Task sharing and task shifting: Optimizing the primary health care workforce for improved delivery of noncommunicable disease services in Kenya

Benjamin Tsofa
Joshua Munywoki
Fatuma Guleid
Jacinta Nzinga
Lucy Kanya
Task sharing and task shifting:
Optimizing the primary health care workforce for improved delivery of noncommunicable disease services in Kenya

Benjamin Tsøfa
Joshua Munywoki
Fatuma Guleid
Jacinta Nzinga
Lucy Kanya
About AHOP

The African Health Observatory - Platform on Health Systems and Policies (AHOP) is a regional partnership that promotes evidence-informed policy-making. AHOP is hosted by the WHO Regional Office for Africa (WHO AFRO) through the integrated African Health Observatory and is a network of centres of excellence from across the continent, leveraging existing national and regional collaborations. National Centres currently include the College of Health Sciences, Addis Ababa University, Ethiopia; KEMRI Wellcome Trust, Kenya; the Health Policy Research Group, University of Nigeria; the School of Public Health, University of Rwanda; and Institut Pasteur de Dakar, Senegal. AHOP draws on support from a technical consortium including the European Observatory on Health Systems and Policies (EURO-OBS), the London School of Economics and Political Science (LSE) and the Bill & Melinda Gates Foundation (BMGF). AHOP joins a cohort of regional health systems Observatories including the European Observatory and the Asia-Pacific Observatory (APO) who have shared their learning to inform the development of the AHOP approach.

About AHOP policy briefs

AHOP policy briefs are one of a suite of outputs produced by the platform. We aim to capture current concepts, experiences, and solutions that are of importance to health policymaking within the African region, often applying a comparative lens to learn from diverse approaches. We recognise that there are multiple approaches to writing policy briefs. Through consultation we have developed a distinct AHOP approach, with all our briefs following a common template. AHOP briefs bring together existing evidence and present it in an accessible format; use systematic methods transparently stated; and all undergo a formal and rigorous peer review process.

Acknowledgements

Series Editor: Katie Shuford
Series Coordinator: Dorothy Chisare

Reviewers: The authors and editors are grateful to external reviewers Anthony Etyang and Jemima Kamano for commenting on this brief and contributing their expertise. The brief was also reviewed internally by Serge Bataliack, Aminata Seydi, Sokona Sy and Ebongue Mbondji (WHO AFRO); Suszy Lessof and Sherry Merkur (EURO-OBS); Logan Brenzel (BMGF); Lesong Conteh, Beth Kreling, Charles Ebikeme, and Bryony Simmons (LSE); and Alex Njeru, Edwine Barasa, Kui Muraya, David Gathara, Emelda Okiro, and Samson Kinyanjui (KEMRI Wellcome Trust, Kenya); and Brendan Kwesiga (WHO Kenya Country office) on behalf of the AHOP partners.

Data: We would like to thank the Ministry of Health Kenya and the Kenya National Bureau of Statistics who have contributed data to inform the writing of this brief.

Production: Our thanks go to Ashleigh Slingsby (LSE) for copyediting the brief, Alexia Honore (LSE) for French copyedit support, and to Cat Johnson (Manta Ray Media) for the design.


Further information

Web: https://ahop.aho.afro.who.int
Email: AFRO Team: afrgoahop@who.int; Technical Partners: ahop@lse.ac.uk
Twitter: @AHOPlatform

This programme is supported by the Bill & Melinda Gates Foundation.
Contents

vi 
Key messages

vii 
Executive summary

1 
Introduction

3 
Context

6 
Integrating NCD care into the PHC system

10 
Conclusion

14 
References
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHU</td>
<td>community health unit</td>
</tr>
<tr>
<td>CHW</td>
<td>community health worker</td>
</tr>
<tr>
<td>CVD</td>
<td>cardiovascular disease</td>
</tr>
<tr>
<td>HW</td>
<td>health worker</td>
</tr>
<tr>
<td>HWF</td>
<td>health workforce</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NCD</td>
<td>noncommunicable disease</td>
</tr>
<tr>
<td>NPHW</td>
<td>non-physician health worker</td>
</tr>
<tr>
<td>PHC</td>
<td>primary health care</td>
</tr>
<tr>
<td>TSS</td>
<td>task sharing and task shifting</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WHO PEN</td>
<td>WHO Package of essential noncommunicable disease interventions for primary health care in low-resource settings</td>
</tr>
</tbody>
</table>
**Key messages**

Integration of noncommunicable disease (NCD) care into primary health care (PHC) is crucial in addressing the NCD burden: this could improve health promotion and access to early NCD diagnosis and facilitate continuous management of NCDs at the population level. Successful NCD integration requires both investment in the health system and refocusing of PHC from an infectious disease emphasis to a system approach inclusive of NCD care.

**Strengthening the health workforce (HWF) is key in reorganizing the PHC system:** availability and adequate capacity and distribution of health workers are crucial.

**Task sharing and task shifting (TSS) is an effective intervention to address HWF challenges:** sharing clinical tasks with non-physician health workers (NPHWs) such as nurses and community health workers (CHWs) or shifting some tasks to them could help strengthen HWF to accommodate NCD care at the PHC level.

**An enabling legal and regulatory framework and adequate training of NPHWs are required to support TSS:** the key enablers for successful TSS are training and on-the-job support for NPHWs. The barriers include the lack of a legal and regulatory framework for the new roles NPHWs assume such as prescribing medicines and other health system responsibilities.
Executive summary

Responding to the NCD burden for Kenya requires a restructuring of the health system. The burden of NCDs continues to rise and hinders the country’s universal health coverage ambitions. It was reported that in 2019, over one third of all deaths in Kenya were attributable to NCDs. Four major NCDs, that is cardiovascular diseases (CVDs), cancers, diabetes and chronic respiratory diseases, accounted for 57% of these deaths.

Controlling NCDs involves providing promotive, preventative, curative and palliative health services throughout the life cycle. Weak health systems and those structured around infectious or communicable diseases cannot adequately provide these services, given the chronic nature of NCDs and their long-term reliance on the health system. As such, the entire health system needs to be restructured to move from just providing acute episodic care to integrate a continuum of NCD services delivered over time.

Integrating NCD care into PHC is underutilized in Kenya

Integrating NCD care into the PHC system offers great potential, as PHC is the entry point for most people into the health system. Studies show that NCD services can be delivered at the PHC level with good outcomes. But this model is underutilized in Kenya, and for several reasons:

- access to care is inequitable with most services being available in private facilities and primarily in urban areas;
- supply of essential NCD drugs is inconsistent;
- health information systems are weak;
- only a limited number of facilities have the full capacity for NCD services;
- health workers are in short supply, especially in rural areas.

This means that a coordinated and integrated national service delivery system for NCD control through PHC will require significantly strengthening the current PHC system.

PHC workforce as an important lever in strengthening PHC

An assessment of the progress of African countries, including Kenya, in integrating NCD care into PHC found that countries needed to significantly increase their HWF capacity, among other factors. HWF in Kenya faces a myriad of challenges, including severe shortages and maldistribution, leading to inequitable access to care for most of the population. Integrating NCD care into PHC could mean a significant increase in the workload of existing workers and subsequently add pressure on a workforce already facing major challenges. Innovative approaches are needed to rapidly expand and optimize HWF to accommodate NCD care at the PHC level.

Task sharing and task shifting as effective interventions for optimizing the health workforce for the response to the NCD burden

Task sharing and task shifting (TSS) can optimize the HWF by increasing the efficiency of available HWs. With TSS, specific tasks normally performed by a physician are shared with or delegated to health professionals of a different or lower cadre or persons without formal health education, but who are specifically trained for the tasks. Studies on the effectiveness of TSS in NCD services at the PHC level show NPHWs, in this case nurses and community health workers (CHWs), to be effective in performing tasks such as health promotion and screening for, and diagnosis and treatment of NCDs with good health outcomes. The key enablers identified are training of NPHWs and providing them with on-the-job support tools such as treatment and referral guidelines, plus supervision. The barriers include a lack of legal and regulatory frameworks supporting the new NPHWs’ roles such as prescribing and dispensing of medicines and other health system challenges.

To support TSS implementation at the health system level, tailored pilot programmes are needed to determine its feasibility and scaling up. Legal and regulatory frameworks should in place to support the expanded health worker roles and ensure efficient and safe TSS. Importantly, TSS models should be rigorously documented and evaluated to learn what works and in what circumstances. In addition, as interventions for HWF have implications for the entire health system, they must be viewed through a systems lens.
Introduction

Over one third of all deaths in Kenya in 2019 were attributed to NCDs (Vos et al., 2020). The four major NCDs – CVDs, cancer, diabetes and chronic respiratory diseases – accounted for 57% of these deaths. Furthermore, the direct and indirect economic impact of NCDs is significant- Kenya is said to have lost Ksh 230 billion or 3.4% of its gross domestic product in 2016 from rising NCD-related medical costs and indirect productivity losses. At the household level, an estimated decrease of 28.6% in income due to NCDs was reported in 2007 (Mwai & Muriithi, 2016; Mensah et al., 2020). Therefore, preventing and managing NCDs are significant public health and economic priorities.

Controlling NCDs involves addressing their risk factors and ensuring their early detection and timely and appropriate management. This requires delivering well-designed and cost-effective services that are highly coordinated across all health system levels. Adopting an integrated health service delivery approach is key to sustainably delivering such services. However, this requires a paradigm shift in the service delivery systems from addressing NCDs separately or vertically to holistic service delivery for disease groups in an integrated manner.

Different integrated health care service delivery models are already in use in Kenya. These include integrating services into existing vertical programmes and the more “systems” approach of integrating services into PHC. Examples at the vertical programme level include integration of family planning with HIV care, NCD care with HIV services, and HIV services with tuberculosis care (Gupta et al., 2014; Legido-Quigley et al., 2013; Narasimhan et al., 2019; Warren et al., 2017; Adeyemi et al., 2021; McCombe et al., 2022). At the system level, services are delivered by integrating the primary, secondary, and tertiary levels of care, allowing patients to transition from one level to another as needed. This is outlined in the Kenya essential package for health, which includes the provision of NCD services, from health promotion to referral and disease management.

Evaluations of different integrated NCD service delivery approaches show their effectiveness to vary (Hyle et al., 2014; Njuguna et al., 2018; Mwagomba et al.; 2018, Narain, 2011). For example, studies across various low and middle income countries show that vertical integration of NCDs into HIV service delivery can increase retention in and adherence to care (Duffy et al., 2017; Janssens et al., 2007; Osetinsky et al., 2019). However, this approach also contributes to the creation of a fragmented array of isolated or siloed programmes that are challenging to scale up owing to broader health system flaws. On the other hand, the systems approach of integrating services into PHC offers an opportunity for health promotion and greater access to early diagnosis and continuous management of NCDs throughout an individual’s life (Demaio et al., 2014; Coleman et al., 1998; Haque et al., 2020; Varghese et al., 2019). This model is underutilized in Kenya, largely owing to the inequitable access to health care services and a lack of the essential health system investment in the management of long-term NCDs through PHC (Wami et al., 2022; Subramanian et al., 2018; Rockers et al., 2018).

Successful integration of NCD services into PHC is directly linked to the strengthening of all components of the PHC system such as financing, human resources, service delivery, information management, governance and provision of health commodities. As PHC in Kenya undergoes reorganization under the new PHC Strategic Framework 2019–2024, appropriate and cost-effective interventions are required to strengthen NCD service delivery at the PHC level (MoH, 2020b).

Owing to the breadth and complexity of the health system, this brief will focus on interventions targeting only the HWF component of the health system. HWF challenges have been a consistent barrier in scaling up NCD care for PHC (Tesema et al., 2020). They include acute shortages of specialized health worker cadres, inefficient distribution of HWF and failure to attract and retain HWs at the PHC level.

\section*{Background}

Over one third of all deaths in Kenya in 2019 were attributed to NCDs (Vos et al., 2020). The four major NCDs – CVDs, cancer, diabetes and chronic respiratory diseases – accounted for 57% of these deaths. Furthermore, the direct and indirect economic impact of NCDs is significant- Kenya is said to have lost Ksh 230 billion or 3.4% of its gross domestic product in 2016 from rising NCD-related medical costs and indirect productivity losses. At the household level, an estimated decrease of 28.6% in income due to NCDs was reported in 2007 (Mwai & Muriithi, 2016; Mensah et al., 2020). Therefore, preventing and managing NCDs are significant public health and economic priorities.

Controlling NCDs involves addressing their risk factors and ensuring their early detection and timely and appropriate management. This requires delivering well-designed and cost-effective services that are highly coordinated across all health system levels. Adopting an integrated health service delivery approach is key to sustainably delivering such services. However, this requires a paradigm shift in the service delivery systems from addressing NCDs separately or vertically to holistic service delivery for disease groups in an integrated manner.

Different integrated health care service delivery models are already in use in Kenya. These include integrating services into existing vertical programmes and the more “systems” approach of integrating services into PHC. Examples at the vertical programme level include integration of family planning with HIV care, NCD care with HIV services, and HIV services with tuberculosis care (Gupta et al., 2014; Legido-Quigley et al., 2013; Narasimhan et al., 2019; Warren et al., 2017; Adeyemi et al., 2021; McCombe et al., 2022). At the system level, services are delivered by integrating the primary, secondary, and tertiary levels of care, allowing patients to transition from one level to another as needed. This is outlined in the Kenya essential package for health, which includes the provision of NCD services, from health promotion to referral and disease management.

Evaluations of different integrated NCD service delivery approaches show their effectiveness to vary (Hyle et al., 2014; Njuguna et al., 2018; Mwagomba et al.; 2018, Narain, 2011). For example, studies across various low and middle income countries show that vertical integration of NCDs into HIV service delivery can increase retention in and adherence to care (Duffy et al., 2017; Janssens et al., 2007; Osetinsky et al., 2019). However, this approach also contributes to the creation of a fragmented array of isolated or siloed programmes that are challenging to scale up owing to broader health system flaws. On the other hand, the systems approach of integrating services into PHC offers an opportunity for health promotion and greater access to early diagnosis and continuous management of NCDs throughout an individual’s life (Demaio et al., 2014; Coleman et al., 1998; Haque et al., 2020; Varghese et al., 2019). This model is underutilized in Kenya, largely owing to the inequitable access to health care services and a lack of the essential health system investment in the management of long-term NCDs through PHC (Wami et al., 2022; Subramanian et al., 2018; Rockers et al., 2018).

Successful integration of NCD services into PHC is directly linked to the strengthening of all components of the PHC system such as financing, human resources, service delivery, information management, governance and provision of health commodities. As PHC in Kenya undergoes reorganization under the new PHC Strategic Framework 2019–2024, appropriate and cost-effective interventions are required to strengthen NCD service delivery at the PHC level (MoH, 2020b).

Owing to the breadth and complexity of the health system, this brief will focus on interventions targeting only the HWF component of the health system. HWF challenges have been a consistent barrier in scaling up NCD care for PHC (Tesema et al., 2020). They include acute shortages of specialized health worker cadres, inefficient distribution of HWF and failure to attract and retain HWs at the PHC level.
Key question
This brief seeks to answer the following policy question: how can the HWF be optimized to support the integration of NCD services into Kenya’s PHC system? It presents evidence on TSS as an option for strengthening HWF to enable PHC systems to respond to the NCD burden. It focuses on CVDs and diabetes, two prevalent NCDs in Kenya. The brief is intended to support evidence-informed deliberation among policy-makers and other PHC stakeholders in Kenya. It is not intended to prescribe specific policy options or implementation strategies.

Methodology
This policy brief summarizes the global and local evidence on optimizing the HWF for the delivery of NCD care at the PHC level. We searched electronic databases including PubMed, Health Systems Evidence, the Cochrane Library and Google Scholar for relevant systematic reviews and primary studies. We also checked the reference lists of key studies to identify additional resources. We summarized the key details of each study, including the intervention and its outcomes, barriers and facilitators (see Appendix 1).
Kenya’s health system underwent a drastic transformation in 2010 after the country adopted a two-tier, devolved governance system comprising national and county governments. The national Government’s health sector’s responsibilities include developing health policies, building capacity, mobilizing resources, conducting research, managing national referral health facilities, and providing technical assistance to counties. County governments are responsible for their health facilities and pharmacies, ambulance services and promotion of PHC (see Figure 1).

Figure 1: Kenya’s health system’s six levels of health service delivery.

<table>
<thead>
<tr>
<th>Government tier</th>
<th>Service delivery level</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>National government</td>
<td>Level 6: National referral hospitals</td>
<td>Specialized care, capacity building and research</td>
</tr>
<tr>
<td></td>
<td>Level 5: Country referral hospitals</td>
<td>Specialized care and capacity building</td>
</tr>
<tr>
<td></td>
<td>Level 4: Primary referral hospital/sub-country hospitals and medium sized private hospitals</td>
<td>Immediate outpatient and inpatient care</td>
</tr>
<tr>
<td></td>
<td>Level 3: Health centres, maternity centres, nursing homes</td>
<td>Level 2 and 3: Immediate outpatient services, basic emergency services, maternity services, basic diagnostic services and health education</td>
</tr>
<tr>
<td></td>
<td>Level 2: Dispensaries and clinics</td>
<td>Community health services according to the essential package for health</td>
</tr>
<tr>
<td></td>
<td>Level 1: Community health units</td>
<td></td>
</tr>
</tbody>
</table>

Source: Kenya Health Policy 2014–2030
The Kenya Government has taken several policy-level steps to address the rising burden of NCDs. The Kenya essential package for health outlines details on NCD service delivery across all levels of the health care system. Health promotion is provided at level 1, disease screening and management at levels 2 and 3 and specialized care for complicated cases at levels 4–6 (Kraef et al., 2020; Asiki et al., 2018; Shiroya et al., 2019).

The National NCD Strategic Plan 2021–2025 provides a framework for developing action plans for the prevention and control of NCDs by the national and county governments. A key strategy in the strategic plan is to develop and implement an integrated NCD model for PHC. In addition, the Ministry of Health (MoH) has developed disease-specific policies such as the Kenya national guidelines for cardiovascular diseases management 2018 and the National and clinical guidelines for management of diabetes mellitus. The establishment of an NCD department in MoH and an NCD interagency coordinating committee and the support from the presidency for universal health coverage have been important facilitators in strengthening NCD management. However, the implementation of these policies and frameworks has been challenging.

PHC services are currently primarily provided at levels 1–3 of the health care system structure and are the responsibility of county governments (Table 1). To increase access to PHC services and improve the quality of care, MoH recently developed the PHC Strategic Framework 2019–2024. Under that framework, PHC is provided through the PHC network, which utilizes a hub and spoke model in which the emphasis is on levels 2–4 facilities (Figure 2). Level 2 facilities will be strengthened and upgraded to provide the same level of care as the current level 3 facilities and will be known as PHC facilities.

### Table 1: Health facilities within the national PHC network

<table>
<thead>
<tr>
<th>Level</th>
<th>Number of facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 4</td>
<td>895</td>
</tr>
<tr>
<td>Level 3</td>
<td>2,237</td>
</tr>
<tr>
<td>Level 2</td>
<td>10,943</td>
</tr>
<tr>
<td>Level 1</td>
<td>9,150 (community health units)</td>
</tr>
</tbody>
</table>


Each PHC facility will have a multidisciplinary team of HWs assigned to a population in a predetermined geographical area known as the community PHC zone (Figure 2). Each of these zones will have a set number of community health units (CHUs) where all individuals in the area will be registered. The CHUs will be managed by CHWs and will be linked to the PHC facilities. This brief will consider this scenario as constituting what Kenya’s PHC system is. PHC services for NCDs under the new framework include health promotion and education, disease screening, rehabilitation, workplace health and safety, and food quality and safety. The framework also aims to strengthen the referral system to ensure that NCD care is delivered at the appropriate health service level.
CVDs were the underlying cause of death in 13.8% of the reported deaths in Kenya in 2019, compared with 13% in Africa and 32% globally. The leading CVDs as causes of death were stroke at the levels of 6.1% overall, 5.8% for males and 6.4% females, and ischemic heart disease at the levels of 4.6% overall, 4.7% for males and 4.6% for females (Vos et al., 2020). In that year, the age adjusted comparative prevalence of diabetes in Kenya was estimated to be 4%, compared with 5.3% in Africa and 9.8% globally, with associated deaths among adults aged 20–79 years estimated at 15 285. In addition, an estimated 43.7% of individuals had undiagnosed diabetes, compared with 53.6% for Africa and 44.7% globally. Diabetes-related expenditure per person with diabetes among people aged 20–79 years was estimated to be US$ 448.60 (Sun et al., 2022). In 2015, only 41% of Kenyans aged 15–69 years diagnosed with diabetes received treatment and only 7% of them had their disease controlled (MoH, 2016).

In their study assessing the readiness of health facilities in Kenya to deliver CVD and diabetes services, Wami et al. (2022) found that while the availability of services was high, with readiness scores of 69% for CVDs and 74% for diabetes, the services were concentrated in facilities in level 4 and above in the public health care system and in private facilities. In addition, there was a notable shortage of trained HWs of all cadres and inadequate management guidelines to support provision of care.

The World Health Organization (WHO) considers the top risk factors for the majority of NCDs to be excessive consumption of alcohol, tobacco use, physical inactivity and an unhealthy diet (WHO, 2022; see Table 2 for data from a 2015 survey in Kenya).

Table 2: Risk factors for and determinants of CVD and diabetes in Kenya

<table>
<thead>
<tr>
<th>Risk factors and determinants of CVD and diabetes</th>
<th>2015 Kenyan statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity/overweight</td>
<td>27%</td>
</tr>
<tr>
<td>Consumption of tobacco products</td>
<td>13%</td>
</tr>
<tr>
<td>Exposure to second-hand smoke</td>
<td>24% at home and 20.9% at work</td>
</tr>
<tr>
<td>Failure to engage in the recommended amount of physical activity</td>
<td>6.5%</td>
</tr>
<tr>
<td>Low consumption of fruits and vegetables</td>
<td>2.1 servings (WHO recommends 5 servings)</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>19.3% of the population, of whom 13% consume alcohol daily</td>
</tr>
</tbody>
</table>

Evidence shows that health promotion, NCD prevention, early diagnosis and management can be delivered at the PHC level with good outcomes (see Wangchuk et al., 2014; Haque et al., 2020; Demaio et al., 2014; Varghese et al., 2019; Hyon et al., 2017; Khunti and Ganguli, 2000). The PHC workforce is a key element in the success of this, and this is acknowledged in Kenya’s new PHC strategy (MoH, 2020b). The focus of the strategy is to ensure availability of PHC workforce with the right skill mix. To this effect, the strategy adopts a multidisciplinary team approach with the requirement that a PHC team consist of medical, clinical, pharmaceutical, public health, health promotion and health records officers, together with nurses, nutritionists and laboratory specialists. Having multidisciplinary teams will facilitate the structuring of the workforce to span the entire spectrum of care in an integrated, multi-modal manner, which is useful in the integration of NCD care at the PHC level.

In 2010, WHO developed the Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resource settings in response to the growing NCD burden and to decentralize NCD care to the PHC level. Implementation of PEN by any Member State is seen as a first step in integrating NCD care into the Member State’s PHC. However, since 2012, only nine WHO African Member States have adapted PEN. In addition, 17 countries have reported training or planning to train their PHC workforce on managing NCDs (Tesema et al., 2020). Studies in Zambia (Mutale et al., 2018) and Ghana (Nyarko et al., 2016) identified PHC workforce capacity as a gap in implementing the PEN guidelines. These guidelines are yet to be implemented in Kenya, owing to challenges such as financial and human resource limitations and poor awareness on the guidelines, amongst other issues.

In Kenya, the Government will need to address the current gaps in providing integrated NCD services within the PHC system. While the Government has made considerable efforts to strengthen PHC, several challenges persist. For example, only 11% of the total health expenditure for the 2017/2018 financial year was spent on NCDs (MoH, 2020c). The health system remains largely hospital centric, and patients suffer long wait times and low quality of care (Yan et al., 2019; Wami et al., 2022). Additional challenges include (1) inequitable access to care with most services being available in private facilities and primarily in urban areas, (2) interruptions in the supply of essential NCD drugs, (3) weak health information systems, (4) few facilities with full capacity for NCD services, and (5) shortage of HWs, especially in rural areas (Wami et al., 2022; Ashigbie et al., 2020; Rockers et al., 2018; Mwangi et al., 2021).

### PHC workforce challenges

In the PHC system, care is delivered by medical officers, clinical officers, nurses, laboratory and pharmaceutical technicians and CHWs across the three PHC levels. The Kenya Health Harmonized Facility Assessment 2018–2019 reports the national core health worker density to be 15.6/10 000, which is significantly below the WHO target of 23/10 000 (Table 3). The country faces a severe shortage of HWs, with only 31 142 employed against the MoH’s goal of 138 266 (Miseda et al., 2017). The number of CHWs in the country was 91 653 in 2020 (MoH, 2020a).

<table>
<thead>
<tr>
<th>HWF indicator</th>
<th>Status (per 10 000 people)</th>
<th>Target (per 10 000 people)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core workforce density*</td>
<td>15.6</td>
<td>23</td>
</tr>
<tr>
<td>Doctor to population ratio</td>
<td>0.6</td>
<td>3.7</td>
</tr>
<tr>
<td>Nurse to population ratio</td>
<td>10</td>
<td>8.7</td>
</tr>
<tr>
<td>Clinical officer to population ratio</td>
<td>3</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*Core workforce includes all cadres within the health workforce.

Source: Kenya Harmonized Health Facility Assessment, 2018
The maldistribution of HWs exacerbates their shortage. Their distribution is unbalanced among counties and between urban and rural areas, which is where most PHC facilities are located (Table 4). HWs in rural areas face several challenges, including inferior living conditions, poorly equipped facilities, lack of supervision from experienced specialists and limited opportunities for career advancement. These factors affect their motivation and retention at the PHC facilities.

Table 4: Distribution of health workers in Kenya

<table>
<thead>
<tr>
<th>Cadre</th>
<th>Public facilities (%)</th>
<th>Private facilities (%)</th>
<th>Urban areas (%)</th>
<th>Rural areas (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td>37.4</td>
<td>62.6</td>
<td>83.9</td>
<td>16.1</td>
</tr>
<tr>
<td>Clinical officers</td>
<td>52.5</td>
<td>47.5</td>
<td>52.1</td>
<td>47.9</td>
</tr>
<tr>
<td>Nurses</td>
<td>62.8</td>
<td>37.2</td>
<td>48.4</td>
<td>51.6</td>
</tr>
<tr>
<td>Total</td>
<td>58.1</td>
<td>41.9</td>
<td>52.7</td>
<td>47.3</td>
</tr>
</tbody>
</table>

Source: Kenya Health Service Delivery Indicator Survey, 2018

Funding and budgeting

The limited funding for HWF and the lack of sufficient data to inform their recruitment and deployment decisions pose as obstacles. Under the devolved governance system, county governments, which are responsible for health service delivery, receive block grants from the national level and budget for the various functions in their county, including funding for health workers. Their budgeting is programme based as opposed to line-item based. They perpetually face challenges with budget execution owing to the untimely nature of the funding flows from the national treasury. Financing for community health has been low, and only 3.5% of the health budget is allocated to community health and PHC in general. This will need to be increased in order to support NCD care integration into PHC (MoH, 2020a).

CHW training and remuneration

There is a shortage of CHWs to deliver community health services, with a gap of 66%. Inadequacies in mentorship, training and management of CHWs and the lack of an accreditation system for community health training are other key challenges. Furthermore, their remuneration is not standardized and no performance reward structures are in place (MoH, 2020a).

TSS use to strengthen PHC workforce for NCD care

Innovative approaches are needed to rapidly expand and optimize the HWF to respond to the PHC challenges relating to NCD care in Kenya (Nishtar & Ralston, 2013). TSS can facilitate the reorganization of the workforce to increase the efficiency of the available human resources. Task shifting refers to the process by which specific tasks are moved or shifted from highly qualified HWs to HWs with fewer qualifications (WHO, 2007). Task sharing is the delegation or sharing of tasks by physicians, nurses, dentists and other health professionals to others, including CHWs. Despite their slight differences, the two terms are often used interchangeably, as they both have the intent of ensuring the right mix of skills is available to provide quality care by optimizing the available HWF capacity (National Academy of Sciences, 2011).

TSS is also a useful option for managing the ballooning human resource wage bill and the inability to attract and retain highly skilled HWs, especially in the public sector and rural settings. In this case, tasks specific to NCD care can be strategically shared between the PHC workforce – who primarily are nurses – and CHWs. It is important to note that although TSS presents an option to address some HWF challenges, it is no panacea. Countries will still need to ensure that their recruitment and distribution policies and practices are responsive to their health systems’ needs.
TSS in Kenya

While Kenya’s National NCD Strategic Plan 2021–2025 acknowledges that HWF will require strengthening to respond to the NCD burden, it does not explicitly include TSS as one of the strategies to achieve this. Recognizing the HWF challenges, MoH developed a TSS policy to optimize the existing workforce, though this was specifically for HIV care and other essential health services for universal health coverage. Kenya’s Task sharing policy guidelines 2017–2030 provide a general overview of TSS and the key aims of the policy (MoH, 2017). They summarize the variety of tasks that may be shared among the cadres for both highly skilled and lower cadres, according to their scope of practice. Specifically, the guidelines list the NCD-related TSS activities for different cadres including for health promotion and screening. However, TSS interventions for NCDs in this policy are limited, as they do not include diagnosis and management of NCDs. The implementation of the policy was halted by the judiciary in 2019 after complaints from the Association of Kenya Medical Laboratory Scientific Officers.

Global evidence on TSS

Reviews of global evidence found that with NPHWs – in this case nurses and CHWs – TSS was a potentially effective strategy for improving access to care for NCDs (Appendix 1) (Joshi et al., 2014; Anand et al., 2019; Seidman & Atun, 2017; Martínez-González et al., 2014; Laurant et al., 2018). NPHWs in these studies performed tasks such as screening for and diagnosing and managing NCDs. In western Kenya, nurses delivered hypertension care at PHC facilities with good clinical outcomes (Vedanthan et al., 2020). In nurse-led NCD services introduced in all PHC clinics in a rural South African district, the nurses supported the management of 68% of the patients with hypertension and 82% of type 2 diabetes patients (Coleman et al., 1998). In a rural district in Eswatini, the management of diabetes and hypertension was effectively delivered by nurses in community clinics (Sharp et al., 2020). Similar findings were reported in Ethiopia (Shanko et al., 2018), Zimbabwe (Frieden et al., 2020), Ghana (Ogedegbe et al., 2018) and Cameroon (Labhardt et al., 2010). On a larger scale, Rwanda’s national nurse-led NCD outpatient programme for PHC facilities was adopted well and was reported to be feasible (Niyonsenga et al., 2021).

The use of CHWs in providing NCD care also has been documented. A 2017 review found that CHWs were potentially effective in delivering preventative care for hypertension and diabetes in developing countries (Jeet et al., 2017). Furthermore, a review of randomized control trials (RCTs) for community-based interventions suggested that these interventions reduced the incidence of diabetes in high risk populations (Shirinzadeh et al., 2019). Findings from eight studies assessing the effectiveness of CHWs in identifying and controlling CVD risk factors found them to be effective in screening for the risk factors and to have good outcomes among the patients, such as reductions in systolic blood pressure (SBP) and improved diet and physical activity etc. (Khetan et al., 2017).

A study covering Bangladesh, Mexico, Guatemala and South Africa assessing the ability of CHWs to screen patients for CVD risks found that with adequate training they could screen and identify individuals at high risk of CVD (Gaziano et al., 2015). In western Kenya, while CHW care did not lead to significant reductions in blood pressure in hypertensive individuals, with the aid of smartphone technology, CHWs effectively linked patients to care (Vedanthan et al., 2019).

Facilitators of TSS

- **Training:** In Ghana, Cameroon and India training of NPHWs on hypertension and CVD screening and management significantly increased their knowledge levels in these topics (Labhardt et al., 2010; Kar et al., 2008; Gyamfi et al., 2017).
- **Adherence to guidelines and on the job training:** The adherence by nurses to the use of treatment guidelines for five NCDs was studied in PHC facilities in an informal urban settlement in Kenya, and the study found that the nurses adhered to the clinical disease management protocols (Some et al., 2016).
- **Support:** Leveraging of the existing infrastructure of vertical programmes, use of mobile technology to access decision support tools, and support from stakeholders were found to be helpful in TSS success in Kenya (Vedanthan et al., 2019).

Barriers to TSS

- **Legislation inadequacies:** The lack of legal and regulatory frameworks that enable NPHWs to prescribe medications reduces their scope of practice.
• **Staffing challenges**: High staff turnover and the inability to retain trained staff are key barriers to TSS. This means that there is constant training of new waves of NPHWs, which is time and resource consuming (Labhardt et al., 2010; Joshi et al., 2014; Vedanthan et al., 2020).

• **Resources shortages**: Even when NPHWs are available to provide care, the lack of medicines and diagnostic equipment is a barrier to the delivery of care (Sharp et al., 2020; Labhardt et al., 2010).

**Figure 3: Addressing PHC Workforce Challenges through Task Sharing and Task Shifting: An Overview**

<table>
<thead>
<tr>
<th>Primary health care workforce challenges in Kenya</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staff:</strong></td>
</tr>
<tr>
<td>• Low health worker to population ratio.</td>
</tr>
<tr>
<td>• Substantial shortage in community health workers.</td>
</tr>
<tr>
<td>• Health workforce unbalanced between counties.</td>
</tr>
<tr>
<td>• Rural areas struggle to attract and retain staff.</td>
</tr>
<tr>
<td>• Inefficient health worker skill mix.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task sharing and task shifting to optimise the health workforce and improve non-communicable disease care through:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• health education,</td>
</tr>
<tr>
<td>• screening high-risk individuals,</td>
</tr>
<tr>
<td>• diagnosis, and</td>
</tr>
<tr>
<td>• treatment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7 facilitators of task sharing and task shifting: global evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Training</strong> Mentorship, training, and supervision of non-physician health workers and community health workers.</td>
</tr>
<tr>
<td><strong>2. Guidelines</strong> Clear, tailored protocols for non-communicable disease management.</td>
</tr>
<tr>
<td><strong>3. Support</strong> Infrastructure, programmes, technology, and stakeholder buy-in.</td>
</tr>
<tr>
<td><strong>4. Legislation</strong> Enabling policy in alignment with existing frameworks.</td>
</tr>
<tr>
<td><strong>5. Staff</strong> Performance and training incentives.</td>
</tr>
<tr>
<td><strong>6. Resources</strong> Investment in medicines, equipment, and health workforce recruitment.</td>
</tr>
<tr>
<td><strong>7. Evidence</strong> Pilot studies on task sharing cost, effectiveness, and feasibility of scale-up.</td>
</tr>
</tbody>
</table>
Conclusion

Establishing a TSS approach

Integrating NCD care into PHC is an effective and equitable approach for addressing the rising burden of NCDs. However, for Kenya, significant progress is needed to strengthen the PHC system to accommodate quality NCD care. As the Government implements its suite of NCD-related strategies with the provision of PHC integrating NCD care as a key objective, TSS can be considered as one of the pathways to facilitate this process.

Based on the evidence, NPHWs such as nurses and CHWs can be used effectively to expand the delivery of CVD and diabetes services in PHC settings. These include preventative services such as health education, CVD screening for high risk individuals and CVD diagnosis and treatment. Evidence suggests that this may improve disease outcomes, facilitate linkage to and increased accessibility of care, and save on costs (Seidman & Atun, 2017). However, the evidence on the cost-effectiveness of these interventions is still inconclusive, and more studies are required.

The current national TSS policy and guidelines need to be updated to support the expanded roles in NCD care. This includes the development of appropriate regulatory frameworks that define the organization of service delivery and improve quality. However, TSS alone cannot fully address health workers’ issues such as HWF maldistribution and shortages, recurring strikes and poor performance. In addition, implementing changes among HWF to accommodate NCD care at the PHC level will depend on, and has implications for, several other health system-related factors. Thus, it should not be addressed in isolation but rather should be assessed in the wider context of the health system.

Rigorous assessment and evaluation of TSS interventions for NCD care in the country must be conducted with the acknowledgement that different contexts and settings within the country will require tailored interventions.

Policy implications

For PHC facilities in Kenya, where most health workers are non-physicians, there is evidence to support the need for their enhanced role in controlling NCDs. In addition, NPHWs may be easier to recruit and retain than are medical doctors, especially in rural areas. TSS interventions will require careful consideration on staff recruitment; legal and regulatory frameworks to support the HWF expanded roles and enable efficient and safe TSS; adequate HWF training and support; availability of medical supplies; appropriate compensation; and reliable referral and information systems (Heller et al., 2019; Karimi-Shahanjarini et al., 2019).

The crucial role of NPHW and community buy-in in TSS success

Successful implementation of TSS will require buy-in from all stakeholders, as it will have implications for workloads and the hierarchy within cadres (Karimi-Shahanjarini et al., 2019), bearing in mind that sometimes the concept is viewed as offering an avenue for competition among HWs. In addition, without clear structures, tasks may not be appropriately or efficiently delegated. However, TSS is already practised in Kenya and should be guided by the TSS policy and guidelines (Oluoch et al., 2018; Mombo & Kaseje, 2015). Still, the guidelines need to be revised and expanded to include more advanced tasks for nurses.

While patients may be more amenable to receiving services such as health promotion from NPHWs, they may be less inclined to accept the more medical services from them (Karimi-Shahanjarini et al., 2019; Rashid, 2010). Therefore, buy-in from the community must be sought, as they will need to trust and accept the care from NPHWs in order to demand NCD care at PHC facilities. In addition, material incentives such as payment and non-material incentives such as opportunities to acquire new...
When considering TSS implementation, policy-makers could either introduce TSS at scale and integrate NCD care at all PHC facilities or use pilot projects in different counties with well-designed evaluation to inform the scaling up. Analysis of eight studies on TSS among NPHWs in low and middle income countries, including Kenya, found that pilot studies were critical in understanding the implementation considerations and feasibility, which could inform the approach of scaling up TSS to the national level (Joshi et al., 2018). Several pilots of PHC-centred NCD care delivery are currently going on in Kenya. Once completed, they will provide evidence on costs and further insight into the effectiveness, feasibility and implementation considerations for PHC-centred delivery of NCD care (Naanyu et al., 2021). Considering the vast health resource disparity between counties, TSS would also likely need to be tailored to specific regions or counties. When implemented effectively, TSS may contribute to improved NCD care in PHC systems.

Skills and community recognition can be considered to increase acceptability of TSS amongst NPHWs. Although there is limited evidence on the cost-effectiveness of TSS among NPHWs in NCD services, Seidman & Atun (2017) found some evidence that TSS has the potential to save costs in activities related to NCDs. However, more studies will be needed.
### Annex. Summary of a sample of studies on TSS to NPHWs

<table>
<thead>
<tr>
<th>Author</th>
<th>Study types included</th>
<th>Countries</th>
<th>Intervention</th>
<th>Tasks performed</th>
<th>Outcomes</th>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joshi et al., 2014</td>
<td>7 RCTs and 15 observational</td>
<td>Cameroon, India, South Africa, China, Ethiopia, Kenya, Philippines, Pakistan, Tanzania, Zimbabwe</td>
<td>TSS to NPHWs (nurses, midwives, and lay HWs)</td>
<td>Screening, algorithm-based management, management with medication, follow-up, diagnosis</td>
<td>Process outcomes: NPHWs can screen for CVDs and diabetes and other NCDs. Studies that permitted NPHWs to prescribe drugs showed that NPHWs can treat hypertension and diabetes according to protocols. Treatment concordance between physicians and NPHWs was high; decisions were the same for 87% of CVD cases in India. Four studies showed improved access to care at the community level. Disease outcomes: NPHWs could achieve control in 68% of hypertensive patients and 82% of diabetic patients</td>
<td>Training of NPHWs and provision of algorithms, protocols and guidelines</td>
<td>Staff attrition, drug supply irregularities, unavailability of equipment, lack of authority to prescribe</td>
</tr>
<tr>
<td>Anand et al., 2019</td>
<td>32 RCTs, 11 cluster randomized trials and 20 observational studies. 31 were included in meta-analysis</td>
<td>Asia, Africa, Latin America</td>
<td>TSS to NPHWs (nurses, pharmacists, dietitians and lay HWs)</td>
<td>Education for patients, follow-up care, algorithm-based management, non-physician drug prescription, referrals, organization of care</td>
<td>Disease outcome: SBP was decreased. Mean difference (MD) was −4.85 mm Hg (−6.12 to −3.57, I² = 76%) overall</td>
<td>Use of management protocols, nurses having authority to prescribe, inclusion of follow-up interventions. The intervention was more effective if it targeted high risk individuals rather than the general population.</td>
<td>The impact was greater in countries with a better doctor to population ratio</td>
</tr>
<tr>
<td>Martínez-González et al., 2014</td>
<td>11 RCTs</td>
<td>UK, US, Netherlands, South Africa, Russia</td>
<td>TSS to nurses</td>
<td>Guideline-based management, initiation and prescription of treatment, development of action plans, provision of urgent care</td>
<td>Disease outcomes: Greater reductions in SBP in favour of nurse-led care (weighted MD: −4.27 mmHg, 95% CI −6.31 to −2.23)</td>
<td>Use of management guidelines and availability of nurses with specialized skills</td>
<td>Not reported</td>
</tr>
<tr>
<td>Laurant et al., 2018</td>
<td>18 randomized trials</td>
<td>UK, US, Netherlands, South Africa, Canada, Sweden, Spain</td>
<td>TSS to nurses</td>
<td>Urgent care, ongoing care, and follow-up</td>
<td>Disease outcomes: Compared to doctor-led care, nurse-led primary care probably slightly improves blood pressure control and probably had similar outcomes for diabetes indicators. Patient satisfaction was slightly higher in nurse-led primary care compared to doctor-led care</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Ogedegbe et al., 2014</td>
<td>3 RCTs</td>
<td>Nigeria, China, Iran</td>
<td>TSS to NPHWs (nurses, pharmacists and CHWs)</td>
<td>Patient education, facilitation of clinic visits, treatment (with physician backup), medication initiation, medication adjustment, follow-up</td>
<td>Disease outcomes: Hypertension studies reported a significant mean blood pressure reduction (2/1 mm Hg and 30/15 mm Hg), and the diabetes trial reported a reduction in the glycated haemoglobin levels of 1.87%</td>
<td>Continuous training and feedback from higher level professionals, provision of treatment, algorithms/guidelines, and bridging hospital care to home care</td>
<td>Lack of policy to support NPHWs to prescribe medication, lack of a referral system, low competency of NPHWs to manage uncomplicated CVD risk factors, lack of organizational structure to accommodate NPHWs as primary care providers</td>
</tr>
<tr>
<td>Ogedegbe et al., 2018</td>
<td>Pragmatic cluster randomized trial (n = 757)</td>
<td>Ghana</td>
<td>TSS to trained nurses plus provision of health insurance coverage (HIC) vs provision of HIC only</td>
<td>Patient education, initiation/titration of antihypertensives, CVD risk assessment</td>
<td>Disease outcomes: The nurse-led plus HIC group had a greater SBP reduction (~20.4 mm Hg; 95% CI ~25.2 to ~15.6) than the HIC group (~16.8 mm Hg; 95% CI ~19.2 to ~15.6). Reduction was sustained at 24 months. Lifestyle behaviours did not change appreciably in either group</td>
<td>Provision of HIC increased access to services. Nurses had authority to initiate drug therapy</td>
<td>Nurses not being allowed to prescribe anti-hypertensives makes it difficult to scale up the programme across Ghana</td>
</tr>
<tr>
<td>Author</td>
<td>Study types included</td>
<td>Countries</td>
<td>Intervention</td>
<td>Tasks performed</td>
<td>Outcomes</td>
<td>Facilitators</td>
<td>Barriers</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Vedanthan et al., 2020</td>
<td>Single observation study (n = 1,051)</td>
<td>Kenya</td>
<td>TSS to nurses</td>
<td>Patient education, prescription of initial medication, escalation of medication based on algorithm, referral to higher level care</td>
<td>Disease outcomes: SBP decreased from baseline to 3 months: slope -4.95 mmHg/month (−6.55 to −3.35). Retention in care was 42%</td>
<td>Leverage existing infrastructure and task redistribution strategy implemented by AMPATH for the treatment and prevention of HIV, clinical support tools, consistent medical supply, linkage and retention activities, stakeholder engagement, social support for patients</td>
<td>Low retention</td>
</tr>
<tr>
<td>Sharp et al., 2020</td>
<td>Single observation study (n = 1,125)</td>
<td>South Africa</td>
<td>TSS to nurses</td>
<td>Identification and screening of patients, diagnosis, patient education, treatment, referral</td>
<td>Disease outcomes: There was a significant reduction in mean BP among hypertensive patients of 9.9 mmHg systolic and 4.7 mmHg diastolic (p = 0.01) after four visits, and a non-significant reduction in fasting blood glucose among diabetic patients of 1.2 mmol/l (p = 0.2)</td>
<td>Availability of specialist nurse supervision</td>
<td>Stockouts of medication</td>
</tr>
<tr>
<td>Labhardt et al., 2010</td>
<td>Single observation study (75 clinics)</td>
<td>Cameroon</td>
<td>TSS to nurses</td>
<td>Preventative care, diagnosis, treatment of hypertension and diabetes</td>
<td>Disease outcomes: Among hypertensive patients with ≥ 2 documented visits (n = 493), SBP decreased by 22.8 mmHg (95% CI: -20.6 to -14.9 with p = 0.0001) and diastolic BP by 12.4 mmHg (-10.9 to -13.9 with p = 0.0001). Among diabetic patients (n = 79) FPG decreased by 3.4 mmol/l (-2.3 to -4.5 with p &lt; 0.001)</td>
<td>Training of nurses and availability of equipment to manage hypertension and diabetes</td>
<td>Reallocation of trained staff, medicine availability interruption, high levels of loss to follow-up</td>
</tr>
<tr>
<td>Jeet et al., 2017</td>
<td>16 RCTs</td>
<td>China, India, Iran, Nigeria, South Africa, Pakistan, American Samoa, Ghana, Thailand, Costa Rica</td>
<td>TSS to CHWs</td>
<td>Preventative care addressing risk factors</td>
<td>Behavioural outcomes: Tobacco cessation in the intervention arm was significantly different from standard care (RR: 2.0, 95% CI: 1.11, 3.58). Quality of evidence on increased physical activities was very low, and quality of evidence on changes in dietary behaviour was low.</td>
<td>Not reported</td>
<td>Not reported</td>
</tr>
<tr>
<td>Khetan et al., 2017</td>
<td>4 RCTs, 3 quasi-experimental studies, 3 cross-sectionalal studies and 1 retrospective analysis</td>
<td>South Africa, Kenya, India, Bangladesh, Pakistan, Iran, Ghana, Mexico, Guatemala</td>
<td>TSS to CHWs</td>
<td>Risk assessment/screening for risk factors</td>
<td>Disease outcomes: Significant reduction in systolic and diastolic blood pressure (MD [SBP]: -4.03, 95% CI: -5.02, -3.04; MD [DBP]: -2.38; 95% CI: -3.27, -1.49); and in blood sugar levels [glycated haemoglobin] MD: -0.83%, 95%CI: -1.25, -0.41</td>
<td>Not reported</td>
<td>Low levels of numeracy and literacy among CHWs, lack of trust in CHWs to conduct cardiovascular risk assessment and make referrals</td>
</tr>
<tr>
<td>Vedanthan et al., 2019</td>
<td>Single RCT</td>
<td>Kenya</td>
<td>TSS to CHWs with training and smartphone technology</td>
<td>Encourage linkage to care</td>
<td>Disease outcomes: No significant improvement of SBP; linkage to care was reported as 49% overall</td>
<td>CHWs were equipped with smartphone technology that had real-time decision support and data entry and provided tailored messaging and recommendations</td>
<td>Not reported</td>
</tr>
</tbody>
</table>

**Note:** CHWs = community health workers, HIC = health insurance coverage, HW = health worker, MD = mean difference, NPHWs = non-physician health workers, RCTs = randomized controlled trials, SBP = systolic blood pressure, TSS = task sharing and task shifting
References


Medicine & International Health, 26, 953–961.

outcomes of national decentralization of integrated outpatient services for severe non-communicable diseases to district hospitals in Rwanda. Tropical Medicine & International Health, 26, 953–961.

The WHO Regional Office for Africa

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Africa is one of the six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

Member States

Algeria
Angola
Benin
Botswana
Burkina Faso
Burundi
Cabo Verde
Cameroon
Central African Republic
Chad
Comoros
Congo
Côte d’Ivoire
Democratic Republic of the Congo
Equatorial Guinea
Eritrea
Eswatini
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mozambique
Namibia
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
South Africa
South Sudan
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

World Health Organization

Regional Office for Africa

Cité du Djoué
PO Box 6, Brazzaville
Congo

Telephone: +(47 241) 39402
Fax: +(47 241) 39503
Email: africom@who.int
Website: https://www.afro.who.int/