

Community Health Worker Integration into Formal Health Systems in Rural Sub-Saharan Africa: Models, Facilitators, Barriers, and Training Needs from a Systematic Review

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Abstract Sub-Saharan Africa (SSA) faces persistent shortages of skilled health workers, weak rural health infrastructure, limited access to care, and fragmented Community Health Worker (CHW) programmes. The contribution of CHWs to primary health care (PHC) depends less on their presence in communities than on the extent to which they are integrated into formal health systems. The aim is to synthesise evidence on the integration models, facilitators, barriers, and capacity-building requirements that shape the integration of CHW programmes into formal health systems in rural SSA. A PRISMA 2020, guided the systematic review of secondary data. Seven databases (PubMed/MEDLINE, Scopus, Web of Science, EMBASE, CINAHL, African Index Medicus, AJOL) and grey literature from WHO, UNICEF, the World Bank, USAID, and Ministry of Health repositories were searched for English-language publications from January 2010 to December 2025. Of 444 records, 42 met the inclusion criteria. Quality was appraised using AMSTAR 2, and evidence was combined through thematic and framework synthesis mapped onto the WHO Health System Building Blocks. Three integration models were identified: government-led (strongest institutionalisation), NGO-led (partial, project-bound), and hybrid (most common). Integration was strongest in service delivery, governance, and workforce support, and weakest in financing, health information systems, and supply chains. The leading facilitators were political commitment and policy recognition, supportive supervision, and sustainable financing; the critical barriers were governance fragmentation, supply chain stock-outs, and weak supervision. Ten competency domains were required for integration, six of them essential: clinical service delivery, referral management, health information systems, supply chain management, community engagement, and supportive supervision. Consistent with WHO guidance, integration is a health system strengthening process rather than a workforce intervention. Rural SSA programmes are institutionalised operationally but remain structurally unsupported, and training alone did not sustain performance where governance, financing, supervision, information, and supply systems were weak. The review introduces the CHW Integration Capability Framework, a three-tier model linking foundational competencies, system interface capabilities, and sustained performance. Sustainable integration requires simultaneous investment across all six building blocks, prioritising domestic financing, harmonised information systems, and public supply chains, together with explicit transition pathways from partner-dependent to nationally owned CHW programmes.

Keywords Community Health Workers, Health System Building Blocks, Integration, Primary Health Care, Sub-Saharan Africa.

Introduction

Sub-Saharan Africa (SSA) continues to face persistent shortages of skilled health workers, inadequate infrastructure, geographic barriers to access, and a high burden of communicable and non-communicable disease. WHO projects a substantial health workforce deficit in the African Region by 2030, threatening progress towards Universal Health Coverage (UHC) and the Sustainable Development Goals [1, 2]. These constraints are most acute in rural and underserved communities, where Community Health Workers (CHWs) have become a critical, cost-effective component of primary health care (PHC), extending services to populations beyond the reach of formal facilities [3, 4].

CHWs are trained, community-based workers who deliver promotive, preventive, referral, and selected curative services while linking communities to formal health systems. Across SSA, they have contributed to improvements in maternal and child health, immunisation coverage, infectious disease control, treatment adherence, and community surveillance [4, 5]. Ethiopia, Rwanda, and Malawi report improved PHC access through institutionalised CHW programmes embedded within national health systems [7-9], and CHWs were central to community-level responses during the COVID-19 pandemic [1, 10].

However, the effectiveness and sustainability of CHW programmes depend not on the presence of CHWs in communities, but on the extent to which they are integrated into formal health systems. Integration refers to the degree to which CHW programmes are embedded within routine health system functions: leadership and governance, financing, workforce management, service delivery, health information systems, and access to medicines and technologies [3, 11, 12]. CHWs achieve the greatest impact where governance is coherent, financing is

predictable, supervision is reliable, referral pathways function, information systems are integrated, and supply chains are dependable [1, 13, 14]. Conversely, fragmented implementation, donor-dependent financing, parallel reporting systems, weak supervision, and recurrent stock-outs continue to undermine programme performance [15-17].

Capacity-building needs are therefore best understood not as isolated training topics but as a structured set of integration capabilities [4, 5, 18]. Many integration failures occur at the interface between CHWs and the formal health system, where workers hold basic clinical competencies but lack the supervisory structures, referral linkages, and institutional recognition required to engage effectively with health system functions [3, 5, 11, 18].

Models of CHW Integration in Sub-Saharan Africa

CHW programmes in SSA have evolved through three dominant integration models: government-led (institutionally embedded within the national health system and regulated by the Ministry of Health, as in Ethiopia and Malawi), NGO-led (initiated, financed, and managed by non-governmental or development partners), and hybrid models that combine state stewardship with partner-supported implementation (as in Kenya, Uganda, and Sierra Leone) [3-5]. Deeper integration across governance, financing, human resources, supply chains, information systems, and service delivery is consistently associated with greater sustainability, better quality of care, and stronger contributions to UHC [3, 15].

The WHO Health System Building Blocks Framework

This review is anchored on the WHO Health System Building Blocks Framework, which comprises service delivery, health workforce, health information systems, access to essential medicines and technologies, health financing, and leadership and governance. The framework

holds that health outcomes depend not only on how well each block performs, but on how coherently the blocks function together, and it therefore allows the strengths and weaknesses

of CHW integration to be analysed systematically [1, 12]. The framework is summarised in Figure 1.

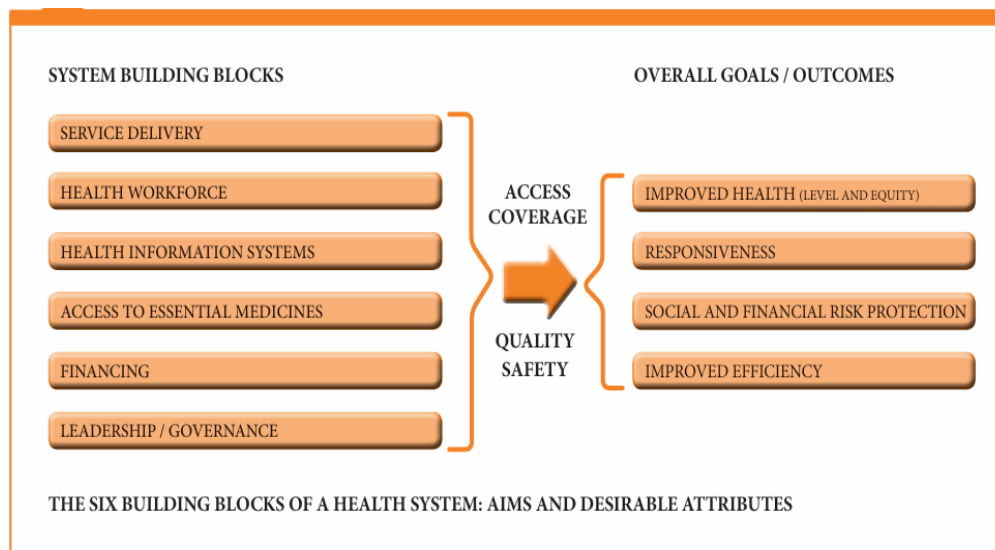


Figure 1. The WHO, Health Systems Framework

Source: [12]

Applied to CHWs, the framework shows that integration is typically strongest in service delivery and community outreach, while substantial weaknesses persist in financing, governance, supply chains, and information systems, particularly in rural settings where health systems are already fragile [1, 19].

Research Gap, Study Novelty, and Contribution

Previous reviews have examined CHW performance, supervision, motivation, and disease-specific outcomes [5, 18, 20], and a recent scoping review has mapped CHW programme components to the health system building blocks [19]. The evidence nevertheless remains fragmented: no synthesis has simultaneously examined the facilitators, barriers, integration models, and training requirements for CHW integration across all six WHO Health System Building Blocks in rural SSA or explained why competency-based training frequently fails to translate into sustained performance. This review addresses this gap.

The review makes three contributions. First, it synthesises facilitators, barriers, and training needs for CHW integration across all six building blocks in rural SSA, and prioritises them by frequency, consistency, and reported impact. Second, it compares government-led, NGO-led, and hybrid models and identifies common and context-specific determinants of integration. Third, it introduces the CHW Integration Capability Framework, a novel three-tier model linking foundational competencies, system interface capabilities, and sustained performance, offering a practical tool for workforce development, programme design, and policy planning.

Aim of the Study

This study systematically reviews and synthesises evidence on the facilitators, barriers, integration models, and capacity-building requirements influencing the integration of Community Health Worker programmes into formal health systems in rural Sub-Saharan Africa.

Research Questions

1. What facilitators and barriers influence the integration of CHW programmes into formal health systems in rural Sub-Saharan Africa?
2. What models have been used to integrate Community Health Worker programmes into formal health systems in rural Sub-Saharan African settings?
3. What training and capacity-building requirements are necessary for effective CHW integration?

Materials and Methods

Study Design

This study employed a systematic review design using secondary data to synthesise evidence on the facilitators, barriers, integration models, and capacity-building requirements influencing the integration of Community Health Worker (CHW) programmes into formal health systems in rural Sub-Saharan Africa. The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses [21] guidelines to ensure transparency, reproducibility, and rigorous reporting of the review process.

Review Framework and Analytical Domains

The review question was structured using the Population, Intervention, Comparison, Outcome (PICO) framework: Population - CHWs and equivalent community-based cadres in rural SSA; Intervention - integration of CHW programmes into formal health systems; Comparison - integration models (government-led, NGO-led, hybrid) and country contexts; Outcomes - facilitators, barriers, integration maturity, and training requirements. Evidence synthesis was guided by the WHO Health System Building Blocks Framework (leadership and governance, financing, health workforce, service delivery, health information systems, and medical products and technologies) [12, 25]. These blocks were

adopted as the analytical domains for three reasons. First, they are the internationally accepted architecture for health system analysis and are used in WHO CHW guidance, which makes the findings directly comparable with global policy recommendations [3, 12]. Second, the recurrent determinants reported in the CHW literature - governance and policy recognition, financing and remuneration, supervision and workforce management, digital and information systems, supplies, and referral or service delivery - map cleanly onto these six blocks rather than onto disease- or programme-specific categories [11, 19]. Third, using the blocks prevented the analysis from privileging any single model or country and allowed integration to be compared consistently across heterogeneous settings.

Search Strategy

A comprehensive search was conducted across seven electronic databases: PubMed/MEDLINE, Scopus, Web of Science, EMBASE, CINAHL, African Index Medicus, and African Journals Online (AJOL). Grey literature was sourced from WHO, UNICEF, World Bank, USAID, and national Ministry of Health repositories, and the reference lists of included studies were hand-searched. The search period covered publications from 1 January 2010 to 31 December 2025, and the final search was run in December 2025. Only English-language publications were retrieved. Search terms combined three concept blocks using Boolean operators, adapted to the controlled vocabulary of each database: (i) cadre - "community health worker*" OR "village health worker*" OR "health extension worker*" OR "health surveillance assistant*" OR "lay health worker*" OR "community health volunteer*"; (ii) focus - integrat* OR institutionalis* OR "health system*" OR governance OR financing OR supervision OR "supply chain" OR "information system*" OR referral OR training OR "capacity building" OR competenc* OR facilitator* OR barrier*; and

(iii) setting - "sub-Saharan Africa" OR Africa OR rural OR the names of individual SSA countries. The three blocks were combined with AND (for example, in PubMed: ("community health worker*" [tiab] AND (integrat* [tiab] OR "health system*" [tiab]) AND ("sub-Saharan Africa" [tiab] OR rural [tiab])).

Eligibility Criteria

Studies were eligible if they focused on CHWs or equivalent community-based cadres operating in rural or underserved SSA settings and reported evidence on integration, facilitators, barriers, training needs, or integration outcomes. Reviews, empirical evaluations, policy documents, and country case studies were all eligible. Studies were excluded if they were conducted outside SSA, addressed exclusively urban or facility-based cadres, or reported no health system or integration outcomes.

Quality Assessment

The AMSTAR 2 tool was applied to critically appraise the methodological quality of included systematic reviews. AMSTAR 2 examined 16 domains covering key features such as review questions and eligibility criteria, literature search comprehensiveness, study selection and data extraction, risk of bias assessment, synthesis methods, publication bias, conflicts of interest, and overall confidence in review findings. This structured quality assessment process enhanced the credibility of the synthesis and strengthened the validity of policy and programme implications [22, 25].

Data Synthesis and Analysis

Evidence synthesis employed a combination of thematic synthesis and framework synthesis. Thematic synthesis followed three stages: (1) line-by-line coding of extracted findings, (2) development of descriptive themes, and (3) generation of higher-order analytical themes. Framework synthesis mapped findings

against the WHO Health System Building Blocks (service delivery, health workforce, health information systems, access to essential medicines and technologies, health financing, and leadership/governance) to enable systematic comparison across studies and countries. [12, 23, 24].

To enable comparison across heterogeneous studies, a structured rating system was developed to classify the relative importance of facilitators, barriers, and training needs. Each item was rated on three criteria: frequency of reporting across the included studies, consistency of findings across countries and programme models, and the reported strength of influence on integration outcomes. Frequency thresholds were applied consistently (facilitators and training: reported in 10 or more studies = high importance or essential; 5-9 studies = moderate importance or important; 4 or fewer = low importance. Barriers: 10 or more studies = critical; 4-9 = high; 1-3 = moderate). This allowed the findings to be prioritised rather than simply listed, and the ratings are reported in Tables 2, 5, 6, and 7.

Results

Included Studies and Characteristics

A total of 444 records were identified through database and grey literature searching. Forty duplicates were removed, and 362 records were excluded at title and abstract screening because they did not address CHW integration into health systems or CHW capacity and training needs. Forty-two (42) studies were retained for synthesis. Figure 2 presents the selection process, adapted from PRISMA 2020 [21].

The included studies provided a heterogeneous body of evidence comprising policy documents, empirical programme evaluations, systematic reviews, and country case studies, reflecting both conceptual and implementation-oriented perspectives.

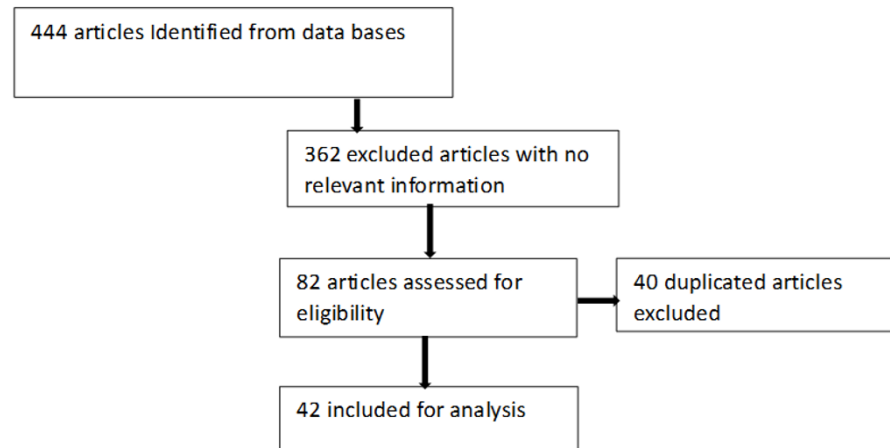


Figure 2. Illustrates, The Selection Process of Articles

Source: Adapted from the PRISMA guidelines [21]

Geographical Distribution of Evidence and Country Integration Maturity

The evidence base was concentrated in countries with established national CHW programmes, particularly Ethiopia, Rwanda, Kenya, Malawi, Uganda, Ghana, and South Africa, while Central African countries remained underrepresented (Table 1). East Africa showed both the strongest evidence base and the highest integration maturity, reflecting long-standing government-led programmes such as Ethiopia's Health Extension Programme

and Rwanda's Community Health Programme [7, 8]. Southern Africa showed relatively mature integration, particularly in service delivery and workforce, although financing constraints continue to affect sustainability [3, 34]. West Africa (Ghana, Nigeria, Liberia, Sierra Leone) showed moderate integration with substantial cross-country variation, Ghana being the exception with relatively mature integration through CHPS. Central Africa showed the weakest evidence base and the lowest integration maturity, reflecting fragile health systems and limited institutionalisation.

Table 1. Geographic Distribution of Evidence

Region	Evidence Strength	Rationale	Representative Countries	Integration Maturity	Rationale
East Africa	Very High	Largest volume of CHW literature; extensive evidence from Ethiopia, Rwanda, Kenya, Uganda, and Tanzania; multiple systematic reviews and programme evaluations	Ethiopia, Rwanda, Kenya, Uganda, Tanzania	High	Strong national CHW programmes, policy recognition, structured supervision, established referral systems, and formal workforce integration

Southern Africa	High	Strong evidence base from South Africa, Malawi, Zambia, Zimbabwe, and Mozambique	South Africa, Malawi, Zambia, Zimbabwe	Moderate–High	Well-established CHW programmes with strong service delivery, but challenges remain in financing and workforce sustainability
West Africa	Moderate	Moderate evidence from Nigeria, Liberia, Sierra Leone, and Senegal; more programme variability. Ghana could be an exception.	Ghana, Nigeria, Liberia, Sierra Leone	Moderate	Mixed integration models; stronger service delivery integration than financing, HMIS, or governance integration
Central Africa	Low	Few studies and limited programme evaluations; underrepresented in the literature	DRC, Central African Republic, Cameroon, Chad	Low	Weak institutionalisation, fragile health systems, donor dependency, and limited CHW system integration

Source: Author's synthesis from included studies

Interpretation of classification: Evidence strength was assessed based on the volume, diversity, consistency, and depth of evidence available from each region. Integration maturity was assessed according to the degree of institutionalisation of CHW programmes across the WHO Health System Building Blocks, including governance, financing, workforce, service delivery, health information systems, and supply chains.

Integration Across the WHO Health System Building Blocks

Integration was strongest in operational functions (service delivery, governance, and workforce support) and weakest in institutional support functions (financing, health information systems, and supply chains)

(Table 2). Many programmes have therefore expanded community-level service delivery without achieving integration into the systems required for sustainability, accountability, and resilience, indicating that financing, information systems, and supply chain infrastructure should be prioritised [3, 26].

Table 2. Traffic Light Framework for CHW Integration Across WHO Health System Building Blocks

Health System Building Block	Status	Interpretation
Service Delivery		Strongly integrated and routinely embedded
Leadership & Governance		Well integrated with minor implementation gaps
Health Workforce		Generally integrated through training and supervision structures
Health Financing		Partially integrated with donor dependence and funding instability

Health Information Systems		Weakly integrated with reporting and data-use challenges
Supply Chain		Poorly integrated with frequent stock-outs and logistics constraints

Source: Author's synthesis from included studies

Traffic Light Key

-  **Green** = Strong (Score ≥ 10 studies)
-  **Yellow** = Partial (Score 6 – 9 studies)
-  **Orange** = Weak - moderate integration (Score 2 – 5 studies)
-  **Red** = Poorly integrated (≤ 2 studies)

The Traffic Light Framework (Table 2) summarises the relative strength of CHW integration across the six building blocks, based on the frequency, consistency, and depth of integration reported in the included studies.

Comparison of Integration Models by Frequency, Sustainability, and Integration Level

Government-led models achieved the highest frequency, sustainability, and integration scores, indicating the strongest

alignment with formal health system structures (Figure 3). Hybrid models also performed well, reflecting their relevance where government stewardship is complemented by NGO or donor support. NGO-led models showed only partial integration, often operating through parallel systems that support short-term delivery but limit sustainability, while disease-specific or vertical programmes scored lowest. The gradient is consistent: the more a model is led, financed, supervised, and institutionalised by government, the higher its integration and sustainability, confirming that integration is a matter of embedding CHWs within the health system architecture rather than simply deploying community-based workers [3, 19, 26].

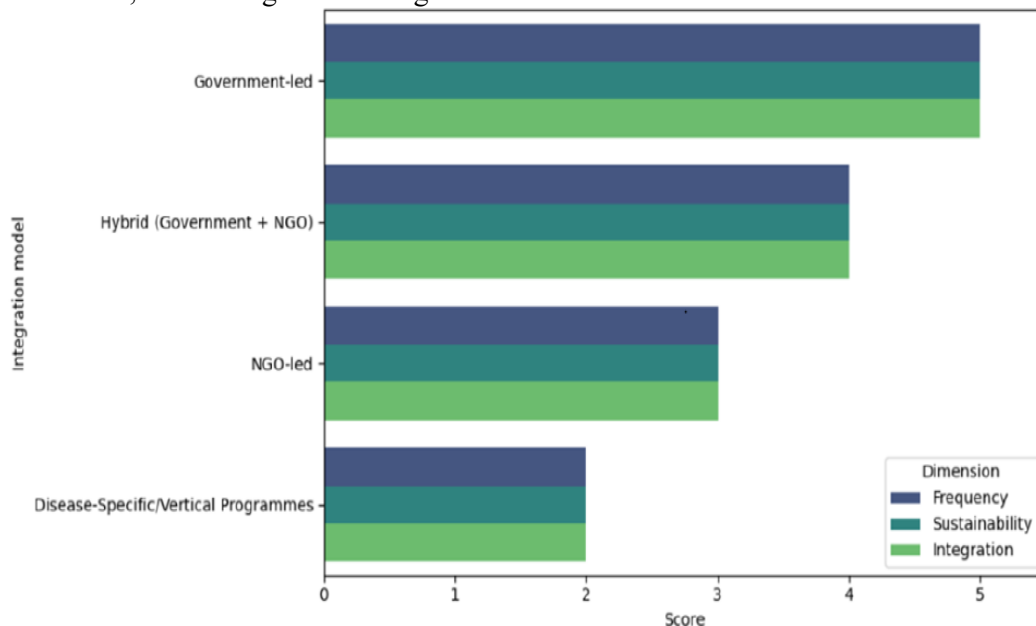


Figure 3. Grouped Horizontal Bar Chart Comparing CHW Integration Models by Frequency, Sustainability, and Integration Level

Source: Author's synthesis of included studies [3, 19, 26]

Interpretation of ratings: 5.0 - High (well institutionalised, consistently functional); 4.0 - Moderate-High (generally integrated with minor gaps); 3.0 - Moderate (partially integrated); 2.0 - Low (limited integration with major weaknesses); 1.0 - Very Low (minimal integration and weak institutional embedding).

Comparison of Integration Models Across Core Health System Building Blocks

Table 3 compares the three models across the core building blocks. Integration is a progressive process of institutional alignment rather than a single event, forming a continuum from government-led (strongest institutionalisation, with CHWs embedded in national policy, government financing, Ministry of Health accountability, standardised training, district supervision, national information

systems, and public supply chains), through hybrid (transitional), to NGO-led (partial and project-based). NGO-led models may strengthen short-term implementation through intensive training, dedicated supervision, parallel digital tools, and NGO-managed last-mile logistics, but reliance on project funding limits sustainability beyond funding cycles. Hybrid models are particularly relevant in resource-constrained settings but require explicit transition mechanisms to avoid permanent dependence on external actors.

Table 3. Comparison of CHW Integration Models Across Core Health System Building Blocks

Characteristic	Government-Led	NGO-Led	Hybrid
Policy basis	National CHW policy, legal mandate	MOU / project agreement	Shared national framework + operational MOU
Governance	Ministry of Health accountability	NGO operational control	Joint steering committee; progressive handover
Financing source	Domestic government budget	Donor/NGO project funding	Mixed: government core + partner supplemental
CHW status	Civil servant or salaried staff	Community volunteer or project employee	Variable: transitioning toward formalisation
Training	National standardised curriculum	NGO-specific, often more intensive	National curriculum + partner quality assurance
Supervision	District/facility-embedded	Dedicated, lower ratio, partner-funded	Government-led, partner-supported
HMIS integration	Integrated into national DHIS2	Often parallel digital tools	Pilot integration, transitioning to national
Supply chain	National logistics system	NGO-managed last-mile	Government backbone + partner gap-filling
Sustainability	Strongest institutionalisation	Fragile beyond project cycles	Pragmatic; risk of permanent hybridity

Source: Author's synthesis of included studies [3-5, 10, 18, 19, 28]

Note: The categories reflect the predominant characteristics of health system building blocks reported in the reviewed studies and may vary across individual programmes and country contexts.

Country-Level Integration Models

The classification in Table 4 is an analytical typology rather than a rigid country label, since many CHW systems are evolving and combine government policy leadership with NGO or

donor implementation support [19]. It reflects evidence that CHW programmes in Ethiopia, Ghana, Malawi, Nigeria, Rwanda, and Zambia are formally linked to national health systems, although integration varies across financing, supervision, information systems, and supplies.

Table 4. Country-Level CHW Integration Model Table

Country	Main CHW Cadre/Programme	Dominant Model	Integration Level	Sustainability Outlook
Ethiopia	Health Extension Workers	Government-led	High	High, if financing and supplies remain stable
Rwanda	Binômes and Agents de Santé Maternelle	Hybrid with strong government stewardship	High	Moderate-high, dependent on continued partner-aligned financing
Kenya	Community Health Promoters/Volunteers and Community Health Assistants/Officers	Hybrid	Moderate-high	Moderate, with county financing and coverage constraints
Uganda	Village Health Teams	Hybrid / NGO-supported	Moderate	Moderate-low unless financing and supervision are strengthened
Tanzania	Community Health Workers under community-based health programme	Hybrid transitioning towards government-led	Moderate-high	Moderate, dependent on formalisation and scale-up financing
South Africa	Ward-Based Primary Health Care Outreach Teams	Government-led with hybrid legacy	Moderate-high	Moderate, affected by supervision, employment, and resource challenges
Malawi	Health Surveillance Assistants	Government-led	High	Moderate-high, dependent on workload management and public financing
Zambia	Community Health Assistants	Government-led	High	Moderate-high, dependent on payroll absorption and scale-up
Zimbabwe	Village Health Workers	Hybrid	Moderate	Moderate-low, dependent on allowances, supervision, and supply continuity
Ghana	Community Health Officers/Nurses and Community Health Volunteers under CHPS	Government-led	High	High for salaried CHOs/CHNs, lower for volunteer component
Nigeria	Community Health Extension Workers (CHEWs), Junior Community Health Extension Workers (JCHEWs), and	Hybrid	Moderate	Moderate, with state-level variation and partner dependence

	Community Health Officers (CHOs) and community health influencers/promoters			
Liberia	Community Health Assistants and Community Health Service Supervisors	Hybrid with strong government leadership	Moderate-high	Moderate, with strong policy architecture but donor financing dependence
Sierra Leone	Community Health Workers and peer supervisors	Hybrid	Moderate-high	Moderate, dependent on professionalisation, financing, and transition from partner support

Source: Author's synthesis of included studies [3-7, 18, 28, 31-33]

Interpretation of integration level: **High:** fully institutionalised within national health systems; **Moderate high:** strongly integrated with some partner-support functions; **Moderate:** partially integrated with notable implementation gap;

Interpretation of the Table

Government-led models are strongest where CHWs are formally embedded in national workforce structures, as with Ethiopia's Health Extension Workers, Malawi's Health Surveillance Assistants, Zambia's Community Health Assistants, and Ghana's CHPS-linked Community Health Officers; in these settings CHWs are connected to national policy, public supervision, government financing, information systems, and supply chains, although integration still differs across recruitment, training, remuneration, supervision, and supplies [3, 5, 18, 28].

Hybrid arrangements are the most common, occurring where government provides policy direction but implementation depends substantially on partners, as in Kenya, Uganda, Tanzania, Zimbabwe, Nigeria, Liberia, and Sierra Leone. Partner support can strengthen training, supervision, logistics, data systems, and service delivery, but sustainability depends on whether these functions are progressively absorbed into national systems; Liberia illustrates a national programme that emerged from partner-supported post-Ebola reforms into a formal, standardised, compensated cadre.

NGO-led systems rarely function as the dominant national model, although donor

support remains highly influential in implementation. The key implication is that integration should be assessed not by the existence of a national policy alone, but by whether financing, supervision, data reporting, commodities, and referral systems are actually embedded in the public health system, consistent with WHO warnings against fragmented workforce planning [3].

Facilitators of CHW Integration

The synthesis identified eleven key facilitators that influenced the successful integration of Community Health Worker (CHW) programmes into formal health systems across rural Sub-Saharan Africa. They were ranked according to frequency and reported impact.

1. Analysis suggests that System-level factors were more influential than programme-specific interventions. The highest-ranked facilitators were political commitment and national policy recognition, supportive supervision, and sustainable financing, followed by competency-based training. Countries with clear national CHW policies, formal governance structures, and government ownership showed more consistent integration,

stronger accountability, and greater sustainability [3, 4, 28]. Supportive supervision was the critical operational facilitator because it reinforced competencies, improved service quality, strengthened referrals, and improved motivation and retention [3, 18, 40], while competency-based training was consistently associated with improved performance [3, 5, 27] and predictable remuneration with workforce stability and reduced attrition [3].

2. At the system level, reliable supply chains, integrated health information systems, functional referral

mechanisms, and partner coordination sustained continuity of care and strengthened community-facility linkages [3, 36], while community ownership and trust increased service uptake, acceptability, and accountability [3, 39].

Overall, integration is most successful where investment is coordinated across governance, workforce development, financing, supervision, information systems, and logistics. Isolated interventions such as training alone are insufficient; integration is achieved through the combined functioning of multiple building blocks [3, 35].

Table 5. Priority Facilitators of CHW Integration into Health Systems

Rank	Facilitator	Importance
1	Political commitment & policy recognition	High importance
2	Supportive supervision	High importance
3	Sustainable financing	High importance
4	Competency-based training	Moderate importance
5	Reliable supply chains	Moderate importance
6	Community ownership	Moderate importance
7	Partner coordination	Moderate importance
8	HMIS integration	Low importance
9	Referral systems	Low importance
10	Career pathways	Low importance
11	Digital health support	Low importance

Source: Author's synthesis from included studies [3-5,18, 27, 28, 36, 39, 40]

Importance ratings were derived using the frequency, consistency, and impact criteria and thresholds defined in Section ("Data Synthesis and Analysis").

Barriers to CHW Integration

Ten recurrent barriers were identified and these are linked with the health system building blocks. CHW integration barriers were primarily systemic and institutional, indicating that programme effectiveness is constrained more by health system weaknesses than by individual CHW capacity. These are synthesised using the health system building blocks.

Governance and Financing: Governance fragmentation and unstable financing were the

most critical barriers, resulting in poor coordination, weak accountability, inconsistent implementation, and limited programme sustainability [3, 10, 18, 34].

Health Workforce: Weak supervision, limited career progression, high workloads, and poor collaboration with facility staff undermined CHW motivation, retention, and performance [3, 5, 18, 29].

Health Information Systems: Fragmented reporting systems, poor data quality, and limited integration of CHW data into routine HMIS reduced the effectiveness of community-

level information for decision-making and planning [3, 5, 37].

Service Delivery and Supply Chains: Frequent commodity stock-outs, weak referral systems, transport constraints, and inadequate facility readiness disrupted service continuity and reduced community trust in CHW programmes [3, 5, 36].

Generally, the findings show that sustainable CHW integration requires coordinated strengthening of governance, financing, supervision, information systems, and supply chains, as isolated interventions are unlikely to address interconnected system barriers.

Table 6. Priority Barriers to CHW Integration in Health Systems

Rank	Health System Building Blocks	Barrier	Severity
1	Leadership and governance	Governance fragmentation	Critical
2	Medical product, vaccines and technology	Supply chain stockouts	Critical
3	Health workforce	Weak supervision infrastructure	Critical
4	Health financing	Financing instability	High
5	Service delivery	Community trust and stigma issues	High
6	Health workforce	Training inadequacies	High
7	Service delivery	Weak referral systems	High
8	Leadership and governance	Partner coordination failures	Moderate
9	Health information system	HMIS disconnection	Moderate
10	Health workforce	Role overload	Moderate

Source: Author's synthesis from included studies [3, 5, 10, 18, 29, 30, 34, 36, 37]

Severity ratings follow the thresholds defined in Section ("Data Synthesis and Analysis") (critical: reported in ≥ 10 studies; high: 4–9; moderate: 1–3).

Training Needs for Effective CHW Integration

The synthesis identified ten core competency domains required for effective CHW integration (Table 7). These domains were not predetermined; they emerged inductively through thematic synthesis of training-related findings and were subsequently aligned with the WHO Health System Building Blocks Framework and WHO CHW guideline recommendations [3, 27].

Effective integration required competencies extending well beyond technical clinical skills. While clinical and preventive service delivery

competencies remained foundational, the studies consistently emphasised referral management, health information systems, supply chain management, community engagement, supportive supervision, digital literacy, professional ethics, emergency preparedness, and work planning [3, 27, 35, 38], reflecting the complex role of CHWs as system actors at the interface between communities and formal services. Training alone was insufficient: competencies translated into performance only where supported by ongoing supervision, refresher training, mentoring, and continuous learning [3, 5, 27, 35].

Table 7. Priority Training Building Blocks

Competency Area	Priority
Clinical & Service Delivery	Essential
Referral Management	Essential
Health Information Systems	Essential
Supply Chain Management	Essential
Communication & Community Engagement	Essential
Supportive Supervision	Essential
Digital Literacy	Important
Professional Ethics	Important
Emergency Preparedness	Important
Work Planning	Important

Source: Author's synthesis from included studies [3, 5, 27, 35, 38]

Priority ratings follow the thresholds defined in Section ("Data Synthesis and Analysis") (essential: reported in ≥ 10 studies; important: 1–9).

CHW Integration Capability Framework

The synthesis of facilitators, barriers, and training requirements gave rise to the CHW Integration Capability Framework, the study's central conceptual contribution. It proposes that effective integration is neither a single event nor a binary outcome, but a progression across three interdependent tiers (Figure 4).

Tier 1 (Foundational Competencies) represents the essential knowledge and skills required for basic CHW practice, including clinical and service delivery competencies, communication skills, professional ethics, and community engagement. These competencies provide the foundation for all other integration capabilities and were consistently identified across the literature as prerequisites for effective CHW performance.

Tier 2 (System Interface and Integration Capabilities) reflects CHWs' ability to operate effectively within the broader health system. This includes competencies related to referral and counter-referral processes, health information systems, documentation and reporting, supply chain management,

coordination with health facilities, and participation in supervisory structures. The synthesis demonstrated that many integration failures occur at this interface, where CHWs possess basic clinical skills but lack the capabilities or institutional support needed to interact effectively with health system structures.

Tier 3 (Sustained Performance and Adaptive Capability) is the highest level, encompassing continuous learning, supportive supervision, mentoring, problem-solving, emergency preparedness, and adaptive decision-making. Sustained effectiveness was achieved only where Tier 1 and Tier 2 capabilities were reinforced by ongoing support, learning opportunities, and responsive health system structures [4, 5, 18].

CHW effectiveness is therefore a progressive capability pathway rather than a static workforce attribute. The framework explains why training alone often fails to improve long-term outcomes where governance, supervision, financing, information systems, and supply chains remain weak (Figure 4).

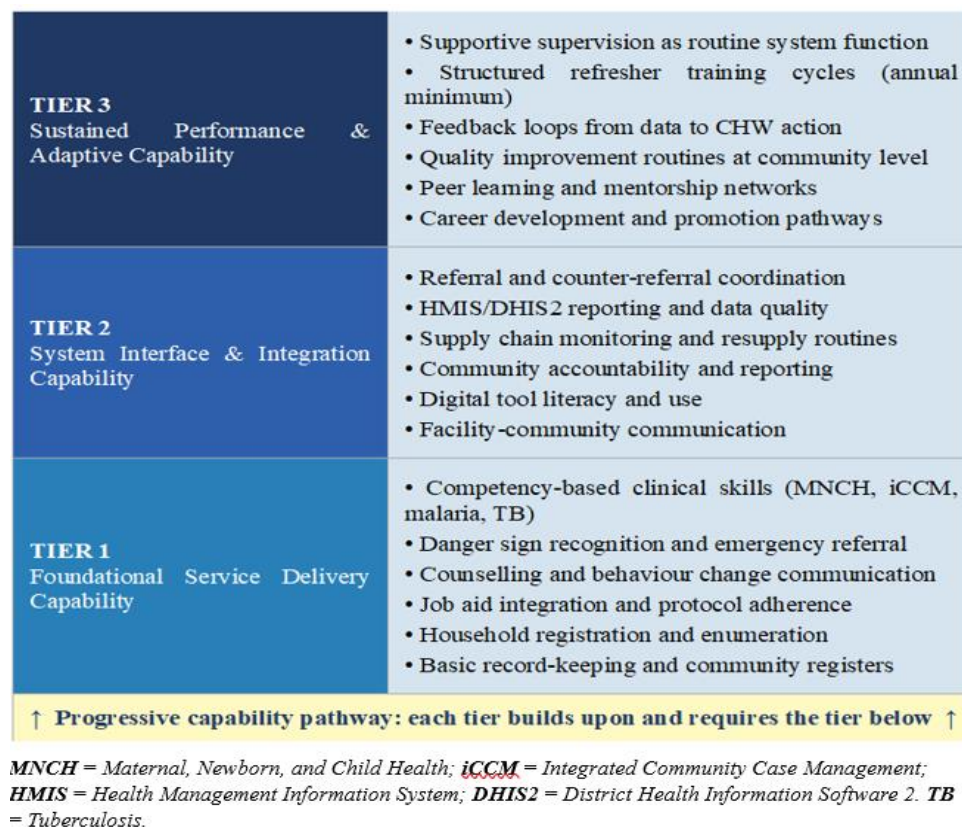


Figure 4. CHW Integration Capability Framework - Three-Tier Model

Source: Author's conceptualisation based on study findings and literature review.

Discussion

Integration Across the Health System Building Blocks

CHW integration in SSA is substantial but uneven across the WHO building blocks: strongest in service delivery, workforce support, and basic information functions, and weakest in financing, governance, and supply chains. Programmes are thus integrated at the operational level of primary health care while remaining insufficiently embedded in the structural functions that sustain performance, so CHWs are expected to improve access, referrals, and uptake despite persistent weaknesses in financing, logistics, supervision, and governance. Effective integration should therefore be understood not as service delivery expansion but as the extent to which CHWs are supported across all six building blocks.

Integration Models and Their Implications for Health System Strengthening

Government-led integration showed the strongest alignment with formal health systems, embedding CHWs within national governance, financing, supervision, information, and supply-chain structures, and thereby strengthening accountability, sustainability, and state ownership. NGO-led models achieved only partial integration through parallel systems that may improve short-term delivery while weakening long-term sustainability. Hybrid models were the most common and mirror the realities of resource-constrained, donor-dependent settings.

These results confirm that CHW integration is essentially a health system strengthening process rather than a stand-alone programme. Incomplete integration reflects structural weaknesses in the health system itself and is

consistent with evidence that both the "hardware" (resources, infrastructure) and the "software" (governance, trust, social capital) of health systems determine programme performance. CHWs amplify the system: they extend the reach of health services while also exposing existing system weaknesses. Investment in a well-organised CHW subsystem embedded within primary health care can reduce maternal, newborn, and child morbidity, improve access to essential services, and strengthen community-level outbreak detection and response [4, 39].

Facilitators and Barriers, and Their Implications for Health System Strengthening

The facilitators and barriers identified confirm that CHW integration is fundamentally a health system strengthening process rather than a narrow workforce intervention, depending on the coordinated functioning of governance, financing, workforce development, information systems, supply chains, referral mechanisms, and service delivery platforms. Political commitment confers the policy legitimacy needed to embed CHWs in formal systems; sustainable domestic financing stabilises the workforce and reduces exposure to donor cycles; and standardised training with supportive supervision builds both clinical competence and system-interface capability, including reporting, referral, commodity use, and community engagement [3, 26, 35].

Conversely, the barriers reveal persistent weaknesses in the wider system. Governance fragmentation remains a major constraint where partner-managed programmes operate parallel training, supervision, reporting, financing, or logistics systems [3, 28, 35]; such arrangements may improve short-term implementation but weaken stewardship, duplicate reporting, and limit sustainability. Partner support strengthens the health system only when aligned with national policy and accompanied by explicit

transition pathways to domestic ownership. Supply chain stock-outs directly undermine CHW credibility, service continuity, and community trust: even recognised, trained, and supervised CHWs are ineffective without commodities [3, 18], which illustrates the distinction between nominal and functional integration.

Weak supervision, fragmented information systems, inadequate referral pathways, unstable financing, and role overload further demonstrate that CHW performance is shaped by the systems within which CHWs operate [3, 18].

Training Needs for Effective CHW Integration

Effective integration required competencies extend beyond clinical service delivery to referral management, health information systems, supply chain coordination, community engagement, digital literacy, professional ethics, and work planning, reflecting the evolving role of CHWs as actors linking communities with formal health systems.

These competency requirements align closely with WHO guidance, which recommends competency-based training, supportive supervision, and continuous professional development as determinants of CHW programme effectiveness [3, 27]. Importantly, training alone did not achieve sustained integration; competencies were translated into practice only where reinforced by supervision, mentoring, refresher training, and continuous learning [5, 11, 18].

The CHW Integration Capability Framework: Interpretation and Implications

The CHW Capability Framework treats integration as a progressive, three-tier capability pathway rather than a collection of independent competencies. Unlike conventional capacity-building approaches, which concentrate on training inputs, it

specifies how competencies are converted into effective health system engagement and, ultimately, into sustained performance. The synthesis indicated that most integration failures occur at the second tier, where CHWs hold basic competencies but lack the institutional support and operational capacity to function within formal health systems.

The framework's key contribution is its recognition that integration capabilities are sequential and interdependent: higher-level integration functions depend on foundational competencies, and sustained performance depends on effective system engagement and continuous institutional support. This exposes the limits of isolated interventions, such as training without supervision or supervision without competency development, and explains why coordinated investment across the capability pathway is required. By linking workforce development to integration outcomes, the framework complements the WHO Health System Building Blocks Framework and provides a practical tool for programme design, workforce development, monitoring, and policy planning, although further empirical validation is required.

Comparison with Global Evidence and WHO Recommendations

The findings largely align with global CHW and health system frameworks, which hold that effective integration depends on coordinated governance, financing, supervision, information systems, and supply chains rather than workforce deployment alone [3-5, 18]. They are consistent with the WHO CHW guideline recommendations on competency-based training, supportive supervision, remuneration, and career pathways [3], and with prior reviews reporting that supervision and remuneration drive CHW performance [18, 20] and that CHW programme components map unevenly onto the building blocks [19]. The present review extends these findings by showing that, in rural SSA, integration is

systematically stronger in service delivery and governance than in financing, information systems, and supply chains, and that this asymmetry, rather than any deficit of CHW competence, explains much of the observed variation in programme sustainability.

The review also underscores the depth of donor and partner dependence. Global evidence recognises the catalytic role of external support but cautions that fragmented financing undermines national ownership [3, 4, 15]. In rural SSA, donor-driven implementation frequently fragments training, supervision, reporting, remuneration, and supply systems, producing uneven integration across settings and over time [5, 28]. The findings therefore do not challenge global CHW integration theory; they demonstrate how difficult integration is to sustain where enabling system conditions, remoteness, and resource constraints interact [3-5, 39].

Future Research

1. Future research should validate the CHW Integration Capability Framework across diverse contexts and identify the combinations of governance, financing, supervision, training, HMIS, supply chain, and referral interventions that most effectively support integration.
2. Longitudinal and mixed-methods studies to determine whether improved CHW integration leads to better retention, service quality, community trust, primary health care outcomes, and long-term programme sustainability.

Limitations of the Study

1. Variability in the quality of the included evidence. Although we appraised quality, the reviewed studies differed considerably in methodological design, analytical rigor, and reporting standards.

2. Regional heterogeneity represents an important limitation of this review. The included studies spanned multiple countries with differing policy environments, health system capacities, CHW models, and implementation contexts.
3. Potential publication bias; Evidence on CHW integration is derived primarily from published studies, which may disproportionately report successful programmes, positive outcomes, and innovative interventions. As a result, unsuccessful integration programmes, may be underrepresented.
4. The proposed CHW Integration Capability Framework has not yet been empirically validated. Its validation is identified as a priority for future research.

Despite these limitations, the consistency of findings across multiple contexts and study designs strengthens confidence in the conclusions and their applicability to CHW integration policy and practice in rural Sub-Saharan Africa.

Conclusion

This review synthesised evidence from 42 studies on the models, facilitators, barriers, and competency requirements shaping the integration of Community Health Workers into formal health systems in rural Sub-Saharan Africa. Integration is uneven across the health system building blocks: CHWs are increasingly embedded in service delivery, governance, and workforce structures, but financing, health information systems, and supply chains remain weak, limiting sustainability and institutionalisation. Of the three dominant models, government-led arrangements showed the strongest institutionalisation and accountability, NGO-led models achieved short-term delivery gains through parallel systems that were fragile beyond project cycles, and hybrid models were the most common and

pragmatic but require deliberate transition towards national ownership.

Integration is therefore a health system strengthening process rather than a workforce intervention. It is enabled by political commitment, sustainable domestic financing, supportive supervision, competency-based training, reliable supply chains, integrated information systems, and functional referral pathways, and it is constrained by governance fragmentation, financing instability, weak supervision, stock-outs, and disconnected data systems. The review further identifies ten competency domains required for integration and proposes the CHW Integration Capability Framework, a three-tier model in which foundational competencies, system interface capabilities, and sustained performance are sequentially linked and mutually reinforcing. The framework explains that training alone does not deliver sustained results and offer a practical tool for workforce planning, programme design, and implementation monitoring, although it requires empirical validation.

Sustainable CHW integration requires coordinated investment across all six WHO health system building blocks, with particular attention to governance, financing, information systems, workforce, and supply chains. Governments, policymakers, and development partners should move beyond fragmented, disease-specific, and externally driven approaches towards institutionalised, system-wide strategies that recognise CHWs as an essential and supported component of the primary health care workforce.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Approval

This study is a systematic review of secondary data from publicly available published sources. No primary data collection

involving human participants was conducted. Formal ethical approval was therefore not required. All included studies were accurately represented, appropriately cited, and reported in compliance with PRISMA 2020 standards.

Author Contributions

Sowo Anita Lebbie conceptualised the study, and co-authors contributed to writing and approval of the final manuscript.

Data Availability

The data supporting the findings of this study are derived from publicly available published literature. All included studies are cited in the reference list. The corresponding author can

provide full data extraction records upon reasonable request.

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