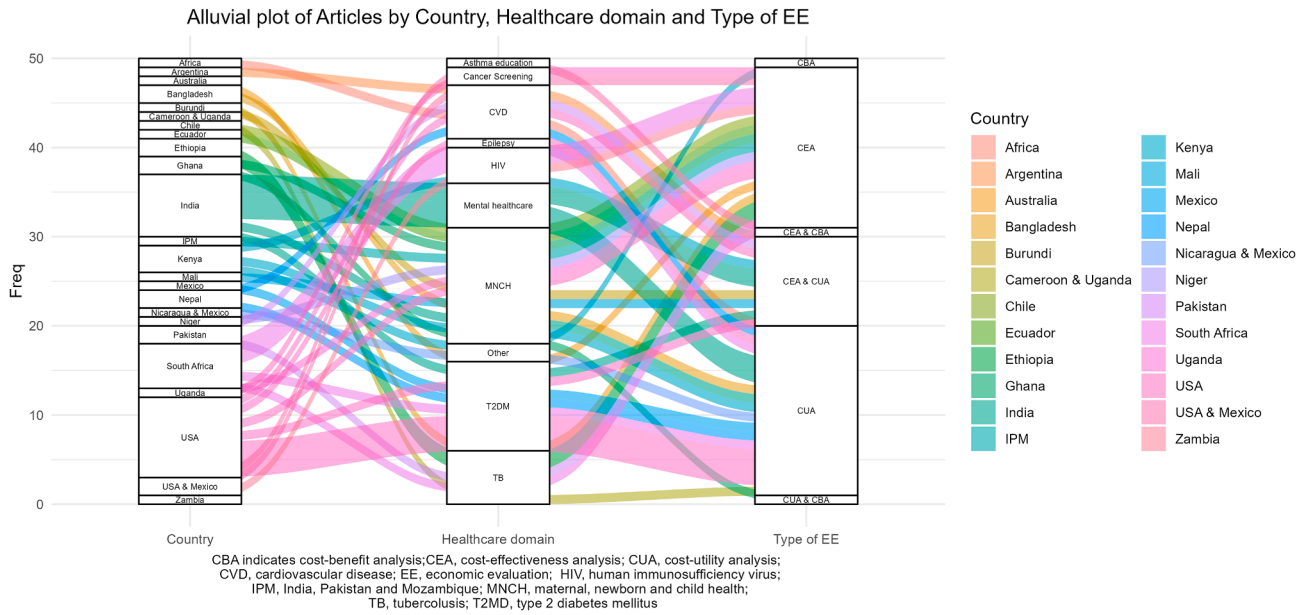
By grouping the articles by health domain, some stronger conclusions may be made. Within the domains of MNCH, T2DM, TB, HIV, CVD, mental health, and MNCH, the articles indicated that CHW interventions were cost-effective or at least had the potential to be (Table 3). Costs per QALYs gained seemed substantially higher when CHWs are involved in T2DM care with ICURs exceeding $10 000/QALY gained, compared with TB or HIV care, for which ICURs all lay below $1000. For the other health domains, meaningful patterns could not be traced with

Table 2. Methodological aspects of the included studies.

Methodological aspect	Count
Type of economic evaluation	cost-effectiveness analyses (CEA) (n = 19, 38%) cost-utility analyses (CUA) (n = 19, 38%) cost-benefit analysis (CBA) (n = 1, 2%) combination of CEA, CUA or CBA (n = 11, 22%)
Analytical approach	trial-based analyses (n = 31, 62%) model-based approaches (n = 18, 36%), of which 11 articles used Markov models combined trial and modeling approaches (n = 1, 2%)
Analytic perspective, based on the taxonomy of Sittimart et al[84]	healthcare sector perspective (n = 21, 42%) (limited) societal perspective (n = 15, 30%) healthcare provider perspective (n = 7, 14%) healthcare payer perspective (n = 3, 6%) multiple perspectives (n = 5, 10%)
Sensitivity analyses	one-way sensitivity analysis (n = 25, 50%) probabilistic sensitivity analysis (n = 17, 34%) did not perform or did not report a sensitivity analysis (n = 10, 20%)

CEA indicates cost-effectiveness analysis; CBA, cost-benefit analysis; CUA, cost-utility analysis.

Figure 2. Alluvial diagram.



CBA indicates cost-benefit analysis;CEA, cost-effectiveness analysis; CUA, cost-utility analysis; CVD, cardiovascular disease; EE, economic evaluation; HIV, human immunosufficiency virus; IPM, India, Pakistan and Mozambique; MNCH, maternal, newborn and child health; TB, tubercolusis; T2MD, type 2 diabetes mellitus

confidence given that the number of studies was insufficient to draw conclusions (Table 3).

MNCH

Eight studies[43,45,49,55,57,60,64,72] focused on interventions for children under 5 years old. Two Markov model-based studies reported ICURs of −$1409[43] and $211[55] per DALY avoided (2024 US$), respectively, for CHWs providing oral rehydration salts and facilitating measles vaccination in children under 5 years old. The variability in ICERs (cost per DALY averted,[57] cost per treated child,[72] cost per admitted child,[64] and cost per fully vaccinated child[45]) makes stronger conclusions impossible, although all costs for CHWs supporting children less than 5 years were relatively low compared with domains such as T2DM and CVD. Three of these studies[55,57,64] demonstrated robustness of their findings with a PSA. Looking at disaggregated costs and DALYs averted, the studies showed that a large amount of DALYs (>1000) can be averted targeting children under 5 years old in LMICs, but this also comes with substantial investments.[49,60,87]

Five studies[42,44,48,78,83] evaluated CHWs supporting (peri) pregnant women through regular home visits. Similar to before, the studies did not show comparable ICERs, and only 2 out of 5 studies concluded the CHW intervention was cost-effective.[42,78] One study evaluated preventing repeated teenage births in low-income African American communities,[78] the other focused on promoting postnatal care in a rural area of Bangladesh.[42] The latter study performed a probabilistic sensitivity analysis.[42]

T2DM

Ten[40,51,61,63,71,74,75,77,79,81] included studies argued that involving CHWs offering education, support, and lifestyle interventions in T2DM care was a cost-effective approach. Six[61,71,74,75,77,79] out of the 10 studies were model-based evaluations applying time horizons of at least 5 years. Duan et al[61] and Ryabov[75] substantiated their findings with a probabilistic sensitivity analysis. Five[74,75,77,79,81] studies originated from the United States, with ICURs ranging from $479 to $46 735 per QALY gained (2024 US$). This was notably higher compared with the study of Sathish et al[51] that reported an ICUR of $61 per QALY (2024 US$). CHWs in this study offered group sessions to individuals with high risk for diabetes in India.[51]

The majority of CUAs[51,61,63,71,75,79,81] showed that the incremental QALYs gained are very limited, ranging from 0.0085[63] to 0.7[75] QALYs gained. These studies also reported relatively low incremental costs. In the remaining 2 CUAs[74,77] the incremental costs are remarkably higher, resulting in many more QALYs gained: 394.92[77] and 561.3.[74]

CVD

Six included articles[39,62,66,76,80,88] studied the impact on CVD of CHWs providing educational information on diet and physical activity. All 5 articles reported the intervention was (potentially) cost-effective. Two US-based studies used a Markov model for evaluation.[76,80] Hollenbeak et al[76] found that the intervention was not initially cost-effective at 6 months but had the potential to be if results persisted over 10 years. Smith et al[80] concluded that the CHW intervention was dominant, using a societal perspective and a time horizon of 30 years. A study from Pakistan[66] reported an ICUR of $1785 per CVD DALY averted from a societal perspective. This is the only CVD study that performed a PSA. When ICURs were expressed as cost per QALY, similar values were found despite differences in context, study perspective and time horizon: $5203 per QALY in the United States[76] and $4130 per QALY in Argentina.[39] Additionally, the reporting quality of these 5 articles scored above average.

Similar to the CUAs of T2DM, the incremental QALYs gained are low,[39,76,80] unless investments of millions of dollars are made.[62,88]

Mental health

Five studies on 3 interventions from India[50,52-54,56] involved CHWs in mental healthcare as psycho-educators or counselors. The studies were all trial-based evaluations with a time horizon of 12 to 19 months, and no significant changes in QALYs were detected between intervention and control arms. However, the interventions were deemed cost-effective because of the lower

Table 3. Summary table of included articles.

First author and publication year	Country	Intervention	Control	EE type	Analytical approach, time horizon	Perspective	Threshold	ICER/ICUR (2024 US$)	Analysis of uncertainty	Author's conclusion
MNCH, focus on (peri)pregnant women (*n* = 5)										
Aracena et al,[44] 2009	Chile	Home visits	Standard care from the health centers	CEA	Trial-based, 15 months	Healthcare provider	Not mentioned	US$13.50 ($19.16) (per point lower on the Goldberg's questionnaire)	Not mentioned	"Results demonstrate that the home visit program was more effective than the standard care provided by the health centers"
Barnet et al,[78] 2010	USA	Motivational intervention (CAMI) with additional visits or CAMI only	Usual care	CEA	Trial-based, 2 years	Healthcare payer	Not mentioned	$17 388 ($24,683) (adjusted), per prevented repeated birth	ODSA	"The CAMI costs and cost-effectiveness compare favorably with other effective programs"
Lefevre et al,[42] 2013	Bangladesh	pregnancy surveillance through home visits	Pre-existing care	CUA	Trial-based, 2 years	Societal	GNI of Bangladesh in 2010, which was US$ 780 per capita	$104.62 ($ 146.75) per DALY averted ($49 601.5/338 DALYs averted)	ODSA and PSA	"The home-care package represents a highly cost-effective intervention strategy"
Pitt et al,[48] 2016	Ghana	Home visits	No home visits	CEA	Trial-based + scenario modeling, not mentioned	Healthcare sector	WHO-CHOICE	$352 ($450) per discounted life-year saved	ODSA and PSA	"The seemingly modest mortality reductions achieved by a newborn home-visit strategy might in fact be cost-effective"
Bone et al,[83] 2021	India, Pakistan and Mozambique	Initial triage and treatment	Standard of care in each country	CEA,	Trial-based, 4 years	Healthcare system (India, Mozambique), limited societal (Pakistan)	India: $115 and $770, Mozambique: $8 and $294, Pakistan: $87 and $669	No effect for base case	PSA	"The intervention was not cost-effective due largely to minimal differences in YLL"
MNCH, focus on children under 5 (n = 8)										
San Sebastián et al,[45] 2001	Ecuador	Child immunization services	District Hospital strategy	CEA	Trial-based, 5 years	Societal	Not mentioned	$32 ($61) per child	Yes, not specified	"The CHWs strategy is more effective and less costly than the District Hospital strategy"
Rakuomi et al,[57] 2017	Kenya	Antimalarial treatment	four comparator groups	CUA	Model-based: decision-analytical tree, 5 years	Healthcare provider	Not mentioned	CHW pre-referral treatment = $5.5 ($7.1) per DALYs averted ($109 895/15.5 DALYs averted)	PSA	"Use of CHWs was more cost-effective than provision of pre-referral treatments at a primary health facility especially, with high referral compliance."
Bettampadi et al,[55] 2018	India	Childhood measles vaccination	no ASHA	CUA	Markov model, lifetime (68 years)	Societal	Not mentioned	$162 ($211) per DALY averted compared with no ASHA ($1257/5.96 DALYs averted)	ODSA and MDSA	"ASHAs were cost-effective under a wide range of scenarios even when a single health outcome such as measles vaccination was considered"
Niyibitegeka et al,[43] 2021	Burundi	Childhood diarrhea management	Routine management of diarrhea at health facilities	CEA & CUA	Markov micro-simulation, 5 years	Healthcare provider and societal	WHO-CHOICE GDP = US$261	ICUR = −$1173 (−$1409) per DALY avoided (−$3 873 341/2749 DALYs averted)	ODSA and PSA	"Providing inexpensive diarrheal treatment (oral rehydration salts and zinc) in communities is an attractive cost-effective intervention."

continued on next page

Table 3. Continued

First author and publication year	Country	Intervention	Control	EE type	Analytical approach, time horizon	Perspective	Threshold	ICER/ICUR (2024 US$)	Analysis of uncertainty	Author's conclusion
Cho et al,[49] 2022	Ghana	Childhood disease prevention: malaria and diarrhea	Waitlisted control communities	CEA & CBA	Trial-based, 20 months and 10 years	Societal	WHO-CHOICE	Median of $1150 ($1474) per DALY averted ($1817,995.4/ 1233 DALYs averted)	PSA	"We need more research to find the most effective scope of work for CHWs."
Molanes-López et al,[64] 2024	Niger	Uncomplicated severe acute malnutrition (SAM)	Outpatient treatment	CEA	Model-based, 10 months	Societal	Not mentioned	$98.01 ($ 117.7) per additional SAM case recovered	MDSA	"CHWs-led SAM treatment was found to be cost-effective when compared to the standard protocol"
Mulogo et al,[72] 2024	Uganda	Childhood illness: malaria, pneumonia and diarrhea	Health facility-based service	CEA	Model-based, not mentioned	Healthcare provider	Uganda's public health expenditure per capita of US$21	ICER of US$6.67 ($ 6.82) per under five-year child treated appropriately	ODSA	"CHW-led iCCM is a cost-effective strategy"
Cichon et al,[60] 2025	Mali	Group 1: standard malnutrition protocol Group 2: simplified protocol	Standard protocol by nurses at health centers	CEA & CUA	Trail-based, 17 months	Societal	100 US$ per DALY	Group 1: $60.3 ($73.7) per DALY. ($174 749.84/ 2371 DALYs averted) Group 2: $52.8 ($64.5) per DALY ($177 309.2/ 2749 DALYs averted)	Not mentioned	"[…] cost-effective strategy, due to lower treatment costs and greater coverage"
T2DM (n = 10)										
Brown et al,[77] 2012	USA	lifestyle modification program	Usual care	CUA	Markov model (Archimedes model), 5,10, and 20 years	Societal	$50 000 per QALY gained	$33 319 ($46 735) per QALY gained (20 year) ($13 158 339/ 394.92 QALY gained)	ODSA	"The CHW program was cost-effective."
Prezio et al,[74] 2014	USA	Culturally tailored diabetes education and management program	Usual care (waitlist)	CUA	Markov model (Archimedes model), 5,10, and 20 tears	Healthcare sector	$50 000 per QALY gained	$355 ($479) per QALY (20 year) ($268 877/561.3 QALY gained)	PSA	"[…] is a cost-effective way to reduce diabetes-related complications for uninsured Mexican Americans"
Ryabov,[75] 2014	USA	Monthly visits with educational message	Usual care	CUA	Markov model (CDC Diabetes model), lifetime	Healthcare sector	Not mentioned	$13 810 ($19 730) per QALY ($13 811/0.7 QALY gained)	PSA	"The intervention has a substantial impact on the medical costs of type 2 diabetes treatment."
Mash et al,[71] 2015	South Africa	Group education program	Usual care	CUA	Markov micro-simulation, 10 years, 30 years and lifetime	Societal	WHO-CHOICE: GDP per capita for South Africa is $6003	$1862 ($2423) per QALY gained. ($163/0.0673 QALY gained)	Not mentioned	"[the intervention] represents value for money."
Segal et al,[40] 2016	Australia	Chronic condition management for 18 months	Usual care	CEA	Trial-based, 18 months	Healthcare provider	Not applicable	$42 880 ($ 58 922) for each person whose HbA1c level was reduced below the critically high level	Not mentioned	"The costs of delivering the GBACC model were considerable in absolute terms but achieved only a modest effect."
Huang et al,[81] 2019	USA	culturally relevant and culturally tailored CHW home visit	Waitlisted standard care	CEA & CUA	Trial-based, 2 years	societal	A variety of thresholds from $39,000 to $154,353 per QALY gained	$13 191 ($17 793) per QALY gained ($889.65/ 0.05 QALY gained)	ODSA	"This ICER shows that the CHW intervention is highly cost-effective"
Sathish et al,[51] 2020	India	Peer-support lifestyle intervention	Booklet on lifestyle change	CEA & CUA	Trial-based, 2 years	Health system & societal	Three times India's GDP per capita: US$6,108	cost per QALY gained was US $50 ($61) (health system) ($2.44/ 0.04 QALY gained), and US $155 ($189) (societal). ($7.6/0.04 QALY gained)	ODSA and MDSA	"[…] was cost-effective in individuals at high risk of developing diabetes in India over 2 years."

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Table 3. Continued

First author and publication year	Country	Intervention	Control	EE type	Analytical approach, time horizon	Perspective	Threshold	ICER/ICUR (2024 US$)	Analysis of uncertainty	Author's conclusion
Duan et al,[61] 2021	Mexico	household engagement by community health workers	Usual care	CUA	Model-based (Markov model), 5 years and lifetime	Societal	ICERs less than one time the GDP per capita (US$8739.76) were considered very cost-effective	US$10 444 ($13 323) per QALY gained (5years) ($266/0.02 QALY gained); US $2,981 ($3803) per QALY gained (lifetime) ($494/0.13 QALY gained)	ODSA and PSA	"[…] is a cost-effective, community-based model of diabetes care for patients in rural Mexico."
Ye et al,[79] 2021	USA	Accompanying visits, support in goal setting, home visits and phone calls	EUC	CUA	Markov model (Michigan model), 20 years	Healthcare sector	$100 000 or $150 000 per QALY gained	CHW + PL intervention had an ICUR of $28 800 ($35 208) per QALY ($972/0.0276 QALY gained)	ODSA	"The 6-month CHW-led DSME intervention without further postintervention CHW support was not cost-effective in Latino adults with T2D."
Dahal et al,[63] 2024	Nepal	12 modules of intensive face-to-face training sessions of self-management practices	Usual care	CUA	Trial-based, 6 months	Healthcare sector	WHO-CHOICE	$3561 per QALY gained ($30.3/0.0085 QALY gained)	PSA	"a cost-effective approach to manage type 2 diabetes, offering good value for money"
CVD (n = 6)										
Jafar et al,[66] 2011	Pakistan	Blood pressure control	4 arms: HHE by CHWs, trained GP, HHE plus trained GP, and no intervention	CEA & CUA	Trial-based, 2 years	Policy maker and societal	Not mentioned	HHE plus GP: $115 ($167) per DALY averted (policy perspective) $1226 ($1785) per DALY averted (societal perspective) compared with no intervention. (incremental DALYs not reported)	PSA	"The combined intervention of HHE plus trained GP is potentially affordable and more cost-effective for BP control than usual care or either strategy alone in some communities in Pakistan, and possibly other countries in Indochina with similar healthcare infrastructure"
Hollenbeak et al,[76] 2014	USA	Coronary heart disease (CHD)	educational brochures and usual physician care	CEA & CUA	Markov model alongside clinical trial, 6 months (trial) & 10 years (model)	Healthcare provider	$20 000 for CEA & $50 000 to $100 000 for CUA	$47 per mm Hg reduction in SBP and $453 419 per CHD event avoided (6 months). $3998 ($5203) per incremental QALY (10-year). ($520/0.1 QALY gained)	Not mentioned	"The intervention does not appear to be cost-effective in the first 6 months. If intervention results are sustained over the long term, the program may be cost-effective over the patient's lifetime."
Augustovski et al,[39] 2018	Argentina	Hypertension control	Usual care without any active study intervention	CEA & CUA	Trial-based, 18 months	Healthcare sector	US $14 062 per QALY	$26 per mm Hg of SBP and $3299 ($4130) per QALY ($173.5/0.042 QALY gained)	ODSA	"The multicomponent intervention was cost-effective for blood pressure control among low-income hypertensive patients."
Krishnan et al,[62] 2019	Nepal	Cardiovascular disease prevention	usual care	CUA	Trial-based, lifetime	Healthcare sector	WHO-CHOICE given Nepal's annual GDP per capita of US$835 for 2017	scenario A resulted in an ICUR of $582 ($711) per DALY averted ($19 947 816/28056 QALY gained) and scenario B resulted in an ICUR of $411 ($502) per DALY averted. ($24 479 528/48764 QALY gained)	ODSA	"The program is projected to be highly cost-effective in both scenarios compared with the WHO thresholds for cost-effectiveness for Nepal"

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Table 3. Continued

First author and publication year	Country	Intervention	Control	EE type	Analytical approach, time horizon	Perspective	Threshold	ICER/ICUR (2024 US$)	Analysis of uncertainty	Author's conclusion
Smith et al,[80] 2019	USA	Cardiovascular disease prevention	no intervention	CUA	Markov model, 30 years	societal	Not mentioned	Dominant (−$4607/0.16 QALY gained)	ODSA	"A community-based CVD intervention demonstrated to reduce CVD risk is cost-effective."
Hickey et al,[88] 2024	Africa	Hypertension screening of adults > 40 years	Standard of care	CUA	Model-based, 50 years	Healthcare sector	$500 per DALY averted	$389 per DALY averted ($17 600 000/61500QALY gained)	Scenario analysis	""[…] likely to be cost-effective in most settings across Africa."
Mental health (n = 5)										
Buttorff et al,[54] 2012	India	psychoeducation, case management, interpersonal psychotherapy and/or antidepressants	Treatment by physicians	CEA & CUA	Trial-based, 1 year	Societal	*"There are no accepted threshold values to indicate WTP for improvement in depression measures"*	More costly, more effective (health system), ($0.5/0.02 QALY gained) less costly, more effective (societal) (−$45/0.02 QALY gained)	PSA	"[the intervention] was not only cost-effective but also cost-saving"
Patel et al,[56] 2017	India	contextually adapted brief psychological treatment	EUC	CUA	Trial-based, 3 months	Health system and societal	*"An incremental cost per QALY gained of less than GDP per capita has been considered to be highly cost-effective"*	Health system: $9333 (12 025 per QALY) ($60/0.005 QALY gained)	ODSA	"[…] and was cost-effective in this setting."
Weobong et al,[50] 2017	India	contextually adapted brief psychological treatment	EUC	CUA	Trial-based, 1 year	Healthcare sector	WTP of $16,060 equivalent to GDP per capita in Goa	cost per QALY = −$1721 (health system perspective) (−$19/0.011 QALY gained)	Not mentioned	"HAP plus EUC was dominant over EUC alone, with lower costs and better outcomes"
Nadkarni et al,[52] 2017a	India	Counseling for alcohol problems	EUC	CUA	Trial-based, 3 months	Health system and societal	The monthly wage for an unskilled manual worker in Goa ($415)	Not calculated because no effect ($25/0.001 QALY gained)	ODSA	"[the intervention] was better than EUC alone […] and might be cost-effective."
Nadkarni et al,[53] 2017b	India	Counseling for alcohol problems	EUC	CUA	Trial-based, 1 year	Societal	The monthly wage for an unskilled manual worker in Goa ($415)	Not calculated because no effect (−$223/0.006 QALY gained)	Not mentioned	"CAP provides better outcomes at lower costs from a societal perspective."
TB (n = 6)										
Islam et al,[41] 2002	Bangladesh	TB program with CHWs (BRAC area)	Government TB program without CHWs (government area)	CEA	Trial-based, 1 year	Healthcare sector	Not mentioned	cost per patient cured was US$ 64 ($116) in the BRAC area compared with US$ 96 ($174) in the government area.	Not mentioned	"The government program was 50% more expensive for similar outcomes."
Khan et al,[65] 2002	Pakistan	DOT by CHWs	Health center DOT, DOT by family member or unsupervised	CEA	Trial-based, 1 year	Societal	Not mentioned	CHW DOT: cost per patient treated = $115 ($206); cost per case cured = $172 ($308).	Not specified	"The CHW sub-group achieved the highest cure rates (67%), with a cost per case only slightly higher than the self-administered group ($172 per case cured). This approach should be investigated further."
Clarke et al,[69] 2006	South Africa	DOT by CHWs	DOT by nurses	CEA	Trial-based, 6 months (costs), 1 year (effects)	Healthcare provider (Boland Health District)	Not mentioned	Not calculated	Not mentioned	"Our study points way to a more cost-effective TB strategy to improve health and survival in resource-poor settings"

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Table 3. Continued

First author and publication year	Country	Intervention	Control	EE type	Analytical approach, time horizon	Perspective	Threshold	ICER/ICUR (2024 US$)	Analysis of uncertainty	Author's conclusion
Datiko and Lindtjørn,[46] 2010	Ethiopia	DOT by CHWs (CDOT)	Health facility-based DOT (HFDOT)	CEA	Trial-based, 1 year	societal	Not mentioned	The incremental cost-effectiveness ratio of HFDOT to CDOT was -16.3.	ODSA	"Involving [CHWs] in TB treatment is a cost-effective treatment alternative to the health service and to the patients and their caregivers."
Mafirakureva et al,[87] 2023	Cameroon and Uganda	Screening, TPT initiation and follow-up	Facility-based care	CUA	Decision-analytical model, lifetime	Health system	$1000 per DALY averted	$620 ($703) per DALY averted in Cameroon ($281 903/401 DALY averted) and $970 ($1100) per DALY averted in Uganda ($305 800/278 DALY averted)	PSA	"[…] in our case would be considered cost-effective at willingness-to-pay thresholds of $1000 per DALY averted."
Malhotra et al,[47] 2025	Ethiopia	Home-based model with CHW	Facility-based care	CEA	Trial-based, 6 months	Healthcare sector	Not mentioned	−$10.28 (−$10.9) per additional child contacted	PSA	"home-based contact management offers a cost-saving alternative for households and maintains similar completion rates to facility-based care."
HIV (n = 4)										
Bango et al,[70] 2016	South Africa	Patient support groups, task shifting to lay workers	Nurse-led standard of care	CEA	Trial-based, 39 months	Healthcare provider	Not mentioned	"Dominant given lower costs and higher effectiveness"	ODSA	"Adherence clubs offer the potential to enhance healthcare efficiency and patient accessibility"
Sharma et al,[59] 2016	Kenya	Home visits, counseling and testing	Written invitations	CEA & CUA	Mathematical model, 10 years	Healthcare payer	Very cost-effective if the ICER is less than Kenya's 2014 GDP per capita (1358 USD)	$615 ($800) USD per DALY averted ($12 953 600/16 192 DALY averted)	ODSA	"ICERs fall below Kenya's per capita gross domestic product ($1358) and are therefore considered cost-effective"
Fatti et al,[68] 2018	South Africa	Patient support by home visits	Usual care	CEA	Trial-based, 1 year and 2 years	Healthcare provider	Not mentioned	US$600 ($ 809) (1y) and US$776 ($1047) (2y) per patient-loss averted	Not mentioned	"[…] and is a low-cost intervention with reasonable cost-effectiveness that can aid progress toward several health, economic and equality-related SDG targets."
Wall et al,[82] 2020	Zambia	Couples' voluntary HIV counseling and testing (CVCT)	Existing services	CEA	Compartmental model, 5 years	Healthcare sector	Not mentioned	$384 ($495) per adult HIV infection averted	ODSA and PSA	"CVCT was effective and affordable in Zambia."
Other (n = 6)										
Wang'ombe,[58] 1984	Kenya	Extending and improving access to primary healthcare	Not mentioned	CBA	Trial-based, 1 year	Healthcare sector	Not mentioned	Cost-benefit ratio for the whole project area ranged from 9.85 to 9.36	Yes, not specified	"This economic appraisal of the participation strategy shows that it is both feasible and desirable"
Schuster et al,[73] 2015	USA	Cancer screening	waitlist control group	CEA	Trial-based, 1 year and 2 years	Healthcare sector	Not mentioned	US$236 ($313) per additional screening without development costs, US$839 ($1112) with development costs	Not mentioned	"These findings suggest this program, when compared with others, offered a more cost-effective approach for promoting cancer screening."

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Table 3. Continued

First author and publication year	Country	Intervention	Control	EE type	Analytical approach, time horizon	Perspective	Threshold	ICER/ICUR (2024 US$)	Analysis of uncertainty	Author's conclusion
Lairson et al,[85] 2018	USA & Mexico	Colorectal Cancer Screening	non-intervention comparison group	CEA	Trial-based, 3 years	Healthcare payer	Not mentioned	$268.12 ($362) for CHW in the individual session. The group session showed extended dominance	ODSA	"Compared to the experience in the control county, the group-based video-only intervention was the most cost-effective CRC screening promotion intervention"
Tschampl et al,[84] 2020	Nicaragua & Mexico	to prevent and control dengue and other mosquito-borne diseases.	Control communities with no intervention	CUA	Trial-based, 18 months	healthcare sector	WHO-CHOICE	Mexico: US$29 618 ($39 952) ($23 371 920/ 585 DALY averted) per DALY averted, for Nicaragua: US$29 196 ($39 382) per DALY averted ($11 499 544/292 DALY averted)	PSA	"Camino Verde, as implemented in the research context, was marginally cost-effective in Mexico, and not cost-effective in Nicaragua, from a healthcare sector perspective."
Wagner et al,[67] 2020	South Africa	Epilepsy and improving anti-seizure medication (ASM) adherence	current practice	CUA	Markov micro-simulation, lifetime	Societal	South Africa's GDP per capita of $13,215	$1494 ($1944) per QALY gained for males ($11 470/5.9 QALY gained), $1857 ($2417) per QALY gained for females ($9885/ 04.09 QALY gained)	ODSA	"The introduction of a CHW to monitor ASM adherence in rural South Africa is modeled to be cost-effective."
Naufal et al,[86] 2021	USA & Mexico	Asthma education	no intervention	CEA & CBA	Trial-based, 42 months	Societal	Not mentioned	CEA ratios ranging from 0.9 to 82.8 CBA ratio of 0.147	ODSA	"Cost savings and ratios suggest that such a program could reduce health disparities […] of the children with asthma and their whole family."

ASHA indicates accredited social health activist; ASM, anti-seizure medication; BRAC, Bangladesh Rural Advancement Committee; CAMI, computer-assisted motivational intervention; CAP, counseling for alcohol problems; CBA, cost-benefit analysis; CDOT, community-based DOT; CHD, coronary heart disease; CUE, cost-effectiveness analysis; CUA, cost-utility analysis; CVCT, couples' voluntary HIV counselling and testing; CVD, cardiovascular disease; DALY, disability-adjusted life-year; DOT, direct observation treatment; EE, economic evaluation; EUC, enhanced usual care; GDP, gross domestic product; GP, general practitioner; HAP, healthy activity program; HFDOT, health facility-based DOT; HHE, home health education; HIV, immunodeficiency virus; ICER, incremental cost-effectiveness ratio; ICUR, incremental cost-utility ratio; iCCM, integrated community case management; MDSA, multi-way deterministic sensitivity analysis; MNCH, maternal newborn and child health; ODSA, one-way deterministic sensitivity analysis; PL, peer leader; PSA, probabilistic sensitivity analysis; QALY, quality-adjusted life-year; SAM, severe acute malnutrition; SBP, systolic blood pressure; T2DM, type 2 diabetes mellitus; TB, tuberculosis; TPT, tuberculosis-preventive treatment; WTP, willingness-to-pay; YLL, years of life lost.

overall mean cost of the interventions compared with enhanced usual care, which comprised a consultation with a PHC physician. Buttorff et al[54] was able to underpin this with a probabilistic sensitivity analysis. However, the reporting quality of these 5 articles scored below average.

Within mental healthcare, the disaggregated incremental costs of the CUAs were low—even cost-saving in 2 studies[50,53]—and associated with very low incremental QALYs gained, ranging from 0.005[56] to 0.02.[54]

TB

Six included articles[41,46,47,65,69,87] focused on TB and evaluated DOT by a CHW compared with facility-based DOT or DOT by clinical nurses. Five[41,46,47,65,69] out the 6 studies were trail-based CEAs with a time horizon of (less than) 1 year. ICERs expressed as cost per patient cured ranged from $64 to $172. Datiko and Lindtjørn[46] reported DOT by CHW costed 37% less for similar outcomes. The CUA by Mafirakureva et al[87] had the highest reporting quality of al TB studies and reported ICURs of $620 per DALY averted in Cameroon and $970 per DALY averted in Uganda. In this study, CHWs went broader than performing DOT and took up screening, treatment initiation, and follow-up.[87] In Ethiopia, home-based contact management offered a cost-saving alternative to facility-based care.[47]

HIV

Three CEAs[68,70,82] and 1 combined CEA-CUA[59] focused on HIV care. All studies applied a different study perspective, different time horizons and expressed their ICERs/ICURs based on other effects: $615 per DALY averted,[59] $384 per adult HIV infection averted,[82] $776 per patient-loss averted.[68] This diversity in presented outcomes impedes overarching conclusions regarding CHW involvement in HIV care, although the reporting quality of these articles scored above average.

Reporting Quality Assessment

The reporting quality was assessed using the items of the CHEERS 2022 checklist.[37] On average, the included articles reported 75% of the applicable criteria. Included studies mainly

failed to report an analysis plan (item 4), the (absence of) heterogeneity within the study results and need for subgroup analysis (item 18), and the approach to engage with patients or others affected by the study (item 21). Other items that were often not reported—although to a lesser degree—were: study population (item 5), setting and location (item 6), time horizon (item 9), discounting (item 10), and methods used to characterize the uncertainty of the analysis (item 20). This exercise did show an overall trend of improved reporting quality for the more recently published articles. The complete quality assessment table can be found in Appendix File 2 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.09.004.

Discussion

The goal of this review was to provide a comprehensive overview and examination of economic evaluations on CHWs in PHC and synthesize the evidence on the cost-effectiveness of such interventions. In line with a previous systematic review from 2015,[22] this review found that involving CHWs can be cost-effective, mainly for MNCH focused on children under 5, TB, HIV, and mental health in LMICs but also for T2DM and CVD management, both in LMICs and high-income countries (HICs).

Table 4 presents an overview of the contexts and interventions examined in the included studies. Because of the heterogeneity of target populations and intervention types, identifying broadly generalizable patterns proved challenging. Nevertheless, several notable trends can be highlighted. First, educational training sessions and counseling provided by CHWs for T2DM and CVD were consistently found to be cost-effective, both in LMICs and HICs. However, these interventions involved high incremental costs in various studies, indicating that substantial investments may be required to achieve comparable outcomes in other contexts. Second, CHW-led interventions targeting children under 5 years of age in LMICs were found to be cost-effective in all but 1 of the included studies. Third, mental health interventions delivered by CHWs in India demonstrated cost-effectiveness. However, further research in other contexts is needed to be able to generalize the cost-effectiveness of CHW mental health interventions. Fourth, in LMICs, TB and HIV interventions that focused on specific, well-defined target populations were found to be more cost-effective than those with broader approaches.

The evidence within other health domains is less straight forward, mainly because the findings are very context specific (ie, local health systems, local interventions, and different methodologies used to estimate costs and effects). This heterogeneity makes it difficult to draw general conclusions about the cost-effectiveness of CHW involvement in PHC. Such heterogeneity is not, however, unexpected: CHW interventions are generally designed to meet local needs, resulting in a significant variability of intervention designs and even in the terminology used for CHWs.[9] On the other hand, the CHEERS 2022 framework for economic evaluations offers a framework which ensures interpretability and usefulness for decision making.[37] Previous studies have already pointed to the need of more extensive cost-effectiveness analysis of CHW interventions, especially in HICs.[12,90,91] Methodological improvements in the evaluation of these programs are therefore necessary to advance the evidence within this field:

First, more in-depth explanations should be provided as to what constitutes "usual care" as the comparator to the CHW intervention. Articles should at least provide a reference to (secondary) sources that give further detailed information about standard practice in the respective PHC system. This is very relevant as the CHW interventions included in this review are looking at the effect of a CHW as an added value within the existing healthcare system. This makes a (detailed) description of "usual care" extremely relevant to researchers and policy makers to obtain an in-depth understanding of the local context and to estimate the generalizability of study findings. In other words, this can help policy makers to decide in what contexts the CHWs can be a cost-effective added value to the existing PHC system.

Second, this review showed that the healthcare sector perspective was most frequently (n = 21, 42%) used, which can be useful to inform future program initiation and potential reimbursement opportunities. Given the broad impact of CHW interventions beyond the healthcare system,[92] meaning the costs saved besides the direct medical costs of the patients, we argue a societal perspective can be beneficial to capture these benefits. Even when the societal perspective was used, costs associated with spillover impacts were almost never reported. For example, a CHW intervention may affect the health of family members.[93] This offers an opportunity for health economic evaluations of future CHW interventions.

The overall reporting quality of the included articles was good, with all articles reporting an average of 75% of applicable items. Articles published after the publications of the CHEERS 2013[94] and 2022[37] checklists did not show major improvements in terms of reporting quality. This also explains why most articles scored poorly on item 4 (health economic analysis plan) and item 21 (engagement with patients and others) because these items were not yet present in the earlier version of the CHEERS checklist.[94] Given that CHW interventions are very context specific, improved reporting on the study population at hand (item 5), and the setting and location (item 6) is necessary to enable the identification of transferable elements of CHW interventions. Item 21 also represents a significant opportunity for future research as it aligns with the bridging function of CHWs: linking communities to the healthcare system. Through the CHW, communities or stakeholders can give their input into the design of the study. For example, the stakeholders can share what they would value as the most relevant outcome measures of the economic evaluation. Overall, this review showed that the reporting quality improved over time. This positive trend is vital to ensure that policy makers and researchers can interpret and apply the findings.

Finally, prudence is needed when attributing the cost-effectiveness reported in this review to CHWs themselves because they are often one component in a complex intervention of many moving parts, albeit a crucial component. They are the bridges that bring the intervention to populations that live in vulnerable or hard-to-reach situations. The economic evaluations included in this review can only allocate (cost-)effectiveness to the entire complex social intervention.

Strengths and Limitations

A strength of this review was the standardized extraction template. ICERs and ICURs were transferred to 2024 US$ (https://eppi.ioe.ac.uk/costconversion/) to increase comparability between studies. With most of the included articles originating from LMICs, questions can arise regarding the absence of articles based in HICs. One explanation can be that the countries represented within this review have extensive experience with CHWs, eg, Accredited Social Health Activist in India.[95,96] This could indicate that economic evaluations of CHW interventions are only pursued in later phases of implementation, after completion of pilot and effectiveness studies. A second explanation can be

Table 4. Summary table of target populations and interventions.

Author, publication year	Country and target population	Type of intervention	Cost-effective?
MNCH, focus on (peri)pregnant women			
Aracena et al,[44] 2009	Chile, adolescents between 14 and 19 years of age throughout their pregnancy and during the early stages of motherhood	In addition to the health center's standard program adolescents enrolled in the study began receiving home visits during the third trimester of pregnancy. The visits continued until the child reached one year of age	Potentially, if intervention effects can be maintained over time
Barnet et al,[78] 2010	USA, adolescent mothers with high risk from low-income African American communities	Home-based intervention conducted by community outreach workers: (1) computer-assisted motivational intervention (CAMI) conducted quarterly with additional visits or (2) CAMI only, a single-component motivational intervention conducted quarterly	Yes
LeFevre et al,[42] 2013	Bangladesh, pregnant women in a population of about 500,000, in the Beanibazar, Zakiganj, and Kanaighat subdistricts of Sylhet division	Home care with CHWs, these women conducted pregnancy surveillance and, for each woman found pregnant, made 2 antenatal home visits to promote birth and neonatal care preparedness and 3 postnatal home visits to reinforce neonatal care and assess the health of each infant when the infant was aged 1, 3, and 7 days	Yes
Pitt et al,[48] 2016	Ghana, pregnant women and their babies in the first week of life in rural Brong Ahafo Region	Two home visits during pregnancy and 3 visits on days 1, 3, and 7 post-partum. Each visit has a specific purpose and taken together, they aim to improve delivery and newborn care practices and care seeking for sick newborn babies	No
Bone et al,[83] 2021	India, Pakistan & Mozambique, pregnant women (15-49 years in India and Pakistan, and 12-49 years in Mozambique) in a mix of rural and peri-urban settings	Community-level initial triage and treatment of hypertensive women in their community by CHWs	No
MNCH, focus on children under 5			
San Sebastián et al,[45] 2001	Ecuador, children less than one year old in a rural area (Naporuna population with Amazonian indigenous ethnic group)	Vaccination campaign: the strategy planned and implemented together with the CHWs organization (CHW strategy) used one canoe, 2 CHWs and one nurse from the District Hospital for the campaign plus 2 volunteer CHWs in each community (5 people in total) spending 10 days in vaccination	Yes
Rakuomi et al,[57] 2017	Kenya, a theoretical cohort of 1000 children who were below 5 years old, residing in rural hard-to-reach areas	Provision of rectal prereferral treatment by CHWs	Yes
Bettampadi et al,[55] 2018	India, children aged less than 5 years in villages with and without ASHA	ASHAs facilitating measles vaccination	Yes
Niyibitegeka et al,[43] 2021	Burundi, children under the age of 5 years	Community case management program in which CHWs provide oral rehydration salts and zinc	Yes
Cho et al,[49] 2022	Ghana, children under 5 in 40 communities in rural Ghana	The CHVs conducted home visits and provided health education to prevent childhood diseases	No, more research needed to find the most effective scope
Molanes-López et al,[64] 2024	Niger, all children 6-59 months who attended health centers or health posts with severe acute malnutrition in a rural area	CHWs-led treatment: outpatient treatment for uncomplicated SAM was provided by nurses and 10 additional CHWs in the intervention group	Yes

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Table 4. Continued

Author, publication year	Country and target population	Type of intervention	Cost-effective?
Mulogo et al,[72] 2024	Uganda, children younger than 5 years	VHWs provide initial assessment, referral or accompaniment to a health facility, as well as pre-referral treatment for certain conditions, for patients exhibiting "danger signs," or indications of a serious illness	Yes
Cichon et al,[60] 2025	Mali, children with moderate and severe acute malnutrition in the conflict affected region of Gao in Northern Mali.	A hybrid model where treatment is provided at health centers and associated CHW sites according to either the standard protocol (Intervention 1) or simplified treatment protocol (Intervention 2)	Yes
T2DM			
Brown et al,[77] 2012	USA, low-income Hispanic adults with type 2 diabetes.	A lifestyle modification program led by community health workers (CHWs)	Yes
Prezio et al,[74] 2014	USA, urban community clinic serving uninsured patients with T2DM of largely Mexican Americans	A one-to-one culturally tailored diabetes education and management program along with usual medical care	Yes
Ryabov,[75] 2014	USA, predominantly Mexican American and largely poor or medically indigent immigrant population.	Monthly visits from CHWs; the CHWs conveyed to individuals assigned to the intervention group a well-structured educational message	Yes
Mash et al,[71] 2015	South Africa, uninsured patients from low socioeconomic groups	A group diabetes education program delivered by health promoters in community health centers in the Western Cape, South Africa	Yes
Segal et al,[40] 2016	Australia, indigenous adults with poorly controlled type 2 diabetes in rural and remote north Queensland.	Intensive chronic condition management for 18 months, delivered by CHWs who had a Certificate III or IV in Aboriginal and/or Torres Strait Islander Primary Health Care	No
Huang et al,[81] 2019	USA, adults over 18, self-identifying as ethnically Samoan, resident in American Samoa and diagnosed with T2DM	Culturally relevant and culturally tailored CHW home visit protocols to address behaviors important in managing T2DM	Yes
Sathish et al,[51] 2020	India, individuals with high risk for diabetes in a low- and middle-income setting	12-month peer-support lifestyle intervention involving 15 group sessions delivered in community settings	Yes
Duan et al,[61] 2021	Mexico, adults with diabetes in rural primary care clinics in Chiapas, Mexico	The program consisted of (1) household engagement by community health workers (CHWs), (2) provider education and support, including evidenced-based algorithms to support decision making, (3) supplemental supply chain management to procure medicines that previously suffered frequent stockouts and (4) active case finding in the community	Yes
Ye et al,[79] 2021	USA, a simulated Latino population	The CHW intervention included 1) 11 Journey to Health/El Camino a la Salud classes, 2) a CHW-accompanied clinic visit to the participant and his or her primary care provider, 3) support from the CHW for goal setting, and 4) home visits and biweekly phone calls	Yes
Dahal et al,[63] 2024	Nepal, adults aged 30-70 years who were clinically diagnosed with T2DM	The intervention comprised of 12 modules of intensive face-to-face training sessions of self-management practices such as physical activity, dietary adherence, strategies to abstain from drinking and smoking, medication adherence, healthcare utilization, blood sugar	Yes

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Table 4. Continued

Author, publication year	Country and target population	Type of intervention	Cost-effective?
CVD			
Jafar et al,[66] 2011	Pakistan, middle- to low-income areas in Karachi	Home health education (HHE): CHWs provided advice at 3-month intervals on the importance of engaging in moderate physical activity; maintaining normal body weight; reducing salt intake; maintaining an adequate intake of potassium; consuming a diet rich in fruit, vegetables, and low-fat dairy products and low in saturated and total fat (including sample recipes for culturally acceptable and economically feasible food products); and smoking cessation	Yes
Hollenbeak et al,[76] 2014	USA, African Americans, in 2 urban academic general internal medicine practices largely serving low-income patients.	Three community support phone calls from trained peers from the same practices alternating with personal counseling by trained mid-level staff at 2 practice visits on alternate months	No, may be cost-effective if results are sustained over the patient's lifetime
Augustovski et al,[39] 2018	Argentina, low-income hypertensive subjects	A multicomponent strategy that included a community health worker (CHW) home-based intervention, physician education, and a text-messaging intervention. CHWs educated, motivated, and facilitated communication between the healthcare system and the patients and their families	Yes
Krishnan et al,[62] 2019	Nepal, people aged 25-65 years with and without hypertension	CHWs measure blood pressure and deliver lifestyle counseling on a variety of topics relating to diet and physical activity, reduced blood pressure among adults with hypertension and ameliorated age-related increases in blood pressure among those without hypertension	Yes
Smith et al,[80] 2019	USA, predominantly rural communities	CHWs create action plans with individual participants and based upon CVD risk, initiate medical referrals, provide smoking cessation aids, and navigate interested individuals into nutritional and exercise programs	Yes
Hickey et al,[88] 2024	Africa, adults ≥40 years	Annual CHW screening for adults ≥ 40 and hypertension treatment integrated within HIV primary care clinic system	Yes
Mental health			
Buttorff et al,[54] 2012	India, subjects with depression and/or anxiety	The collaborative care of each eligible subject was provided by three key healthcare providers: the existing, full-time physician at the facility, a full-time lay health worker (or "health counsellor") trained to provide psychosocial interventions, and a mental health specialist who visited each study facility once or twice a month	Yes
Patel et al,[56] 2017 and Weobong et al,[50] 2017	India, patients with moderately severe to severe depression in primary healthcare settings	A contextually adapted brief psychological treatment based on behavioral activation that focuses on increasing patient activation levels, and comprises the following strategies: psychoeducation, behavioral assessment, activity monitoring, activity structuring and scheduling, activation of social networks, and problem solving	Yes

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Table 4. Continued

Author, publication year	Country and target population	Type of intervention	Cost-effective?
Weobong et al,[50] 2017	India, 10 primary health centers in Goa targeting attendees aged 18-65 years with moderately severe to severe depression in peri-urban and rural settings	A contextually adapted brief psychological treatment based on behavioral activation that focuses on increasing patient activation levels in pleasurable or mastery activities, and comprises the following strategies: psychoeducation, behavioral assessment, activity monitoring, activity structuring and scheduling, activation of social networks, and problem solving	Yes
Nadkarni et al,[52] 2017a	India, patients with harmful drinking attending routine primary healthcare settings	Multisession brief interventions by CHW: motivational interviewing and client-centered general counseling strategies *The evaluation of this intervention at 12 months was considered to be cost-effective (Nadkarni et al,[53] 2017b)	No
Nadkarni et al,[53] 2017b	India, 10 primary health centers in Goa targeting male attendees aged 18-65 years with harmful drinking	Multisession brief interventions by CHW: motivational interviewing and client-centered general counseling strategies	Yes
TB			
Islam et al,[41] 2002	Bangladesh, rural areas	TB program run by the Bangladesh Rural Advancement Committee (BRAC) with CHWs performing DOT	No
Khan et al,[65] 2002	Pakistan, 3 trial sites, including urban and rural areas	DOT by CHWs	No
Clarke et al,[69] 2006	South Africa, farms in the Boland health study district situated in the Western Cape Province	LHWs are involved in TB control activities on farms.	No
Datiko and Lindtjørn,[46] 2010	Ethiopia, smear-positive patients in a densely populated agrarian community	Community DOT: TB patients visit the health post daily for 2 months during the intensive phase to receive treatment under the direct observation of HEWs in their kebele. During the continuation phase, patients collect drugs from the HEWs on a monthly basis	Yes
Mafirakureva et al,[87] 2023	Cameroon and Uganda, children younger than 5 years or children aged 5-14 years living with HIV	Home-based screening for tuberculosis symptoms, tuberculosis-preventive treatment initiation, and follow-up by CHWs	Yes
Malhotra et al,[47] 2025	Ethiopia, children younger than 5 years or children aged 5-14 years living with HIV	Home-based tuberculosis-preventive treatment, administered by CHW	Yes
HIV			
Bango et al,[70] 2016	South Africa, Ubuntu Clinic in Khayelitsha	"Adherence clubs," which are lay health worker led, and nurse supported. They are essentially 4 strategies combined into one: patient support groups, task shifting to lay workers, spaced appointment systems, fast-tracked or simplified clinical visits	Yes
Sharma et al,[59] 2016	Kenya, pregnant women and their male partners in a region of Western Kenya	HOPE intervention: couples in the intervention arm received a home visit in which study staff screened male partners and offered couples HIV counseling and testing. Estimated for 2 scenarios: (1) a higher cost program model, with nurses and highly trained health advisors, and (2) a lower-cost task-shifting model in which nurses and health advisors are replaced with community health workers	Yes

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Table 4. Continued

Author, publication year	Country and target population	Type of intervention	Cost-effective?
Fatti et al,[68] 2018	South Africa, adolescents and youth aged 10 to 24 years receiving ART	Lay community health workers who provided ART patient support by undertaking home visits to ascertain and address household challenges impacting on clinic attendance and adherence	Yes
Wall et al,[82] 2020	Zambia, heterosexual women and their partners in 55 government facilities in 7 Zambian cities	Providing couples' voluntary HIV counseling and testing (CVCT) with couples' family planning counseling (CFPC) with a focus on fertility-goal-based LARC promotion combined with service provision	No
Other			
Wang'ombe,[58] 1984	Kenya, rural population	Community health workers, trained for 12 weeks and deployed in 2 locations in Kenya's Western Province, act as first contact providers of basic healthcare and promoters of selected health, sanitation and nutrition practices	No
Schuster et al,[73] 2015	USA, Korean American women who attended one of 23 ethnic churches in the Baltimore-Washington metropolitan area	A health literacy-focused intervention to promote breast and cervical cancer screenings	Yes
Lairson et al,[85] 2018	USA & Mexico, uninsured without rectal bleeding in the prior 3 months, aged 50 to 75	In brief, the intervention consisted of education, navigation, and provision of no-cost colorectal cancer screening and diagnostic testing, if needed	No
Tschampl et al,[84] 2020	Mexico, 90 clusters in urban and rural in Guerrero Nicaragua, 7 territorial districts and 3 levels of social vulnerability	Brigadistas were trained as organizers and educators by facilitators. Brigadistas visited households and schools engaging their communities in various activities to learn about Dengue virus transmission, including subjects such as the mosquito lifecycle, reproduction, and breeding sites	Not cost-effective in Mexico, marginally cost-effective in Mexico
Wagner et al,[67] 2020	South Africa, Agincourt population who experiences high levels of unemployment, resulting in high levels of labor migration.	CHW educate community members and traditional healers about epilepsy and epilepsy treatment options and regularly visit people with epilepsy to improve adherence and initiate referral when needed	Yes
Naufal et al,[86] 2021	USA & Mexico, elementary and middle school students in Hidalgo County, including their families who live in disadvantaged minority communities	CHWs provide in-depth information about asthma, other educational materials, an allergenic cover for the mattress and pillow, and a spacer	No

ART indicates antiretroviral treatment; ASHA, accredited social health activist; BRAC, Bangladesh Rural Advancement Committee; CAMI, computer-assisted motivational intervention; CFPC, couples' family planning counseling; CHV, community health volunteer; CHW, community health worker; CVCT, couples' voluntary HIV counseling and testing; CVD, cardiovascular disease; DOT, direct observation treatment; HEW, health extension worker; HIV, immunodeficiency virus; MNCH, maternal newborn and child health; SAM, severe acute malnutrition; T2DM, type 2 diabetes mellitus; TB, tuberculosis.

that the economic evaluations of CHW interventions are less frequently published in peer-reviewed journals. A third explanation can be that the extensive; yet, nonexhaustive search strategy failed to include the names of CHWs in national and local initiatives that conceptually coincide with the work CHWs do. It is well known within CHW research that studies seeking to conduct a thorough assessment of CHW initiatives face significant challenges with nomenclature.[97] The review was limited to peer-reviewed articles and omitted gray literature, which may have contributed to publication bias. Ultimately, the English search strategy may have introduced a language bias by missing certain publications, contributing to the underrepresentation of articles in languages other than English. The authors are aware that the reporting quality assessment only considers the presence or absence of the CHEERS items, and this does not reflect the methodological quality. To increase transparency and detail, future reviews of economic evaluations could explore the use of the traffic light system developed by Hoang et al.[98] However, this review provides an in-depth overview of the evidence on the cost-effectiveness of CHW interventions in PHC that can inform researchers, decision makers, healthcare providers, and policy makers in their efforts to ensure that CHW programs are cost-effective and provide high-quality health services to communities in need.

Conclusions

This review found that CHWs can be cost-effective across multiple health domains, both in LMICs and HICs. 35 out of the 50 included articles reported that the CHW intervention was (potentially) cost-effective. However, only 14 out of these 35 articles performed probabilistic sensitivity analyses, which poses a challenge to the robustness of the results stating that CHWs were cost-effective. The substantial heterogeneity in settings, interventions and methodologies makes meta-analysis impossible and indicates a need for more standardized economic evaluations regarding CHW interventions in PHC.

Recommendations

Based on the findings of this review, a few recommendations for future research on the cost-effectiveness of CHWs in PHC can be made. First, authors should report a detailed description of the comparator (eg, which care is provided, by whom). Second, studies applying a societal perspective should consider including spillover effects, especially when targeting chronic conditions. Third, authors should integrate an approach to engage with patients or other stakeholders involved in the study or at least mention why this was not feasible (CHEERS item 21). Fourth, authors should include the analysis plan for the economic evaluation (CHEERS item 4) and perform a PSA to evaluate the robustness of the results. Finally, considering the current gap of economic evaluations from HICs, authors should be encouraged to publish economic evaluations of CHW interventions in scientific literature to further built the evidence in this field.

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Author Affiliations: Interuniversity Center for Health Economics Research (ICHER), Department of Public Health and Primary Care, Ghent University, Ghent, Belgium (Van Iseghem, Meertens, Verhaeghe); Centre for Population, Family and Health, Faculty of Social Sciences, University of Antwerp, Antwerp, Belgium (Vroonen, Masquillier, Wouters); Department of Family Medicine and Population Health, University of Antwerp, Antwerp, Belgium (Op de Beeck, Masquillier); Department of Dermatology, University Hospital Ghent and Skin Cancer Research Institute Ghent (Skin-CRIG), Ghent, Belgium (Meertens); Center for Research and Innovation in Care (CRIC), Faculty of Medicine and Health Sciences, University of Antwerp, Antwerp, Belgium (Masquillier); Interuniversity Center for Health Economics Research (ICHER), Department of Public Health, Vrije Universiteit Brussel, Brussels, Belgium (Verhaeghe).

Correspondence: Tijs Van Iseghem, MSc, Interuniversity Centre for Health Economics Research (ICHER), Department of Public Health and Primary Care, Ghent University, UZ-Gent, 4K3, entrance 42, Corneel Heymanslaan 10, 9000 Ghent, Belgium. Email: tijs.vaniseghem@ugent.be

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