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Community Health Workers' Integration Models and Health System Integration Effectiveness for Universal Health Coverage in Sub-Saharan Africa: A Systematic Review

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Abstract

*In sub-Saharan Africa (SSA), **e**vidence suggests that many low and middle-income countries face severe shortages and uneven distribution of health workers, medicines and infrastructure, resulting in poor quality services and serious gaps in coverage for essential health care. In addressing the human resources gaps of trained health professionals, Community Health Workers (CHWs) were recruited and integrated in the health system and they are increasingly regarded as central actors in achieving Universal Health Coverage (UHC) and strengthening primary health care (PHC) in SSA. Evidence from existing studies shows that community health workers have the greatest impact when they are well integrated across the main health system building blocks. Estimates of Community Health Worker (CHW) density vary widely across Sub-Saharan Africa, ranging from about 11.2 to 59.5 CHWs for every 10,000 people. These differences depend largely on how many hours CHWs work and the scope of services they provide. However, integration models differ widely across nations with mixed outcomes in service provision, equity, and sustainability. Three models of integration dominated: government-driven, hybrid, and Non-Governmental Organisation-driven (NGO). Government-driven models have 40% higher levels of sustainability than donor-based models and cost-effectiveness ratios of $1.20 per capita per annum, for example in Ethiopia and Ghana, among others. Successful CHW integration is context-dependent model selection, with no single model likely to be optimal for every situation; success depends on close adaptation to the local health system and community context.*

Keywords: *Community Health Workers, Health System Strengthening, Integration Models, Sub-Saharan Africa, Universal Health Coverage.*

Introduction

The World Health Organization (WHO) African Region bears a disproportionate share of the global shortage, with low densities of doctors, nurses and midwives and severe maldistribution between and within countries in many countries, with rural, remote and underserved areas facing the greatest shortages. WHO estimates a projected shortfall of 18 million health workers by 2030, mostly in low- and lower-middle-income countries [2] and emphasizes that health systems can only function well when they have sufficient, well-trained and equitably distributed health workers, who are competent, responsive, motivated and productive [39]. Since the Alma-Ata Declaration of 1978, which emphasized 'Health for All' through community participation, CHW programs have evolved from vertical, disease-specific interventions to integrated, comprehensive community health systems. Also, the 2018 Astana Declaration reaffirmed the centrality of primary health care PHC) and explicitly recognized CHWs as an essential health workforce [1]. Community

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Health Workers (CHWs) have emerged as a cornerstone of primary health care delivery in Sub-Saharan Africa, bridging the gap between formal health systems and underserved communities. In Sub-Saharan Africa, where health workforce shortages are most acute with only 2.3 health workers per 1,000 population compared to the World Health Organization (WHO) minimum of 4.45 CHWs provide critical services including maternal and child health, infectious disease management, health promotion, and increasingly, non-communicable disease screening [2].

The WHO adopted a global strategy on human resources for health, aimed at ensuring universal access to health workers and improving their performance, quality, and impact on health systems, which specifically recognises CHWs as an important component of the health workforce. The strategy emphasizes the need for countries to develop comprehensive policies for CHW programs, including training, supervision, and integration with health systems [2].

Integration requires harmonizing CHW roles and competencies with service delivery models and ensuring they are supported by the broader system [4]. The integration of CHW into formal health systems has emerged as a pivotal strategy in addressing health system gaps, particularly in rural Sub-Saharan African countries, where access to healthcare remains severely limited [3].

Sub-Saharan African Community Health Worker programs exist along an integration continuum defined by the strength of the state, external donor support, and policy development. Among other models, there are three common ones that have re-emerged within the sub-region, including NGO-based but government-focused programs, hybrid models that increasingly transfer ownership and responsibility to government entities, and nationalised Ministry of Health (MoH)–based cadres in government systems. We have numerous models operating simultaneously in countries [4, 6, 7]. Country adaptations include cooperative-governed and strategy-focused, community-based and mixed models, which maintain public oversight but vary in financing and accountability structures [4]. The models are supposed to support the WHO six building blocks of health system strengthening but each may have their strengths and weaknesses.

Scott et al. (2018) added that CHW programs are effective when properly integrated into health systems with adequate training, supervision, and support [8]. Evidence across systematic reviews, consistently shows that CHWs improve access, uptake of preventive services, and some clinical outcomes, especially in reproductive, maternal, newborn and child health (MNCH) coverage and behaviors, infectious diseases, and selected noncommunicable diseases (NCDs). The contribution of CHWs have increased Human Immunodeficiency Virus (HIV) testing and ART retention; improved malaria case management; modest but meaningful NCD risk factor control; moderate improvements in common mental disorders via task-shared interventions; equity gains in remote/poor populations and generally favorable cost-effectiveness [5].

The successful integration of CHWs into formal health systems is significantly influenced by several key enabling factors. Key successful factors for CHW programs include Strong political commitment and supportive policy frameworks provide the foundation for sustainable CHW programs, ensuring their recognition and legitimacy within the health system, appropriate selection and training of CHWs, ongoing supervision and support, integration with formal health systems, community ownership and participation, and sustainable financing mechanisms. As the field continues to evolve, innovations in digital health, performance management, and financing models offer new opportunities to enhance CHW effectiveness and sustainability. These facilitating factors work synergistically

to create an enabling environment for effective CHW integration as a blueprint to Universal Health Coverage [4, 6].

Conceptual Framework of CHW Integration into the Health System

Mupara et al. (2023) outlined the CHW programme components (recruitment, education and certification, roles and responsibility, documentation and information management, remuneration, supplies and equipment, and supervision) as key variables corresponding to each of the health system building blocks and supported by standardized national policies and guidelines. The conceptual framework demonstrates the links between the health system building blocks and CHW program components in Figure 1, below.

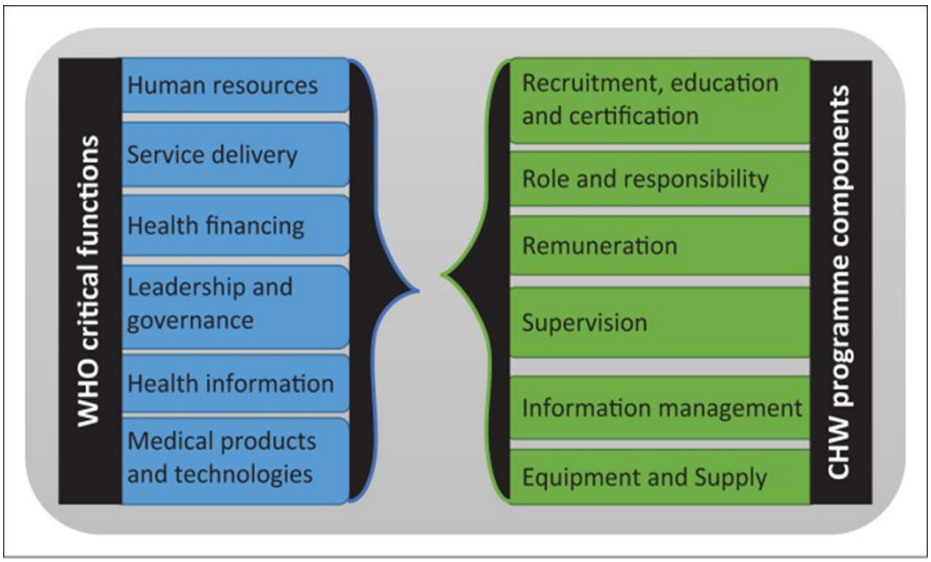

Figure 1. Showing CHW Program Components and the Health System Building Blocks (*Source: Mupara et al. [40]*

Methodology

Design and Study Area

A systematic review is been conducted to provide evidence synthesis on Community Health Workers' integration models, effectiveness and policy recommendations for Universal Health Coverage in Sub-Saharan African.

The study is guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The preferred methodology was a systematic review because it is well-suited to achieving the study's goals, which include synthesising published data on integration models, effectiveness, and policy recommendations for Universal Health Coverage in Sub-Saharan Africa. Both qualitative and quantitative data were included from various identified studies.

Search Strategy

The systematic database search utilized major academic databases for example, WHO Web Site, PubMed/MEDLINE, Scopus, Web of Science, EMBASE, CINAHL, African Index Medicus, and African Journals Online (AJOL). These databases have been selected for their comprehensive coverage of health systems research and their inclusion of African scholarly literature.

The search terms used include community health workers, health system building blocks, integration, Sub-Saharan Africa, CHW integration models, CHW integration effectiveness.

Inclusion and Exclusion

The inclusion criteria: All studies published in the past 15 years (2010 to 2025), to ensure accuracy, while capturing the evolution of CHW integration efforts. Publications in English were used and the countries in Sub-Sahara Africa captured were based on availability of data /publications and these are countries (Ethiopia, Rwanda, Ghana, Kenya and Malawi) that are mostly cited in reviews as case examples with functional CHW integration programs. Other countries also that have made some progress in CHW program integration were also captured. The review encompasses peer-reviewed articles, systematic reviews, meta-analyses, program evaluations and policy documents to provide a comprehensive understanding of the topic.

The systematic review implemented specific exclusion criteria to maintain focus and ensure the quality of included evidence. To ensure currency and relevance of findings, publications dated before 2010 were not be included in the review. Additionally, conference abstracts without accompanying full papers were omitted from the review, as they typically lack the detailed methodology and comprehensive results necessary for thorough analysis.

Data Extraction

The data extraction and analysis process for the systematic review will begin with the development of a comprehensive data extraction template, capturing study characteristics, methodological features, key findings, integration models and recommendations, ensuring consistency and thoroughness in capturing relevant information from each study. This structured approach ensures consistent and comprehensive data collection across all included studies. Comparative analyses was done among the integrated models: government-led, hybrid (government-partner), and NGO-led. A grading system was developed to assess the extent to which the domains of integration are embedded in the national PHC architecture. Each domain is scored on an ordinal scale reflecting the degree of system integration and routine functionality evident in the literature and cross-country implementation experience.

Results

Selection Process of Articles

Of 270 articles identified 250 from databases and 20 from my laptop archives), having used the key searching words, 118 did not have the relevant information needed, 152 full-text articles were assessed, and 113 duplicate articles were excluded. Therefore, 39 were maintained as they met the criteria and were included. This is also illustrated in Figure 2, below.

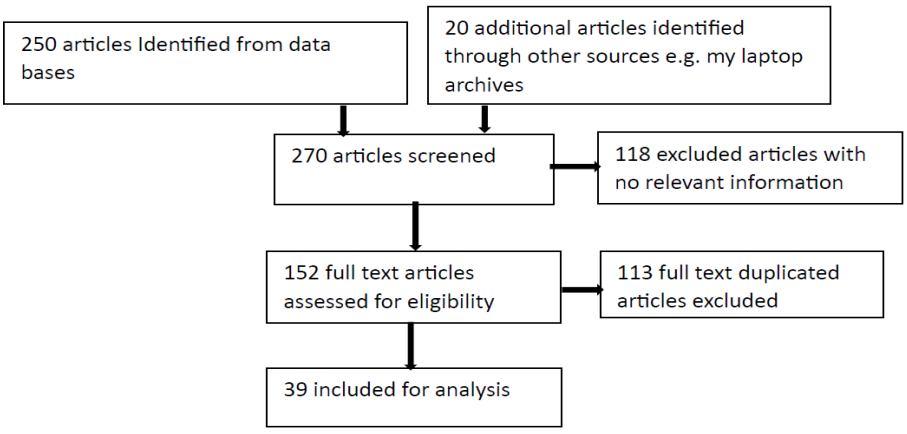

Figure 2. Illustrates, the Selection Process of Articles

Characteristics of Included Studies

The identified studies offer thorough insights into Sub-Saharan African CHW integration models. These consist of policy guidelines, empirical program evaluations, systematic reviews, and country case studies that highlight hybrid, government-led, and non-governmental models. Formalizing CHW hiring, certification, training, supervision, compensation, supply chains, and data integration into national health systems is highly valued. The studies illustrated successful health outcomes that demonstrated the effectiveness of CHW integration in the health system, particularly in maternal and child health, with a particular emphasis on Ethiopia's Health Extension Program, Rwanda's community health system, Ghana's CHP initiative, Kenya's community health strategy and Malawi. Alongside facilitators like community trust, mobile health technologies, and multi-sectoral policy support, obstacles like funding instability, fragmentation, and insufficient supervision are frequently mentioned. When taken as a whole, these pieces highlight the vital role that well-integrated CHW programs play in promoting universal health coverage throughout the region.

CHW Integration Models in Sub-Sahara Africa

In Sub-Saharan Africa, Community Health Worker (CHW) programs are usually organized in three main ways: government-led, NGO-led, and hybrid models. Each approach shapes how the programs are designed, funded, and managed. While they share the same goal of improving community health and the models differ in their structure, leadership, and country examples. For the purpose of this study, the above three models are mainly discussed as they are the most popular ones in Sub-Sahara Africa. These include:

Government-led Model

In government-led models, CHW programs are embedded within the national health systems, coordinated and regulated by ministries of health. These programs are often aligned with national health policies and receive government funding or co-financing to ensure sustainability. A strong emphasis is placed on formal recruitment, training accreditation, supervision, remuneration, and integration into the health system's reporting and supply chains. For countries Using Government-led Models, Ethiopia's Health Extension Program is a prime example, with over 40,000 government-employed health extension workers delivering essential services at community level. Ghana's Community-based Health Planning and Services (CHPS) initiative similarly emphasizes government ownership and scale-up. Rwanda employs a government-coordinated CHW system that has demonstrated improvements in maternal and child health outcomes. Kenya and Sierra Leone have also institutionalized CHW programs through ministry policies and national strategies. These models show better sustainability, standardization, and alignment with Universal Health Coverage (UHC) goals due to stable funding and formal support systems. Government-led programs face resource limitations and require political commitment to achieve scale [4, 16, 32, 40].

NGO-led Model

Community Health Worker (CHW) programs led by NGOs are usually started and funded by non-governmental organizations or international donors. These programs often take two forms:

1. Vertical projects, which focus on specific diseases or groups of people.
2. Community health initiatives, which work alongside existing health services to fill gaps.

These models are implemented in Mozambique and Malawi, NGOs have played a major role in supporting CHW programs, especially for malaria and HIV/AIDS. In Uganda and Tanzania, many smaller

community projects began with NGO funding and guidance.

NGO-led models are often innovative, flexible, and quick to respond to local needs. They can roll out programs faster than government systems and on a contrary, these models can be fragmented, may not always align with national health systems, and often struggle to stay sustainable once donor funding ends [4, 6, 33].

Hybrid Models

Hybrid models bring together the strengths of both governments and NGOs (or donors). In these setups, governments provide leadership and policy direction, while NGOs or donors contribute resources, training, and support. This mix allows programs to benefit from the structure of formal health systems and the flexibility of NGOs, making them more effective and far-reaching. Countries for example Senegal: The Bajenu *Gox* program is guided by government policy but relies on NGOs for community mobilization and building local capacity [4, 30, 40].

This model succeeds as a result of:

1. They combine the coverage and authority of government systems with the innovation and adaptability of NGOs.
2. Communities often trust them more because they feel both locally responsive and officially recognized.
3. Stronger supervision and supply chains make them more reliable, while their flexibility helps them adjust to changing needs.

Other CHW Integration Models

Beyond the government-led, NGO-led, and hybrid approaches, there are several alternative models for integrating CHWs in health systems in Sub-Saharan Africa. These models can stand alone or be combined with the main ones, depending on local needs.

Types of alternative models include:

1. Volunteer-based: CHWs serve their communities without formal pay, often motivated by social responsibility [31].
2. Private sector or market-based: Health services are supported by businesses or market-driven initiatives [35].
3. Faith-based organization (FBO)-led: Religious groups lead and fund CHW programs, drawing on community trust [36].
4. Social mobilization or community-driven: Local communities organize and manage CHW efforts themselves [31].

While government, NGO, and hybrid models dominate because they scale more easily and align with national policies, these alternative models are crucial in specific contexts, whereby, they are especially effective in reaching underserved or rural populations, where formal systems may struggle and many countries use blended approaches, mixing different models to match their health system's capacity and community preferences [34].

Comparison of Integration Models

The WHO, six building blocks of a health system (Health service delivery, Health workforce, Health information system, Medical products, vaccines and technology, Health financing, and Leadership and governance) further describes the models of integration. Table 1 below compares the three integration models in relation with each of the health system building blocks and their level of risk and strengths are also captured.

In summary, Government-led model, integrates CHWs into national policy, payrolls, and management structures, connecting services to primary health care and public value chains for equity and scale. NGO-led integration is project-based, most often piloting new packages (digital technologies, incentives) with specialist supervision and finance, but vulnerable to fragmentation and limited sustainability. Hybrid integration brings NGO implementation together with government

stewardship: NGOs deliver training, commodities, information systems, and quality improvement and government sets standards, integrates CHWs into HMIS and referral systems, and increasingly takes on financing. Hybrids are able to scale up innovations and establish robust systems, but success depends on concurrence of roles, transition strategy, harmonized reporting, and shared supervision to avoid duplication.

Table 1. CHW Integration Model Comparison Table Across the Health System Building Blocks

Domains	**Nationalized, MoH-led**	**NGO-led, government-aligned**	**Hybrid/transition**
Governance and Leadership	CHW programs are embedded in Ministry of Health (MoH) policy/legislation with clear scopes of practice, job descriptions, and implementation guidelines. National technical working groups (TWGs) provide standards and coordinate partner alignment; district health management teams steward implementation and partner activities within sector plans [4, 6, 8].	Program rules, protocols, and reporting are guided primarily by NGOs/projects; alignment to national policy varies by partner and geography. local government stewardship can be limited by project timelines [4, 6, 8].	MoH sets policy/standards; partners align to common national plans with district-led coordination. Government stewardship is explicit but relies on partner operational support [4, 8].
Health Financing	Majority of CHW program costs are on-budget within public financial management cycles (e.g., remuneration, training, supervision, commodities) with pooled or aligned donor support. Incentives are standardized to reduce inequities and churn [9, 20].	Project-based funding with variable duration and scope; incentives differ by project and may not align with public sector norms. Geographic disparities in pay and inputs are common [9].	Cost-sharing: government funds supervisors (e.g., salaries for supervisors, some commodities), while partners contribute operational inputs (training refreshers, transport, digital tools) [9].
Health Workforce	A formalized CHW cadre with standardized pre-/in-service training, certification, competency assessments, and clear progression pathways. Supervisory structures and caseload norms are defined; performance management and coaching-oriented supervision are institutionalized [4, 11].	Training quality can be high within project areas, but curricula and certification may not be nationalized; CHWs are often not on government payrolls; supervision and mentorship intensity varies by partner capacity [11, 4].	National curricula used; partners fund refreshers, mentorship, and QA. Partial payroll integration (some CHWs on stipends, others salaried); standardized supervision with partner augmentation (e.g., more frequent coaching), [11].
Health Information System	CHW indicators and registers are integrated into the national HMIS (often DHIS2), aligned with case definitions and data standards. Data is routinely used at district/facility levels for supervision, commodity planning, and performance review [4, 13].	Packages are frequently vertical (e.g., iCCM or HIV/TB-focused), with referral practices depending on project design and facility engagement. Integration with PHC can be partial [6].	National tools are primary; partners support digitalization, data quality assessments, and feedback loops; reporting flows into DHIS2. Joint data reviews at district level are more routine than under NGO-led models [13, 4].
Medical products, vaccines and technology	Standard CHW kits and commodities flow through the national supply chain; resupply occurs via public systems with defined last-mile procedures; stock monitoring is standardized (e.g.,	Commodities often flow through partner-managed procurement/logistics; public resupply is not assured, leading to	Public supply chain is primary; partners backstop last-mile distribution during gaps (e.g., buffer stocks, transport support). Visibility

	consumption-based reporting, eLMIS where available) [4, 14].	stockouts when projects end or shift [4, 14].	tools/eLMIS may be partner-funded initially with a transition plan. [4, 14].
Health Service Delivery	A national CHW service package linked to facility-based PHC and referral loops (e.g., iCCM, RMNCH, health promotion, NCD screening as applicable). Quality indicators and service coverage are monitored and reviewed in routine management cycles [4, 6, 15].	Packages are frequently vertical (e.g., iCCM or HIV/TB-focused), with referral practices depending on project design and facility engagement. Integration with PHC can be partial [6, 7].	The national package is delivered, with partner-supported enhancements (e.g., increased outreach frequency, targeted pilots for NCDs or newborn care). Referral loops function but may be stronger in partner-supported districts [6, 7].
Strengths	Sustauinable, standardization, Scalability,, equity potential.	Innovation, seed, targeted reach.	Managed risks during scale-up; capacity transfer [10].
Risks	Fiscal shocks; supervision gaps in remote areas; bureaucratic rigidity [10].	Challenges with Sustainability; fragmentation; parallelism [4].	Coordination burden; unclear timelines for absorption.

Facilitators and Barriers to CHW Integration in Health Systems

The successful integration of Community Health Workers into formal health systems is significantly influenced by several key enabling factors including political commitment and clear policies ensuring legal recognition and role clarity, provide the foundation for sustainable CHW programs, ensuring their recognition and legitimacy within the health system, sustainable domestic financing with fair remuneration; and professionalization of the workforce with merit-based recruitment, good pre-service training, ongoing CPD, manageable workloads, and career advancement. Inbuilt, supportive supervision; strong last-mile supply chains; interoperable information systems with data use as routine; functional referral/counter-referral; true community selection and accountability; aligned partners with harmonized tools and transition plans are essential. Pragmatic enablers include transport, safety, job aids, and connectivity [4, 6, 9, 18, 19]. As the field continues to evolve, innovations in digital health, performance management, and financing models offer new opportunities to enhance CHW effectiveness and sustainability. These facilitating factors work synergistically to create an enabling environment for effective CHW integration.

Despite the potential benefits of CHW integration, several significant barriers often impede successful implementation including; high attrition rates because of inadequate compensation and absence of career development opportunities; fractured governance and weak partner coordination among various stakeholders, including government agencies, NGOs, and community organizations, often results in fragmented approaches and inefficient resource utilization; donor reliance and slow transition to local funding; inadequate supervision and quality assurance; non-integration with HMIS and supply chains; and disproportionate coverage, especially in hard-to-reach and conflict zones. These gaps undermine program sustainability and effectiveness. Employing them through fair remuneration, careered professional moves, aligned stewardship and financing, effective management and use of data, coordinated logistics, and pro-equity targeting is imperative for improved outcomes and SDG progress in Africa [4, 6, 11, 18].

Evidence of Effectiveness of CHW Integration into Health Systems

Community Health Workers (CHWs) are crucial in health care system in many parts of Sub-Saharan Africa. When they are fully integrated into national health systems, they make essential services more accessible, especially in resource-limited settings. Their contribution have supported maternal, newborn, and child health, delivering vaccinations, treating common illnesses, providing health education, and connecting patients to higher level care when needed, advancing the broader goal of Universal Health Coverage (UHC) and equity.

CHWs don't just treat illnesses they also prevent disease, tackle social determinants of health, and strengthen resilience during crises like Ebola and COVID-19. Their role proves indispensable in building stronger, more equitable health systems. Evidence have shown that the integration of CHWs in health systems have created impact. The table 2 below show case examples of countries with evidence of CHW contribution in creating positive health impact in Sub-Sahara Africa.

Table 2. Impact and Evidence: Case Examples in Sub-Saharan Africa

	Country	Evidence of effectiveness	Reference
1	Ethiopia	Through task shifting to CHWs, Ethiopia saw UHC service coverage rise from 13 (in 2000) to 35 (in 2021), and maternal and child deaths sharply declined. Modern contraceptive use surged by 34 percentage points, DPT3 vaccine coverage increased by 33 percentage points, and facility deliveries rose by nearly 50 percentage points over two decades. Over 40,000+ Health Extension Workers deployed nationwide as salaried, formally trained cadres embedded in primary health care. Sources consistently describe 30–42k HEWs since scale-up.	[16, 37]
2	Rwanda	Rwanda organized CHWs into cooperatives with performance-based financing (PBF), integrating them into the PHC system with strong district stewardship. CHW cooperatives linked to supervision, PBF, and supply chain reliability; evidence shows increased utilization and improved outcomes in maternal and child health.	[17]
3	Ghana	CHPS is widely cited as cost-effective, with per-capita estimates varying across periods and costing methods. Studies report low per-capita recurrent costs (often single-digit USD), with strong improvements in access and MCH outcomes.	[28]
4	Kenya	Community Health Strategy and CHVs integrated into primary care with mixed funding; digital CHIS scaling 64,000 CHWs expanded access to primary care and boosted immunization and MCH coverage and indicators	[21]
5	Uganda	VHT strategy with iCCM expansion improved treatment coverage; sustainability challenges are tied to remuneration and supplies.	[22]
6	Malawi	HSAs as a formal cadre delivering iCCM and immunization with strong supervision; documented reductions in child mortality.	[23]

7	Tanzania	Child morbidity reduced during the WAJA Program, 2011-2015. Cluster-randomised trial of multi-tasked, paid CHWs, integrated via district health teams, reduced childhood illness incidence and boosted timely curative care-seeking in intervention vs. control areas, attributed to community acceptability, supervision, and remuneration	[24]
9	Sierra Leone	Post-Ebola CHW programs institutionalized with national policies, improving surveillance and PHC linkages.	[26]
10	Liberia	CHW led interventions raised confirmed malaria diagnoses from 71% to 95%, exemplifying their direct effect on essential health outcomes Mothers served by CHWs are nearly six times more likely to exclusively breastfeed. Immunization rates and nutrition outcomes improve with CHW involvement	[25, 37]
11	Nigeria	Maternal and child health coverage increase in northern Nigeria states (Jigawa, Kaduna, Zamfara), the CHW scheme under the Subsidy Reinvestment and Empowerment Programme (SURE-P MCH) integrated CHWs into facilities for antenatal care, immunization, and skilled birth attendance referrals. Realist evaluation showed enhanced access and MCH outcomes during implementation (2014-2016)	[27]
12	Senegal	Government led, “Bajenu Gox” maternal–newborn ambassador model, integrated with facility ANC/PNC and family planning services, improved postpartum family planning uptake and early ANC attendance in urban and peri-urban settings	[30]

CHW Roles and Contribution to UHC

Mayo & Mendoza, (2024), highlighted CHW roles that contributes to the achieving the UHC and these include:

1. **Expanding Access to Health Services:** CHWs are the backbone of healthcare delivery in many resource-limited areas. Their roles include:
    - Providing maternal, newborn, and child health (RMNCH) interventions.
    - Supporting vaccination campaigns and routine immunizations.
    - Diagnosing and treating common illnesses (malaria, pneumonia, diarrhea).
    - Delivering basic sexual and reproductive health services.
    - Health education and behavior change communication.
    - Referrals to higher levels of care.

    This proximity to households reduces geographic and economic barriers, boosts utilization of health services and helps in achieving higher coverage of essential interventions, especially among vulnerable and hard-to-reach groups.
2. **Bridging Gaps in Human Resources for Health:** With projections that Africa alone will face a shortage of over 6 million health workers by 2030, CHWs fill critical workforce gaps, addressing inequities and complementing facility-based care.

Globally, deployments of large cadres have resulted in significant outcomes, such as: Some countries in Sub-Sahara Africa have shown evidence of effectiveness for e.g. Ethiopia, with 42,000 CHWs, have seen a drop in maternal mortality 871 to 267 per 100,000 live births between 2000 and 2020.

3. **Catalysts in Disease Prevention and Health Security:** CHWs have proven indispensable in public health emergencies. They were instrumental in Ebola containment (contact tracing, education), in supporting COVID-19 responses (informing, testing, supporting vaccination), and in controlling the HIV epidemic. Their local credibility and cultural competence built trust crucial to overcoming vaccine hesitancy and misinformation.
4. **Addressing Social Determinants of Health:** Beyond clinical care, CHWs address broader determinants by promoting sanitation, nutrition, and healthy behaviors. They often serve marginalized populations (women, children, elderly, and rural poor) thus contributing to UHC's equity goal.
5. **Enhancing Health System Resilience:** CHWs ensure continuity during health system shocks by maintaining essential services, mobilizing communities, providing psychosocial support, and feeding back grassroots information to guide system responses.

Discussion

CHW Integration Conceptual Framework

The study reinforces and validates the Mupara et al. (2023), health system building blocks linkages with CHW components. The framework establishes systemic alignment as essential, mapping CHW program components including; recruitment, training, certification, and supervision to leadership/governance and human resources building blocks, while remuneration, supplies, and information management correspond to financing, service delivery, and information systems, thereby creating a blueprint, where misalignment in any single element undermines the overall performance. Policy standardization proves very critical, as national guidelines foster consistency across these components, mitigating fragmentation characteristic of NGO-led model and facilitating scale up towards universal health coverage goals. Holistic integration positions CHWs as extensions of the health systems rather than stand-alone actors. Linkages like supervision improving service delivery, help close equity gaps, especially in rural and underserved areas e.g. Ethiopia's Health Extension Program and Rwanda's model show how this works in practice. For SSA countries, the practical actions are; to audit CHW programs against these components to identify weaknesses, prioritize investments in salaries and supervision to keep workers motivated and retained, while also strengthening supplies and data systems to ensure long-term sustainability, working in achieving UHC.

Comparing CHW Integration Models Across the Health System Building Blocks

The concept illustrates the level of alignment/integration of the models to the six health system domains.

Governance and Leadership

Government-driven programs stand the highest chances of achieving the highest level of integration because functions, scopes of practice, and accountability of CHWs are well articulated in national guidelines and operation policies and aligned with PHC arrangements and subnational administration. Such policy articulation supports supervision standards, caseload expectations, channels for referral, and mechanisms for coordination [4, 8]. National TWGs standardize and align partner coordination, and districts manage

implementation within planning cycles, this reduces fragmentation and allows scale with fidelity [4, 6, 8]. Programs implemented by NGOs are generally compliant with national guidelines but run on project regulations and reporting systems, with relatively TWG involvement and district ownership constrained by project timelines [4, 8]. Hybrid models occupy the space between these extremes: policy and standards are established by MoH, coordination is attained through districts via plans and TWGs, and partners align to these structures, while still retaining operational reliance on partner systems for some functions [4, 8, 7]. Integration reduces fragmentation and makes country-wide coverage possible with a single standard.

Health Financing

In the Government-led model, it is critical that funding becomes mainstreamed in public financial management (PFM) procedures: CHW payment, commodities, supervision, and training have budget lines; funds go through government channels; and medium-term spending frameworks improve predictability Programs implemented by the government place the majority of costs on-budget salaries, supervision, training, and supplies go through public financial management, with donor funding pooled/aligned. Standardized incentives reduce inequities and turnover [4, 9]. Programs implemented by NGOs are founded upon project funding, creating variability across geographies/time and heterogeneous incentive structures [9]. Hybrid models share costs: governments fund supervisors and core costs, and partners supply operational inputs (e.g., outreach, logistics) for transition intervals [4, 7].

Health Workforce

In government-sponsored schemes, human resource channels are institutionalized, pre-service and in-service competency-based training, standardized recruitment profiles, credentialing, payroll integration, and (in older schemes) career ladders and incentive mechanisms. These features promote retention and performance, particularly when supplemented with supportive supervision and periodic refresher training [5, 11, 12]. Hybrid models are more likely to adopt national curricula and competency frameworks but may blend government payrolls with donor-funded stipends or top-ups, creating variability in regularity of payment and benefits [9]. NGO-led models can provide solid training and intense support in project fields but possess HR systems (contracts, benefits, performance management) generally beyond government norms and proving difficult to institutionalize at national level.

Two characteristics differentiate higher-performance HR integration across models: a) consistency between role definition and workload and compensation and protections (e.g., PPE, leave, benefits), and b) frequent, coaching-centered supervision driven by data to guide feedback and practice of skills. Where these go off track, programs are faced with mix, inconsistent quality, and equity challenges as services grow up [4, 11, 12].

Health Service Delivery

All models offer services, but integration quality differs in the degree to which services align with the national PHC package and the quality of linkages to facility teams through referral/counter-referral cycles. Government-led and hybrid models more often formalize task lists (e.g., iCCM, RMNCH, FP, selected NCDs), job aids, and quality assurance steps, with clearer escalation criteria and facility linkages. This enables continuity of care, enhanced case management, and more consistent population coverage [7, 10].

NGO-led projects often shine when it comes to small-scale interventions or pilot programs. They can deliver quick results and test new ideas. But when it comes to scaling up, challenges emerge. If their protocols don’t

match national standards or if they run on separate data and supply systems, these projects struggle to integrate into the broader health system. The result is a lack of consistency and difficulty sustaining impact beyond the pilot stage [40].

High service delivery integration is characterised by: standardised protocols and job aids; frequent competency maintenance; systematic supervision with field mentorship; and running referral and counter-referral loops, closing care gaps. They are enabled (or disabled) by the capacity of governance, HR, data, and supply chains to support them [7, 12].

Health Information System

Government programs increasingly integrate community indicators into national DHIS2 (or equivalent), with its standardized registers, monthly summaries, and community modules allowing for aggregation, analysis, and use at multiple levels. Where electronic tools are used, they are increasingly aligned with national data dictionaries and interoperability standards, enabling real-time surveillance, decision support, and feedback loops [13]. Hybrid models most commonly entail combining national HMIS tools with partner-delivered digital solutions; integration quality depends on whether data schemas align cleanly to DHIS2 and whether routine reporting occurs through national channels. NGO-led models most commonly operate parallel project systems (including custom mobile apps) with only partial reporting into national systems, frustrating visibility and institutional learning.

What distinguishes "high integration" is not mere digitization but institutionalization: synchronized indicator sets, periodic data quality audits, management meeting use of data, and interoperable systems that prevent double entry and minimize reporting burden. Embedding these practices in supervision and planning cycles strengthens performance and accountability [4, 7, 13].

Medical Products, Vaccines and Technologies

Sufficient reliable last-mile supply is an enduring hurdle with direct impacts on trust and functionality. Public sector schemes leverage national supply chains (quantification, procurement, warehousing, distribution) and, where available, electronic LMIS for transparency. Institutional channels of escalation, redistribution, and accountability are even better articulated in the event of stockouts, improving recovery time [4, 14]. Hybrid configurations commonly use national chains but engage the services of partner "backstopping" (buffer stockpiles, gap-filling transport, emergency procurement) to overcome the deficiencies, short-term successful but potentially masking underlying problems of the system. NGO-managed models are likely to depend upon partner logistics pipelines, which have the capacity to guarantee high availability across project footprints but are hard to sustain or increase nationwide and may not be compatible with government quantification cycles [14].

Integrated supply chains have standardized resupply kits or algorithms by volumes of service, last-mile visibility (stock cards/eLMIS), facilitative oversight of stock control, and accountabilities clearly shared between facilities, districts, and CHW programs. In the absence of these, supply might fail to respond to demand generated by CHWs, undermining credibility and outcomes [4, 14].

Synthesis and Implications of Health System Building Blocks and Integration Models

The sectors reinforce each other. Financing and governance set the policies and funding; HMIS/data enable learning and accountability; HR and supervision translate standards into practice; and supplies ensure readiness for demand creation. Government models best effectively align these factors most persistently, hybrid models can make integration proceed when built as a bridge to government

ownership, and NGO models can facilitate innovations that need to be intentionally harmonized and institutionalized for scaling [4, 7, 8]. For countries that desire to move "right and up" on the integration frontier, top-down practicalities are enacting CHW jobs and pay in policy and PFM; ensuring curriculum convergence and supervision; combining community indicators into DHIS2 with feedback loops; and improving last-mile supply visibility and accountability. These steps collectively promote equity, resilience, and value for money.

Facilitators and Barriers to Integration

Successful integration of CHWs play a vital role in advancing Universal Health Coverage (UHC) across Sub-Saharan Africa, and their success depends on several key facilitating factors including strong political commitment, clear policies, and sustainable financing, provide the foundation, while professionalization through training and career pathways ensures CHWs are recognized as essential members of the health workforce. Supportive supervision, reliable supply chains, and interoperable data systems help them deliver services effectively, and community accountability keeps programs responsive and trusted. Digital health has an enabling role whereby; electronic registers and decision support enhance compliance; referral tracking and dashboards improve continuity and microplanning; and interoperability with DHIS2 raises visibility of data [4]. Together, these factors strengthen CHW retention, performance, and integration into primary health care, helping to close Africa's projected shortfall of six million health workers by 2030. As a result, countries can expand equitable access to maternal and child health services, vaccinations, and chronic care, particularly in rural and vulnerable communities, while also building more resilient health systems that can withstand crises.

Barriers continue to undermine progress toward Universal Health Coverage (UHC) in Sub-Saharan Africa. Challenges such as high attrition due to poor pay and limited career opportunities, fragmented governance, heavy reliance on donors, weak supervision, and the lack of integration between health information systems and supply chains all contribute to inefficiencies and service gaps. These issues result in inequitable coverage, leaving many communities, especially those in hard-to-reach areas, without reliable access to care. The consequences are serious: fragmented services erode public trust, deepen disparities, and threaten progress toward the Sustainable Development Goals (SDGs). To overcome these barriers, strong policy action is needed. This includes fair remuneration for Community Health Workers (CHWs), better-aligned financing and stewardship, data-driven management, and equity-focused strategies. Addressing these priorities is essential to ensure CHW programs are scalable and sustainable, ultimately building resilient health systems and delivering more equitable health gains.

The interaction between facilitating factors and barriers creates a complex dynamic that influences the success of CHW integration efforts. Understanding and addressing these factors is crucial for developing effective integration strategies that can strengthen health systems and improve healthcare delivery in resource-limited settings. This understanding enables policymakers and program implementers to develop targeted interventions that maximize facilitators while systematically addressing barriers to achieve successful CHW integration.

Effectiveness of CHW Integrated Programs

Integrated CHW programs that are included within national primary health care system with defined roles, standardized training, supervision, linkages to commodities, information systems, and domestic funding

repeatedly demonstrate proof of improved RMNCH coverage and specific health outcomes, especially when scaled up as part of system reforms. Government-implemented programs like Ethiopia's Health Extension Program and Rwanda's national CHW system are perpetually associated with substantial service use increases (e.g., immunization, ANC/PNC, facility delivery), under-five mortality declines, and improved timeliness of treatment if supervision and supply reliability are sustained [4, 6, 29, 38] Key drivers are standardized or paid compensation, routine supervision in PHC hierarchies, being included in HMIS and referral chains, and assured commodity availability, with further digital tools facilitating more stringent protocol follow-up, improved data quality, and follow-up being possible when incorporated into national systems [4, 8, 13]. Community engagement, through local leadership, cooperatives, and accountability mechanisms, improves acceptability, retention, and equity in coverage, thereby improving performance in hard-to-reach places [11].

Relative to others, long-term effectiveness is strongest where there is institutionalized CHW policy, diversified financing with domestic budget lines, and institutionalized program design across districts, reducing short-term project dependency and geographic disparities [4, 6, 9]. Evaluations of large national programs (e.g., Ghana’s CHPS, Malawi’s HSAs, and iCCM scale-ups) report gains in coverage and child survival contingent on supervision intensity, supply security, and fidelity to standardized roles; conversely, volunteer-only or fragmented models show mixed results and greater variability in outcomes [4]. Post-2015 technologies, digital decision support, client tracking, and integrated dashboards, enhance performance in combination with training, supportive supervision, and application of data within management cycles but cannot substitute for essential investments in workforce, commodities, and referral systems [13, 4]. Overall, there is evidence supporting CHW integration as an effective, low-cost strategy for achieving UHC-aligned outcomes when positioned in well-strengthened PHC systems with strong governance and financing.

Integrated CHW platforms can meaningfully advance progress toward UHC by extending essential services, improving timeliness and continuity, and reducing inequities. However, effectiveness depends less on the label “CHW” and more on the system conditions under which CHWs operate policy clarity, domestic financing, supervision quality, supply reliability, data-use routines, and community accountability [4, 6, 8].

Limitations

The Synthesis of CHW integration evidence is constrained by substantial heterogeneity in CHW integration models, study methodologies, scopes of practice across countries and over time that limits cross-study comparability and generalizability. Many reviews conflate the presence of CHWs with ‘well-integrated CHW systems,’ complicating, which components drive effects.

Conclusions

This cross-national synthesis highlights the best results and sustainability of CHW programs in being integrated into national health care systems. A decade of practice in Sub Saharan Africa shows that CHW programs can accelerate nations towards UHC when managed, funded, supplied, supervised, and implemented within PHC and not as parallel projects. Most robust drivers of effectiveness are policy clarity and domestic funding, supportive supervision with Continuous Professional Development (CPD), stable last-mile commodities, interoperable information systems with routine data use, and genuine community accountability. Those nations that make law for CHW policy in national plans, finance programs from domestic budget lines supported by matched partner contributions and

implement at scale with fidelity will be more likely to see improvements in sustained service coverage, timeliness of care, and equity, particularly for RMNCH outcomes. Mechanisms of community engagement, local leadership, cooperatives, and systems for accountability repeatedly improve performance, retention, and acceptability, while digital innovations can accelerate gains when integrated into fundamental routine supervision and decision-making processes. Conversely, projectized financing, fragmented tools, weak oversight, and chronic stockouts undermine performance and erode community trust. There is no one integration model, successful designs are adapted to country context, and health system maturity, but use the same set of system do mains.

Concurrently, experience across Sub-Saharan Africa highlights chronic bottlenecks including volunteer-dependent, project-based, or fragmented models deliver variable and fragile results, inadequate supervision and stockouts compromise effectiveness; and uneven subnational financing sustains geographic inequalities.

A responsive UHC roadmap prioritizes the establishment of a minimum viable, state-owned CHW platform, phasing in supervision, supply, data-use, and CPD upgrades for enhanced quality and equity, consolidating partners under a shared results framework and institutionalizing finance, digital architecture, and professionalization for long-term resilience and value for money. Countries need to contextualize this trajectory to rural remote, urban-informal, or fragile settings, with regular indicators and periodic reviews to iterate.

Future efforts need to address implementation research on cost, quality, and equity; monitor outcomes other than coverage and invest in professionalization, career paths, and gender-responsive policies to sustain a skilled, motivated workforce. In short, when CHW programs are planned and budgeted as ongoing government sector activities rather than temporary projects they provide lasting value for money, encourage universal health coverage, and build the resilience of primary health care systems.

Conflict of Interest

The authors declare no conflict of interest

Ethical Approval

No ethical clearance was needed, since we used secondary data and not human subjects. The synthesis considered publish publications.

Data Availability

This article did not generate or analyze any new data, therefore, there is no dataset to share.

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