Health policy and system support to optimise community health worker programmes: an abridged WHO guideline

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Optimising community health worker (CHW) programmes requires evidence-based policies on their education, deployment, and management. This guideline aims to inform efforts by planners, policy makers, and managers to improve CHW programmes as part of an integrated approach to strengthen primary health care and health systems. The development of this guideline followed the standard WHO approach to developing global guidelines. We conducted one overview of reviews, 15 systematic reviews (each one on a specific policy question), and a survey of stakeholders' views on the acceptability and feasibility of the interventions under consideration. We assessed the quality of systematic reviews using the AMSTAR tool, and the certainty of the evidence using the GRADE methodology. The overview of reviews identified 122 eligible articles and the systematic reviews identified 137 eligible primary studies. The stakeholder perception survey obtained inputs from 96 respondents. Recommendations were developed in the areas of CHW selection, preservice education, certification, supervision, remuneration and career advancement, planning, community embeddedness, and health system support. These are the first evidence-based global guidelines for health policy and system support to optimise community health worker programmes. Key considerations for implementation include the need to define the role of CHWs in relation to other health workers and plan for the health workforce as a whole rather than by specific occupational groups; appropriately integrate CHW programmes into the general health system and existing community systems; and ensure internal coherence and consistency across different policies and programmes affecting CHWs.

Background

Accelerating and sustaining progress in achieving the health targets in the Sustainable Development Goals (SDGs) will require dedicated investment in human resources for health. This is evidenced by target (3c), which aims to "substantially increase health financing, and the recruitment, development and training and retention of the health workforce in developing countries, especially in least developed countries and small-island developing States".[1]

The growing attention to the potential of community health workers (CHWs) to contribute to the progressive realisation of universal health coverage is motivated by substantial evidence demonstrating their effectiveness in delivering a range of preventive, promotive, and curative services related to reproductive, maternal, newborn, and child health;[2–7] infectious diseases;[8–10] non-communicable diseases;[11–13] and neglected tropical diseases.[14] The *WHO Global Strategy on Human Resources for Health: Workforce 2030*,[15] adopted by the World Health Assembly in 2016, encourages countries to adopt a diverse, sustainable skills mix, harnessing the potential of CHWs in interprofessional primary care teams.

Support for CHWs and their integration into health systems and the communities they serve is uneven across and within countries; good practice examples are not necessarily replicated and evidence-based policy options are not uniformly adopted. Although CHWs should be considered as an integral part of primary health-care strategies and of the health system, CHW programmes are often fraught with challenges including poor planning; unclear roles; inadequate education; limited career pathways; lack of certification hindering recognition of competencies and job mobility; multiple competing actors with little coordination, leading to fragmented, disease-specific training; donor-driven management and funding; tenuous linkages with and accountability to the health system; poor coordination, supervision, quality control, and support; and under-recognition of CHWs' contribution.[16] These challenges can contribute to wasted human capital and financial resources, and missed opportunities to provide vital health services to communities.

The impact of CHWs can be maximised through the adoption of evidence-based policies that support their education, deployment, and support by health systems and communities.[17] We have collaborated in the development of a WHO guideline which aims to assist national governments, as well as their domestic and international partners, to improve the design, implementation, performance and evaluation of CHW programmes. We present an abridged version of the guideline here. The full version is available separately.[18]

Scope of the guideline

This guideline is primarily focused on CHWs as defined by the International Labour Organization (ILO) in the International Standard Classification of Occupations (ISCO; occupational group 3253). ILO defines CHWs as health workers who "provide health education and referrals for a wide range of services, and provide support and assistance to communities, families and individuals with preventive health measures and gaining access to appropriate curative health and social services. They create a bridge between providers of health, social and community services and communities

	Number of eligible studies included in systematic reviews
Selection, education, and certification	
In CHWs being selected for preservice training, what strategies for selection of applications for CHWs should be adopted over what other strategies?	16
For CHWs receiving preservice training, should the duration of training be shorter versus longer?	8
For CHWs receiving preservice training, should the curriculum address specific versus non-specific competencies?	2
For CHWs receiving preservice training, should the curriculum use specific delivery modalities versus not?	5
In CHWs who have received preservice training, should competency-based formal certification be used versus not used?	4
Management and supervision	
In the context of CHW programmes, what strategies of supportive supervision should be adopted over what other strategies?	13
In the context of CHW programmes, should practising CHWs be paid for their work versus not?	14
In the context of CHW programmes, should practising CHWs have a formal contract versus not?	1
In the context of CHW programmes, should practising CHWs have a career ladder opportunity/framework versus not?	2
Integration in and support by health system and communities	
In the context of CHW programmes, should there be a target population size versus not?	5
In the context of CHW programmes, should practising CHWs collect, collate, and use health data versus not?	14
In the context of CHW programmes, should practising CHWs work in a multi-cadre team versus in a single-cadre CHW system?	0
In the context of CHW programmes, are community engagement strategies effective in improving CHW programme performance and utilisation?	43
In the context of CHW programmes, should practising CHWs mobilise wider community resources for health versus not?	2
In the context of practising CHW programmes, what strategies should be used for ensuring adequate availability of commodities and consumable supplies over what other strategies?	9

Table 1: Policy questions examined by the guideline

that may have difficulty in accessing these services."[19] Recognising the ambiguity surrounding the use of the term "community health worker", and the blurred boundaries with other types of community-based health worker, this guideline and the corresponding methodology for the search strategies informing the literature reviews were developed using a broad search strategy that, in addition to the term "community health worker", included a wide range of search terms capturing both CHWs (according to the ILO ISCO definition) and other types of community-based health worker. This guideline, therefore, is primarily focused on CHWs, but its relevance and applicability include other types of community-based health worker, defined in the context of this document as "health workers based in communities (ie, conducting outreach beyond primary health-care facilities or based at peripheral health posts that are not staffed by doctors or nurses), who are either paid or volunteer, who are not professionals, and who have fewer than 2 years' training but at least some training, if only for a few hours".

The recommendations of this guideline are of relevance to health systems of countries at all levels of socioeconomic development. The guideline follows a health system approach. Specifically, it identifies the policy and system enablers required to optimise design and performance of CHW initiatives. It does not appraise the body of evidence about the types of interventions being delivered—these are covered by other WHO guidelines.

How this guideline was developed

The 2018 *Guideline on health policy and system support to optimise community health worker programmes*[18] followed the standards for guideline development[20] at WHO that aim to ensure that WHO guidelines meet the highest international standards and contain trustworthy and implementable recommendations. This entailed a critical appraisal of the evidence through systematic reviews and assessment of the certainty of the evidence using the GRADE approach.[21] The scope of the guideline was defined by identifying 15 policy questions, spanning standard human resources for health management functions across the working lifespan of CHWs, and translating them into population, intervention, control, outcome (PICO) questions to commission the development of systematic reviews (table 1). The research questions guiding the systematic reviews were developed based on the PICO framework. Following the review process, evidence gathered was examined from a more granular perspective, identifying which strategies worked better than others within a broader policy question formulated according to the binary yes/no answers that the PICO framework entails.

A Steering Group of WHO and UNICEF staff identified the members of the Guideline Development Group (GDG), which comprised a geographically and gender-balanced representation across different constituencies, including policy makers, end-users of guidelines, experts, health professional associations, CHWs, and labour union representatives (appendix). The GDG led the

development of the policy questions and formulation of recommendations, with the support of the Steering Group. The draft guidelines were then reviewed by an External Review Group, with members selected following an open call for applications. Declarations of interests were managed according to WHO policy.[22] The membership of all the groups and contributors of the guideline is reported in the WHO full guideline document.[18]

Three main sources of evidence were specifically commissioned in support of the development of this guideline and were considered as the main information basis. First, relevant literature was mapped through a review of reviews published elsewhere.[23] 11 databases (PubMed, Embase, PASCAL Biomed, the Cochrane Library, Ovid's Global Health, WHO Global Health Regional Libraries, the Database of Abstracts of Reviews of Effects [DARE], Epistemonikos, Health Systems Evidence, PROSPERO, and the National Guideline Clearinghouse of the US Department of Health and Human Services) were searched for review articles published between Jan 1, 2005, and June 15, 2017. Review articles on CHWs with no more than 2 years of training were included. The review team assessed the methodological quality of the reviews according to AMSTAR criteria and reported findings based on PRISMA guidelines.

Second, dedicated systematic literature reviews were conducted for each of the 15 PICO questions. Eight electronic databases were searched for relevant studies: Medline, Embase, the Cochrane library, CINAHL, PsycINFO, LILACS, Global Index Medicus, and POPLINE. In addition, three databases (OpenGrey, TROVE, and Google Scholar) were searched for grey literature. All 15 systematic reviews referring to the 15 PICO questions were underpinned by a common initial search to broadly identify all possible studies involving CHWs across all countries; the results were then further searched for studies of specific relevance to the 15 PICO questions. The full systematic reviews will be published elsewhere. The search strategies are available on the WHO website. The reviews adopted a common methodology, including assessing the risk of bias using the Cochrane Risk of Bias tool for randomised studies and the Newcastle-Ottawa Scale for non-randomised studies; rating the certainty of the evidence using GRADE for quantitative data and GRADE Confidence in the Evidence from Reviews of Qualitative research (CERQual) for qualitative data; and grading the strength of recommendations using the GRADE evidence-to-decision tables.

Third, a stakeholder perception survey was done to assess the relative importance of different outcomes, and the feasibility and acceptability of the interventions under consideration in the emerging guidelines. A self-administered online survey was disseminated in English and French languages to stakeholders through three major channels: the WHO human resources for health contact list; the Health Information For All (HIFA) online platform; and participants at the 2017 Institutionalizing Community Health Conference (ICHC) held in South Africa in 2017. Eligible participants included stakeholders who were involved directly or indirectly in the implementation of CHW programmes in countries. Responses were graded using a 9-point Likert scale.

In developing the evidence-to-decision tables underpinning the recommendations, the GDG considered evidence from quantitative and qualitative studies, and other factors, including the magnitude of effects, balance of benefits and harms, costs and cost-effectiveness considerations, and implications for health equity, acceptability, and feasibility. In the formulation of recommendations, the sources of evidence were complemented by the expertise and experience of GDG members, which were particularly important for policy areas where published evidence was limited. Decisions on the direction and strength of recommendations were taken by consensus. Interventions supported by low or very low certainty of evidence typically led to a conditional recommendation. Conditional recommendations imply that the GDG is less certain about the balance between the benefits and harms of implementing a recommendation. These conditional recommendations generally include a description of the conditions under which the end user should or should not implement the recommendation. In some instances with low or very low certainty of evidence, the additional factors listed above led the GDG to consider a strong recommendation. Strong recommendations imply that the GDG is confident that the desirable effects of adhering to the recommendations outweigh the undesirable consequences. In such cases, the GDG took a vote, the outcome of which is reported in the pertinent section of the full guideline and for which a majority was defined as 80% or above of the voting members in attendance of the GDG.

Findings and policy recommendations

The overview of reviews identified over 4000 references of potential relevance and 122 eligible reviews (75 systematic reviews, of which 34 included meta-analyses, and 47 non-systematic reviews). The systematic reviews conducted for each of the 15 policy questions considered under the guideline screened almost 88 000 records, resulting in the identification of 137 primary studies eligible for inclusion and analysis in the reviews. The stakeholder survey obtained inputs from 96 respondents on the acceptability and feasibility of the interventions under consideration in the guideline. Respondents included approximately 70% policy makers, planners, and managers of CHW programmes working at national or subnational levels; the remaining 30% were working for academic and research institutions, international agencies, or development partners.

The guideline recommendations resulting from the review of the evidence and the subsequent GDG deliberations are laid out in table 2.

	WHO suggests/recommends	Certainty of evidence	Strength of recommendation	WHO suggests/ recommends not	Certainty of evidence	Strength of recommendation
Selection, education, and certification						
Selection criteria for preservice training	• Minimum educational level that is appropriate to the task(s) under consideration • Membership of and acceptance by the target community • Gender equity appropriate to the context (considering affirmative action to preferentially select women to empower them and, where culturally relevant, to ensure acceptability of services by the population or target group) • Personal attributes, capacities, values, life and professional experiences of the candidates (eg, cognitive abilities, integrity, motivation, interpersonal skills, demonstrated commitment to community service, a public service ethos)	Very low	Conditional	• Age (except in relation to requirements of national education and labour policies) • Marital status	Very low Very low	Conditional Strong
Criteria to determine duration of preservice training	• Scope of work and anticipated responsibilities and role • Competencies required to ensure high quality service delivery • Pre-existing knowledge and skills (whether acquired through prior training or relevant experience) • Social, economic, and geographic circumstances of trainees • Institutional capacity to provide the training • Expected conditions of practice	Low	Conditional			
Competencies in curriculum for preservice training (if expected role includes such functions)	Core: • Promotive and preventive services, identification of family health and social needs and risk • Integration within the wider health-care system in relation to the range of tasks to be performed in accordance with CHW role, including: referral, collaborative relation with other health workers in primary care teams, patient tracing, community disease surveillance, monitoring, data collection, analysis and use • Social and environmental determinants of health • Providing psychosocial support • Interpersonal skills related to: confidentiality, communication, community engagement and mobilisation • Personal safety Additional: • Diagnostic, treatment and care in alignment with expected role(s) and applicable regulations on scope of practice	Moderate	Conditional			
Modalities of preservice training	• Balance of theoretical focused knowledge and practical focused skills, with priority emphasis on supervised practical experience • Balance of face-to-face and e-learning, with priority emphasis on face-to-face, supplemented by e-learning on aspects on which it is relevant • Prioritise training in or near the community wherever possible • Deliver training and provide learning materials in language that can optimise the trainees' acquisition of expertise and skills • Ensure a positive training environment • Consider interprofessional training approaches where relevant and feasible	Very low	Conditional			
Competency-based certification	Competency-based formal certification for CHWs who have successfully completed preservice training*	Very low	Conditional			
Management and supervision						
Supportive supervision	• Appropriate supervisor-to-supervisee ratio allowing meaningful and regular support • Ensuring supervisors receive adequate training • Use of observation of service delivery, performance data and community feedback • Coaching and mentoring of CHWs • Prioritise improving the quality of supervision	Very low	Conditional			
Remuneration	Remunerating practising CHWs for their work with a financial package commensurate to the job demands, complexity, number of hours, training, and roles that they undertake	Very low	Strong	Paying CHWs exclusively or predominantly according to performance-based incentives	Very low	Conditional
Contracting agreements	Providing paid CHWs with a written agreement specifying role and responsibilities, working conditions, remuneration, and workers' rights	Very low	Strong			
Career ladder	A career ladder should be offered to practising CHWs, recognising that further education and career development are linked to selection criteria, duration, and contents of preservice education, competency-based certification, duration of service, and performance review	Low	Conditional			

(Table 2 continues on next page)

	WHO suggests/recommends	Certainty of evidence	Strength of recommendation	WHO suggests/ recommends not	Certainty of evidence	Strength of recommendation
(Continued from previous page)						
Integration in and support by health system and communities						
Target population size	Criteria to be adopted in most settings: • Expected workload based on epidemiology and anticipated demand for services • Frequency of contact required • Nature and time requirements of the services provided • Expected weekly time commitment of CHWs (factoring in time away from service provision for training, administrative duties, etc) • Local geography (including proximity of households, distance to clinic, and population density) Criteria that might be of relevance in some settings: • Weather/climate • Transport availability and cost • Health worker safety • Mobility of population • Available human and financial resources	Very low	Conditional			
Data collection and use	Practising CHWs should document the services they are providing and collect, collate, and use health data on routine activities, including through relevant mobile health solutions. Enablers for success include: • Minimising the reporting burden and harmonising data requirements • Ensuring data confidentiality and security • Equipping CHWs with the required competencies through training • Providing them with feedback on performance based on data collected	Very low	Conditional			
Types of CHW	Adopting service delivery models comprising CHWs with general tasks as part of integrated primary health care teams. CHWs with more selective and specific tasks can play a complementary role when required on the basis of population health needs, cultural context, and workforce configuration	Very low	Conditional			
Community engagement	Adoption of the following community engagement strategies in the context of practising CHW programmes: • Preprogram consultation with community leaders • Community participation in CHW selection • Community monitoring of CHWs • Community involvement in selection and priority-setting of CHW activities • Support to community-based structures • Involvement of community representatives in decision-making, problem-solving, planning, and budgeting processes	Moderate	Strong			
Mobilisation of community resources	• Identifying priority health and social problems and developing/ implementing corresponding action plans with the communities • Mobilising and helping coordinate relevant, local resources representing different stakeholders, sectors, and civil society organisations to address priority health problems • Facilitating community participation in transparent evaluation and dissemination of routine community data and outcomes of interventions • Strengthening linkages between community and health facilities	Very low	Conditional			
Availability of supplies	Adoption of the following strategies to ensure adequate availability of commodities and consumable supplies, quality assurance, appropriate storage, stocking and waste management: • Integration in the overall health supply chain • Adequate reporting, supervision, compensation, work environment management, appropriate training and feedback, team quality improvement meetings • Availability of mHealth to support different supply chain functions	Low	Conditional			

*Certification is defined in this context as a formal recognition awarded by relevant authorities to health workers who have successfully completed preservice education and who have demonstrated meeting predetermined competency standards.

Table 2: Guideline recommendations

Countries should use a combination of CHW policies selected based on the objectives, context, and architecture of each health system. This guideline is not a blueprint that can be uncritically adopted; rather, it should be seen as a critical overview of evidence and a menu of inter-related policy options and recommendations, which need to be adapted and contextualised to the reality of a specific health system.

The starting point for an effective design of CHW initiatives and programmes is a sound situation analysis of population needs and health system requirements. Planners should adopt a whole-of-system approach, taking into consideration health system capacities, population needs, and framing the role of CHWs vis-à-vis other health workers, in order to appropriately integrate CHW programmes in the health system.[24] CHWs should

not be regarded simply as a way to save costs or as substitutes for health-care professionals, but as elements of integrated primary health care teams. Consideration should also be given to linking CHW initiatives with national education, labour, and community development sectoral or subsectoral policies and frameworks.

The role of CHWs should be defined and supported within the overarching objective of constantly improving equity, quality of care, and patient safety. At the same time, consideration should be given not only to the traditional performance measures focused on health service outputs, outcomes, and impact, but also to basic labour rights that include safe and decent working conditions and freedom from all kinds of discrimination, coercion, and violence. Some of these aspects are of particular concern and relevance in both acute crises and chronic complex emergencies, as there is a growing body of evidence that CHWs have a strong potential in mitigating their negative health impact.[25]

The policy options recommended in this guideline have, in the aggregate, considerable cost implications, and these require long-term dedicated financing. Nevertheless, the deployment of CHWs has been identified as a cost-effective approach, and countries at all levels of socioeconomic development, including low-income ones, have demonstrated that it is possible to prioritise investments in large-scale CHW initiatives.[26] In contexts where this is relevant, development partners and external funders should strive to harmonise their support to CHW programmes, and align it with public policy and national health systems.

Limitations

The process to develop this guideline found a paucity of robust evidence across several policy areas examined. As a result, many of the recommendations are conditional based on the low or very low certainty of the evidence.

In the development of this guideline, no geographical restrictions were posed in terms of focus of the recommendations, nor in the search for evidence. However, the majority of studies included in the 15 systematic reviews for the policy questions referred to CHWs' experience in sub-Saharan Africa and south Asia, with evidence from other regions less well represented, and a more limited availability of studies from high-income countries (with the notable exception of the USA, where several included studies were conducted). This has ramifications for the generalisability and applicability of the evidence found to contexts different from those to which the primary evidence refers.

Despite a deliberate attempt by the review team to document detailed characteristics of CHWs, such as their role, duration of training, employment status, and level of payment, most of the identified studies did not provide sufficient information on these features. It was therefore not possible to stratify findings and resulting recommendations according to CHW characteristics.

Finally, the stakeholder perception survey to assess feasibility and acceptability of the policy options under consideration in the guideline had only limited participation by CHWs, as most respondents were planners, policy makers, and managers. Its findings should, therefore, be interpreted as reflective of the views of mainly planners and managers rather than CHWs. Similarly, the views of service users and patients were not directly elicited for the development of this guideline; the weighting of benefits and harms for service users and the communities, however, underpinned the discussion of each of the recommendations.

Outlining a future research agenda on CHWs

Every effort has been made to ensure that the policy recommendations contained in this guideline are informed by an up-to-date appraisal of the published evidence, complemented by assessments of feasibility and acceptability of the policy interventions. Overall, evidence was identified to provide policy recommendations for most areas. However, in several instances important gaps in both scope and certainty of evidence emerged from the systematic reviews; they provide an opportunity to outline priorities for a future research agenda on CHWs.

There is a near-absolute absence of evidence in some areas examined by the guidelines (eg, certification or contracting and career ladders for CHWs, appropriate typology, and population target size). On most policy areas considered, however, there is some evidence (in some cases substantial) that broad strategies (eg, competency-based education, supportive supervision, and payment) are effective. Even so, this evidence is typically not sufficiently granular or is too context-specific to allow for recommending specific interventions—eg, which education approaches, which supervision strategies, or which bundle of financial and non-financial incentives are most effective or more effective than others. Additional cross-cutting considerations include the absence of economic evaluations of the various interventions under consideration and the dearth of evidence tracking policy effectiveness over time through longitudinal studies.

In calling for additional research on the topic, it is important to recognise that, while more methodologically robust evidence is needed, it is probably unrealistic to envisage that there would be large-scale randomised controlled trials to address all persisting evidence gaps from an effectiveness standpoint. It is necessary to avoid too narrow a focus on intervention-specific CHW effectiveness.

In addition, there is a need to investigate the contextual factors and enablers (how, for whom, under what circumstances), and the broader health system requirements and implications of supporting the implementation of several interventions simultaneously. Getting an answer to such policy questions requires health policy and

systems research methodologies,[27] such as implementation research, systems thinking tools, agent-based modelling, complex adaptive systems, heuristics guidance, process monitoring, and rapid synthesis of available research.

As most of the evidence retrieved for this guideline originated in low-income and middle-income countries, additional research should be considered in advanced economies to better identify any differences in contextual factors and effectiveness of approaches that would impact on policy options and recommendations.

The identification of these evidence gaps will hopefully contribute to a growing and more methodologically robust literature, which will enable in due course updating the guideline on the basis of a higher certainty of the evidence.

Conclusion

This guideline reiterates and reinforces the principle underscored by the *WHO Global Strategy on Human Resources for Health: Workforce 2030* that countries should plan for their health workforce as a whole, rather than segmenting planning and corresponding programming and financing efforts by single occupational groups, which carries a risk of fragmentation, inefficiency, and policy inconsistency. CHW initiatives and programmes should be aligned to and as part of broader national health and health workforce policies. Countries should use a combination of CHW policies selected based on the objectives, context, and architecture of each health system.

Further, the recommendations should not be considered in isolation from one another. There is a need for internal coherence and consistency between different policies, as they represent related and interlocking elements which complement and can reinforce one another. CHW programmes and policies will need to be monitored and evaluated over time and adapted and amended through a dynamic process informed by context-specific evidence.

References
1 United Nations. Sustainable Development Goals. http://www.un.org/sustainabledevelopment/sustainable-development-goals/ (accessed Oct 15, 2018).

2 Gilmore B, McAuliffe E. Effectiveness of community health workers delivering preventive interventions for maternal and child health in low- and middle-income countries: a systematic review. *BMC Public Health* 2013; **13:** 847.

3 Glenton C, Scheel IB, Lewin S, Swingler GH. Can lay health workers increase the uptake of childhood immunisation? Systematic review and typology. *Trop Med Int Health* 2011; **16:** 1044–53.

4 Lewin S, Munabi-Babigumira S, Glenton C, et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database Syst Rev* 2010; **3:** CD004015.

5 Lassi ZS, Bhutta ZA. Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes. *Cochrane Database Syst Rev* 2015; **3:** CD007754.

6 Lassi ZS, Middleton PF, Bhutta ZA, Crowther C. Strategies for improving health care seeking for maternal and newborn illnesses in low- and middle-income countries: a systematic review and meta-analysis. *Glob Health Action* 2016; **9:** 31408.

7 Black RE, Taylor CE, Arole S, et al. Comprehensive review of the evidence regarding the effectiveness of community-based primary health care in improving maternal, neonatal and child health: 8. summary and recommendations of the Expert Panel. *J Glob Health* 2017; **7:** 010908.

8 Mwai GW, Mburu G, Torpey K, Frost P, Ford N, Seeley J. Role and outcomes of community health workers in HIV care in sub-Saharan Africa: a systematic review. *J Int AIDS Soc* 2013; **16:** 18586.

9 Smith Paintain L, Willey B, Kedenge S, et al. Community health workers and stand-alone or integrated case management of malaria: a systematic literature review. *Am J Trop Med Hyg* 2014; **91:** 461–70.

10 Wright CM, Westerkamp L, Korver S, Dobler CC. Community-based directly observed therapy (DOT) versus clinic DOT for tuberculosis: a systematic review and meta-analysis of comparative effectiveness. *BMC Infect Dis* 2015; **15:** 210.

11 van Ginneken N, Tharyan P, Lewin S, et al. Non-specialist health worker interventions for the care of mental, neurological and substance-abuse disorders in low- and middle-income countries. *Cochrane Database Syst Rev* 2013; **11:** CD009149.

12 Raphael JL, Rueda A, Lion KC, Giordano TP. The role of lay health workers in pediatric chronic disease: a systematic review. *Acad Pediatr* 2013; **13:** 408–20.

13 Mishra SR, Neupane D, Preen D, et al. Mitigation of non-communicable diseases in developing countries with community health workers. *Globalization Health* 2015; **11:** 43.

14 Vouking MZ, Takougang I, Mbam LM, Mbuagbaw L, Tadenfok CN, Tamo CV. The contribution of community health workers to the control of Buruli ulcer in the Ngoantet area, Cameroon. *Pan Afr Med J* 2013; **16:** 63.

15 WHO. Global strategy on human resources for health: workforce 2030. http://www.who.int/hrh/resources/pub_globstrathrh-2030/en/ (accessed July 17, 2018).

16 Tulenko K, Møgedal S, Afzal MM, et al. Community health workers for universal health-care coverage: from fragmentation to synergy. *Bull World Health Organ* 2013; **91:** 847–52.

17 Pfaffman Zambruni J, Rasanathan K, Hipgrave D, et al. Community health systems: allowing community health workers to emerge from the shadows. *Lancet Glob Health* 2017; **5:** e866–67.

18 WHO. WHO guideline on health policy and system support to optimize community health worker programmes. http://www.who.int/hrh/community/en/

19 International Labour Organization. International Standard Classification of Occupations (ISCO-08): structure, group definitions and correspondence tables. Geneva: International Labour Organization, 2012. http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_172572.pdf (accessed July 23, 2018).

20 WHO. WHO Handbook for Guideline Development, 2nd edn. http://apps.who.int/medicinedocs/en/d/Js22083en/ (accessed Oct 15, 2018).

21 Brozek JL, Akl EA, Alonso-Coello P, et al; GRADE Working Group. Grading quality of evidence and strength of recommendations in clinical practice guidelines. Part 1 of 3. An overview of the GRADE approach and grading quality of evidence about interventions. *Allergy* 2009; **64:** 669–77.

22 Wang X, Chen Y, Yao L, et al Reporting of declarations and conflicts of interest in WHO guidelines can be further improved. *J Clin Epidemiol* 2018; **98:** 1–8.

23 Scott K, Beckham S, Gross M, et al. What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers and their integration with health systems. *Hum Resour Health* 2018; **16:** 39.

24 Perry H, Crigler L, eds. developing and strengthening community health worker programs at scale: a reference guide and case studies for program managers and policy makers. Washington, DC: USAID/MCHIP, 2014. http://www.mchip.net/sites/default/files/MCHIP_CHW%20Ref%20Guide.pdf (accessed Oct 25, 2018).

25 Miller NP, Milsom P, Johnson G, et al. Community health workers during the Ebola outbreak in Guinea, Liberia, and Sierra Leone. *J Glob Health* 2018; **8:** 020601.

26 Dahn B, Woldemariam AT, Perry H, et al. Strengthening primary health care through community health workers: investment case and financing recommendations. http://www.who.int/hrh/news/2015/CHW-Financing-FINAL-July-15-2015.pdf?ua=1 (accessed Oct 25, 2018).

27 Maher D, Cometto G. Research on community-based health workers is needed to achieve the Sustainable Development Goals. *Bull World Health Organ* 2016; **94:** 786.