

From Policy to Practice:

Evaluating the WHO-PEN Framework for Cardiovascular Disease Management in Ghana

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The Reach Alliance

The Reach Alliance is a consortium of global universities — with partners in Ghana, South Africa, Mexico, Canada, United Kingdom, Australia, and Singapore — developing the leaders we need to solve urgent local challenges of the hard to reach — those underserved for geographic, administrative, or social reasons. Working in interdisciplinary teams, Reach's globally minded students use rigorous research methods to identify innovative solutions to climate, public health, and economic challenges. The UN's Sustainable Development Goals (SDGs) provide inspiration and a guiding framework. Research is conducted in collaboration with local communities and with guidance from university faculty members, building capacity and skills among Reach's student researchers.

The Reach Alliance was created in 2015 by the University of Toronto's Munk School of Global Affairs & Public Policy, in partnership with the Mastercard Center for Inclusive Growth.



Note: Authors are listed alphabetically with the faculty mentor listed last.

Cover photo: Patient monitoring machine in ward of hospital (photo by iStock)





Acknowledgements

We express our deepest gratitude to everyone who has supported us throughout this research journey. We are immensely grateful to our performance coach, Anowa Quarcoo, for her invaluable guidance, encouragement, and insightful feedback that helped shape the team and our research. We express deep gratitude toward all participants of this study, including those recommended by our faculty mentors, who gave their limited and invaluable time to partake in the study. Their willingness to share their experiences and insights was crucial to the success of this project. Finally, we acknowledge the support of Professor Angela Owusu-Ansah, provost of Ashesi University and her office, and Professor Adei Research Studio of Ashesi University whose resources and backing made this research possible.

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Contents

Executive Summary.....	1
Context: The Noncommunicable Disease Burden	2
Local and Global Action on NCDs	3
The WHO-PEN Framework’s Unrealized Potential	4
Hardly Reached	4
Our Research Approach and Insights	6
Lessons Learned / Recommendations	17





Figure 1. Ward at the Kokofu General Hospital.

Executive Summary

Noncommunicable diseases (NCDs) are a significant global health challenge, responsible for 71 per cent of all deaths worldwide every year, with lifestyle factors such as tobacco use, unhealthy diets, and physical inactivity being major contributors.¹ In Ghana, NCDs like cardiovascular diseases (CVDs), cancer, diabetes, and chronic respiratory diseases account for 43 per cent of deaths yearly.² The country faces substantial challenges managing NCDs, including inadequate data collection, limited screening facilities, staff shortages, lack of training, infrastructural issues, and medication shortages.

To tackle these issues, the World Health Organization introduced the Cost-effective Package of Essential Noncommunicable Disease Interventions (WHO-PEN). The framework provides a structured approach, to NCD prevention, early detection, management,

intervention, and treatment, emphasizing the integration of NCD care within primary healthcare systems, even in resource-limited environments. While the WHO-PEN has shown promise in enhancing NCD management, the incidence of cardiovascular diseases (CVDs) persists in Ghana.

We sought to evaluate how Ghana is implementing the WHO-PEN framework to manage CVDs in hard-to-reach communities. Employing a qualitative research approach, a combination of cross-sectional surveys, semi-structured interviews, and focus group discussions, we collected rich, detailed data gathered from various sources, including community members, healthcare workers, and stakeholders within select communities.

Our analysis and review of the data revealed very low adoption and implementation rates of the WHO-PEN across the selected communities, revealing a rather pervasive adoption in the National CVD guidelines employed by healthcare

1 "Noncommunicable Diseases," World Health Organization, 16 September 2023. [↗](#)

2 Winfred A. Avogo, "Community Characteristics and the Risk of Non-communicable diseases in Ghana," *PLOS Global Public Health* 3, no. 1 (2023). [↗](#)

workers. The research identified the Trainer of Trainees (TOT) program as an excellent enabler of the framework, but also noted the damaging effects of human and financial resource constraints, inefficiencies in the TOT program, and low involvement of governance actors in the implementation of the WHO-PEN. The research affirmed patients' struggles in affording NCD care, especially in hard-to-reach areas, and the adverse impact it had on their conditions. Through our recommendations, we hope to contribute significantly to tackling these identified gaps and improve NCD care for patients in hard-to-reach areas.

Context: The Noncommunicable Disease Burden

Many communities, particularly those in remote and hard-to-reach areas, face significant challenges in accessing quality healthcare. These challenges are often exacerbated by geographical isolation, limited infrastructure, unequal distribution of specialized resources, and a workforce shortage. Residents of these communities face a double challenge: they experience higher rates of both infectious and noncommunicable diseases (NCDs).

According to the World Health Organization (WHO), NCDs such as heart diseases, cancer,

chronic respiratory diseases, and diabetes constitute a significant portion of the global disease burden and claim the lives of 41 million people worldwide yearly (about twice the population of New York).³ These conditions often have long latency periods and are primarily driven by risk factors such as age, family history, tobacco smoking, unhealthy diet, physical inactivity, and other physiological factors.⁴ Globally, an estimated 77 percent of all NCD deaths occur in low-and middle-income countries, with cardiovascular diseases (CVD) being the prevailing cause.⁵ This underlines the disproportional burden of NCDs on economically weaker regions and the asymmetric interventions that need to be mounted.

While most of the CVD victims are middle-aged, in Africa people tend to develop NCDs at younger ages, suffer longer, and die sooner than those in high-income countries, according to the national guidelines for CVD in Ghana. Coupled with the huge toll NCDs take on health, economic growth, and the developmental vision in this region, this unique demographic challenge underlines the imperative to find a solution to this challenge. Economic costs entail lost productivity from increased absenteeism, early retirement as a result of illness, and loss of productive years because of premature morbidity and mortality. Factors such as these can perpetuate poverty cycles and reduce people's ability to benefit fully from educational or productive opportunities. This struggle against NCDs in Africa is, therefore,

In Africa, people tend to develop NCDs at younger ages, suffer longer, and die sooner than those in high-income countries.

3 "Noncommunicable Diseases," WHO.

4 Ashraful Kabir, Nazmul Karim, Rakibul M. Islam, Lorena Romero, and Baki Billah, "Health System Readiness for Non-communicable Diseases at the Primary Care Level: A Systematic Review," *BMJ Open* 12, no. 2 (2022): e060387. [🔗](#)

5 "Noncommunicable Diseases," WHO.

relevant not only for public health but also for sustainable development and economic growth.

Local and Global Action on NCDs

The World Health Organization's mission is to ensure that everyone has access to quality healthcare wherever they are. Acknowledging the challenges caused by NCDs, WHO addresses their rising prevalence across the globe and specifically in hard-to-reach areas, and created the Package of Essential Noncommunicable Disease Interventions (WHO-PEN). This package addresses gaps in NCD care by providing prioritized, cost-effective interventions for preventing, detecting, and managing diseases such as cardiovascular conditions, cancers, chronic respiratory diseases, and diabetes. Primarily designed for low-resource settings, it aims to integrate NCD care into primary health systems and includes protocols and tools for scaling up care. It emphasizes actions like enhancing health financing, increasing early detection, ensuring the availability of essential medicines and technologies, strengthening health systems, implementing palliative care policies, and leveraging digital technologies to prevent NCDs and reduce healthcare costs.

Since 2012, Ghana has experienced a steady increase in the prevalence of NCDs. According to WHO reports, chronic NCDs contribute to approximately 43 per cent of all deaths in Ghana, with cardiovascular accounting for 19 per cent, cancer at 5 per cent, chronic respiratory diseases at 22 per cent, and other chronic NCDs at 13 per cent.⁶ In Ghana, 21 per cent of premature deaths are attributed to NCDs.⁷ Strokes and other CVDs have emerged as primary causes of mortality as a result of escalating risk factors,

particularly hypertension, which has seen a sharp increase. Current statistics indicate that the death rates for adult hypertension have increased and now range from 19 to 48 per cent, as reported by the Ghana Health Service Annual Report for 2017.⁸


Because of this high prevalence of NCDs in Ghana, in 2020, as part of their NCD Flagship Initiative (2020–2024), the Norwegian government in collaboration with WHO selected Ghana with four other countries for the initiative. Through this initiative, WHO, in collaboration with the Ministry of Health in Ghana, provided technical support to conduct WHO-PEN training in five regions across the country: Central, Eastern, Ashanti, Bono, Savannah, and Northern Regions. It provided medical diagnostics and distributed devices to 25 community health posts, five health centres, and one district hospital in six implementing districts. As of 2022, 515 healthcare workers across different occupational groups (physicians, nurses, midwives, health information officers, and laboratory technicians) at the regional/district level were trained to strengthen early detection, initiation of treatment, and follow-up care for NCDs by using the WHO-PEN framework. These training modules included CVDs, NCD risk factors, pediatric NCDs, and medical ethics, including procedures for entering NCD data into the district health information software.

The government of Ghana also developed a national NCD policy in August 2014, which was later revised in 2022 to align with global strategies and goals, such as the WHO action plan for NCD management. This plan focuses on achieving universal health coverage in a way that leaves no one behind.

Despite the introduction of the national NCD policy in 2014, its subsequent revision in 2022,

6 "Non-communicable Diseases Country Profile 2018" (Geneva: World Health Organization, 2018), 95.

7 "Civil Society Status Report on NCD Response and Landscape in Ghana," The Ghana NCD Alliance, 2023.

8 "Ghana Health Service Annual Report 2016," Ghana Health Service, 2017. 

and other structures like the NCD Prevention and Control Program, the 2020 assessment carried out by PATH (an international nongovernmental organization aimed at transforming public health in low- and middle-income countries) still revealed a significant gap in the existing service delivery model employed to manage NCDs and related diseases in the country.⁹ The assessment revealed weak data collection systems for patient surveillance, poor screening facilities, staff shortages, institutional challenges such as lack of staff training, systemic problems in the referral system, and infrastructural challenges. It also noted medicine shortages throughout the medication pipeline and the heavy financial burden on patients.¹⁰ These highlights underscore the need for more exploration into the underlying causes of these challenges, aiming to devise effective solutions for comprehensive NCD management in Ghana.

The WHO-PEN Framework's Unrealized Potential

The government's recognition of the rising cardiovascular disease (CVD) burden in Ghana, and the subsequent partnerships and frameworks targeted at addressing and reducing its impact on the economy are all significant steps in mitigating CVD's impact on the population. However, since the pilot exercise and implementation of the WHO-PEN, there's been no marked decrease in the CVD burden across the country. To date, the framework has been implemented in Southeast Asia, in African countries such as Ethiopia and Uganda, and in low- and middleincome countries across the Pacific and East Mediterranean. Although the framework itself is quite effective, based on the change of CVD prevalence in

southeast Asian countries following WHO-PEN implementation, there has been slow adoption across the country, inhibiting the impact of the WHO-PEN, which we believe is attributable to inefficiencies in Ghana's healthcare system.

We seek to understand these factors that lead to slow adoption of the framework across the country. To identify existing gaps in NCD service delivery, we evaluate the extent to which the CVD component of the WHO-PEN framework is used in Ghana; the challenges that may hinder its full implementation; and what factors facilitate its adoption.

This research contributes to a number of the SDGs including:



SDG 3: Good Health and Well-being. Improving the management of NCDs in Ghana, and reducing their prematurity would ensure healthy lives and promote well-being for all at all ages.



SDG 10: Reduced Inequalities. Enhancing health access and quality for NCD patients in underserved areas would facilitate reduced health inequalities/disparities.

Hardly Reached

To assess and evaluate the World Health Organization Package of Essential Noncommunicable Disease Interventions in hard-to-reach communities in Ghana, we needed to identify what hard-to-reach communities were in the context of the research. We chose

9 "Ghana Noncommunicable Disease Landscaping," PATH, 2020. [🔗](#)

10 "Civil Society Status Report on NCD Response."

the communities and demographics using a multi-step approach. First, we analyzed data on the prevalence of NCD activities nationwide, leveraging a national landscape document detailing existing NCD activities and services across major regions. The landscaping summary of NCD activities, although restricted to only the Greater Accra, Northern, and Ashanti Region, revealed low activities in the Northern and Ashanti regions, with gaps in interventions addressing cardiovascular diseases.¹¹ These regions were among those the WHO selected in the initial implementation of the framework.

Next, factors contributing to a community being “hard to reach” were considered. This included limited access to healthcare facilities, transportation issues, social and economic marginalization, gender disparity, and potential cultural barriers.

Taking these limitations into consideration, we selected some communities within the Ashanti Region and Eastern Region as hard-to-reach communities for this study. In the Eastern Region, the selected community of Nkawkaw has an urban population of about 88,000, with females outnumbering males in urban and peri-urban areas. In the Ashanti Region, the selected

Table 1. Overview of interviewed personnel

Role	Code for Analysis	Date of Interview
Worker at the Regional Health Directorate, Ashanti Region	HD1	3 July 2024
Facility manager	FM1	25 June 2024
Medical superintendent	MS1	28 June 2024
Administrator assistant	AA1	25 June 2024
Medical officer	MO1	28 June 2024
Medical officer	MO2	24 June 2024
Medical officer	MO3	27 June 2024
Medical officer	MO4	27 June 2024
Physician specialist	PS1	27 June 2024
Physician assistant	PA1	25 June 2024
Physician assistant	PA2	25 June 2024
Physician assistant	PA3	28 June 2024
Doctor	D1	28 June 2024
Nurse specialist	NS1	27 June 2024
Nurse	N1	24 June 2024
Nurse	N2	24 June 2024
Nurse	N3	24 June 2024
Nurse	N4	25 June 2024
Nurse	N5	24 June 2024

11 “Civil Society Status Report on NCD Response”; “The NCD Navigator: 2020 Findings from Data Collection in Ghana and Kenya.” 

community of Bekwai had the majority of its residents between the ages of 15 and 64, with the total female population at 51.9 per cent as of 2021. This gender disparity is significant because Boakye and colleagues' study revealed that women have a two-and-a-half-times higher risk of developing CVDs compared to men.¹² Additional characteristics of these communities include a predominantly elderly population engaged in farming and the sale of agricultural products, traditional housing structures, and reliance on 12-seater buses or shared tricycles for transportation.

Our Research Approach and Insights

To gain a comprehensive understanding of the service delivery models employed, research was conducted in five hospitals: Holy Family Hospital, Bekwai Municipal Hospital, Kokofu General Hospital, Agyakwa Hospital, and Kenop Care Hospital. These facilities, ranging from district to subdistrict levels, are located in Nkawkaw (Holy Family, Kenop Care, and Agyakwa) and Bekwai (Kokofu General Hospital and Bekwai Municipal Hospital). In-person semi-structured interviews were carried out during a week of field research in Nkawkaw and Bekwai, followed by subsequent online interviews. The research received ethical clearance from the Institutional Review Board at Ashesi University and was

Patients often struggle with the chronic nature of their conditions. They think it's like malaria — take the medication and it disappears.

approved by the Health Directorate officials of each district.

Participants were recruited through purposive and snowball sampling, since there was no prior insight into the available healthcare personnel. We interviewed 22 healthcare professionals, including physicians, physician assistants, nurses, doctors, as well as a few CVD patients, with healthcare workers completing a survey to supplement the interviews. By the fifteenth interview, a saturation point was reached when responses showed recurring themes with only minor variations. Interviews were transcribed using TurboScribe, cleaned, and then open-coded in Taguette. The coding process was followed by a review to extract subthemes and larger themes that addressed our research objectives.

Observations at each facility revealed a higher number of females than males in waiting areas for NCD patients, consistent with research on the increased prevalence of NCDs among women. Despite evidence suggesting high levels of NCDs among younger populations, most patients observed in the facilities were elderly. This discrepancy suggests a potential lack of awareness about CVD conditions among younger people, potentially leading to more severe health outcomes later in life.

The interviews highlighted several key challenges and successes within the healthcare system. PA3 remarked, "We can't do echocardiogram.

12 Hosea Boakye, Albert Atabila, Thomas Hinneh, Martin Ackah, Folasade Ojo-Benys, and Ajediran I. Bello, "The Prevalence and Determinants of Non-communicable Diseases Among Ghanaian Adults: A Survey at a Secondary Healthcare Level," *PLOS ONE* 18, no. 2 (2023): e0281310. [🔗](#)

We can't do X-ray. We don't have it here," underscoring the limitations in diagnostic capabilities at the district level. Another healthcare professional from the same facility noted, "We mostly do the diagnosis. We can do the basic labs that we can do. We can refer to go and see a specialist," reflecting the dependence on referrals to higher-level centres for comprehensive care.

A significant success mentioned by PS1 was the establishment of relationships with cardiologists at tertiary centres: "If there are complicated cases beyond our level of care, we would either refer to a tertiary centre or call the cardiologist for consults. So, that relationship with some cardiologists and tertiary units is there." This collaborative approach has improved patient outcomes, as PS1 observed: "Having these guidelines and relationships has really improved patient care and reduced the stress on us." However, challenges persist, particularly in medication compliance and follow-up care. MO3 noted, "Patients often struggle with the chronic nature of their conditions. They think it's like malaria — take the medication and it disappears. But when they default on their medications or don't return for reviews, it exacerbates their conditions."

These insights from the interviews illustrate the nuanced realities of healthcare delivery in district and subdistrict hospitals, highlighting both the resource limitations and the innovative practices developed to overcome these challenges.

Implementation Reach of the WHO-PEN Framework

During the interviews, we discovered a pervasive lack of awareness about the WHO-PEN framework among healthcare professionals. Out of all the participants, only HD1, who had direct involvement in the initial pilot and implementation phases, was aware of the framework's existence.

A nurse at a family hospital vaguely recalled the framework's name from her own internet searches, but beyond that, the framework was largely unknown. Healthcare professionals across facilities in Bekwai and Nkawkaw had not encountered the WHO-PEN package, nor did they recall receiving any formal training related to it.

Instead, healthcare workers reported relying on the Standard Treatment Guidelines (STG) and the National Guidelines for Cardiovascular Disease (CVD) treatment, both developed by the Ministry of Health. These guidelines provide a comprehensive and detailed approach to managing CVDs, incorporating both pharmacological and nonpharmacological interventions. As FM1 explained, "The standard treatment guidelines were brought in, and based on our discussion and experience, we adapt the protocol to suit our context while still adhering to the prescriptions from the STG and national CVD guidelines." D1 echoed this approach, stating, "We look at both GHS and WHO guidelines and develop one that fits our facility's needs." Facilities often post these adapted protocols on the walls for easy access and recall during service delivery.

Similarities in Treatment Protocols

Despite the low awareness of WHO-PEN, significant similarities exist between the STG, National CVD Guidelines, and the WHO-PEN framework in their treatment protocols. (It's worth noting that the CVD guideline was adapted from the STG.)

Medication protocols. All three frameworks emphasize the use of essential medications for managing CVDs, including aspirin, statins, and antihypertensives. The National Guidelines provide more detailed protocols for medication regimens, including specific dosages and follow-up schedules tailored to the Ghanaian population. However, WHO-PEN's focus on essential

medications aligns closely with the National Guidelines' core recommendations, especially in primary care settings. Both frameworks also advocate for lifestyle modifications, such as dietary changes, physical activity, and smoking cessation, as integral components of treatment, underscoring the importance of nonpharmacological interventions alongside medical treatments.

Task-sharing and health worker roles. The WHO-PEN framework promotes the use of non-physician health workers, such as nurses and community health workers, to deliver essential interventions and monitor treatment adherence. This aligns with the National Guidelines, which also support a team-based approach to managing CVDs, particularly in rural and under-resourced areas. Both frameworks recognize the importance of empowering healthcare workers at all levels to ensure that patients receive timely and appropriate care.

Risk stratification and charts. While the National Guidelines provide more comprehensive risk assessment tools tailored to the Ghanaian context, they are notably similar to WHO-PEN's use of risk charts. The WHO-PEN framework employs simplified charts to estimate the 10-year risk of a CVD event based on factors such as age, sex, blood pressure, smoking status, and diabetes. These charts, while less detailed than the National Guidelines' tools, serve a similar purpose in guiding treatment decisions and prioritizing high-risk patients.

Some healthcare professionals, particularly those who had studied abroad or engaged in continuous professional development, were familiar with the WHO-PEN risk charts. However, many facilities did not implement these charts regularly, citing reasons such as a lack of coloured printing or personal preferences among doctors for other methods of risk stratification. In contrast, the National Guidelines incorporate

more advanced risk-assessment tools, but both frameworks share the underlying goal — stratifying patients based on risk to tailor treatment.

Integration and adaptation. These insights suggest that while explicit use of WHO-PEN may be limited, its principles and practices are subtly integrated into the National Guidelines and the Standard Treatment Guidelines that healthcare facilities use. For example, both frameworks emphasize the importance of essential diagnostics, such as basic lab tests and clinical assessments, which are routinely practised across facilities. Although WHO-PEN's risk charts are not universally implemented, the concept of risk stratification remains a common thread, with healthcare workers adapting the tools they have available to meet the needs of their patients.

Most facilities reported having a good stock of the essential drugs recommended by both WHO-PEN and the National Guidelines, though occasional shortages of certain medications were mentioned. However, disparities in access to medical equipment persisted across facilities, highlighting inequities in healthcare infrastructure.



Figure 2. Entrance to health facility in Nkawkaw

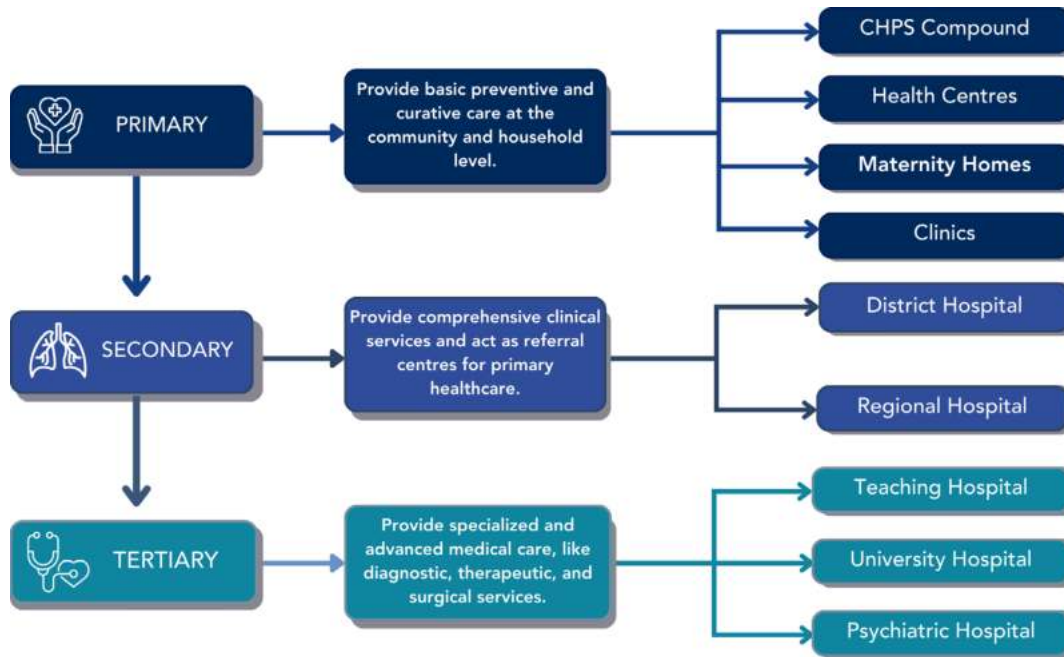


Figure 3. Healthcare facility levels

Despite the low direct implementation of WHO-PEN, its core principles appear to have influenced the broader CVD management landscape in Ghana. Healthcare professionals confirmed that they routinely practised key elements of the WHO-PEN framework, such as conducting basic lab tests and asking specific diagnostic questions, which are similarly emphasized in the National Guidelines. However, differences in infrastructure and resource availability across facilities result in varying degrees of implementation and adaptation of these guidelines.

The variations in how updated treatment guidelines are applied reflect the broader disparities in healthcare infrastructure and resource availability within the country. However, the shared focus on essential medications, task-sharing, and risk stratification underscores the common goals of both the National Guidelines and the WHO-PEN framework in improving cardiovascular care in Ghana.

The Healthcare System in Ghana

In Ghana, healthcare isn't just a system — it's a lifeline that connects millions of people across diverse regions, from bustling cities to remote villages. The nation's healthcare sector is a complex, multilayered system, where collaboration between public and private entities, faith-based organizations, and government agencies is essential for providing care. But there are gaps in this system, particularly in the implementation of global protocols like WHO-PEN, that affect how CVD is managed on the ground.

At the top of Ghana's healthcare structure sits the Ministry of Health (MOH). This institution is the guardian of the nation's health, shaping policy, allocating resources, and ensuring that healthcare services reach every corner of the country. The Ghana Health Service (GHS), an autonomous agency under the MOH, implements national health policies and oversees healthcare delivery at various administrative levels, providing primary and secondary healthcare services. This agency

is organized at the national, regional, district, subdistrict, and community levels. The national level is mainly responsible for translating health policies for implementation, setting standards and procedures, and conducting evaluation and quality control. These major functions take place through the work of the regional and district levels to allow for wider integration of the MOH across the country. The regional level, made up of regional health directorates, provides supervisory, management, and technical support to districts and subdistricts within each region. The district level then comprises management teams and offices that ensure quality service delivery within the context of comprehensive and integrated district health planning.

Both public and private entities provide healthcare services. Public hospitals in Ghana (three categories), including those under the Ghana Health Service, teaching hospitals, and psychiatric hospitals, play essential roles in managing NCDs through primary, secondary, and tertiary care. Faith-based providers also contribute significantly, particularly in underserved areas. An example is the Christian Health Association of Ghana (CHAG), which is a network of various health organizations owned by different churches with the sole aim of providing health care to the underprivileged. The Holy Family Hospital in Bekwai falls under the CHAG. Private hospitals complement the public sector by offering specialized and clinical services, providing additional patient options, and contributing to overall healthcare delivery. Both sectors must work together to address challenges and optimize NCD management in Ghana.

Within both public and private entities, hospitals are categorized into three levels as Figure 3 indicates. A healthcare referral is designed by the MOH to ensure that patients receive appropriate levels of care based on the complexity of their health needs. In the context of CVDs, primary care facilities that focus on prevention, early detection, and management of CVD risk factors such as hypertension and

diabetes mostly refer patients to secondary-care facilities requiring advanced cardiology services and specialized diagnostic tests (like echocardiograms). Secondary-care facilities with cases needing specialized interventions (e.g., coronary angiography) or those with significant complications are referred to tertiary-care facilities.

Based on this existing healthcare structure, the low awareness of the protocol among district facilities appears to arise from the Ghana Health Service, indicating possible problems in information dissemination, stakeholder involvement, and limited government resources. The varied implementation of updated guidelines largely depends on the type of facility. Public hospitals are more likely to have received training and show higher rates of adoption and usage of introduced protocols compared to private and faith-based hospitals because faith-based and private hospitals don't receive the same level of government support for implementing standardized protocols. Public hospitals have better access to government-provided resources and support systems that facilitate the integration of WHO-PEN protocols into their practices. Hospitals higher up the facility hierarchy are also more likely to have received training compared to hospitals further down the hierarchy. For example, a district hospital in Bekwai had received training on updated guidelines specifically for the treatment of cardiovascular diseases, while workers at a much smaller facility within the same district didn't.

The Framework's Enablers

Given the critical role the GHS plays in the implementation of protocols and policies, it uses various methods to disburse information across all levels of care. The prevailing method used by the Ministry of Health to disseminate the WHO-PEN framework is called Training of Trainees (TOT), where selected workers from various facilities are trained at much larger workshops, typically in the capital city Accra,

and then mandated to return to their facilities and train people in turn, causing a shift in skill and information from one person to the next. One interviewee noted that “It is cost-effective as well because the number of people who are going and the transportation costs, allowances, and all those things are contained.” From their perspective, there is “effective implementation, because when they come back to the facility, they deal with small groups of people, and training is effective, or teaching is effective, at that level.” The regional director plays a role in adequately selecting trainers for each workshop, with little to no alteration in the transfer of information from the trainer to the trainee at the healthcare facility. Most healthcare workers commented on receiving letters from regional health directorates explicitly indicating which personnel from the facility had been selected for a training session.

This approach aligns with the concept of normative mechanisms of institutional isomorphism or similarity, which explains how norms are disseminated through training, socialization, and the development of professional networks. Normative mechanisms give rise to hospitals’ compliance with government-imposed standards, ensuring that they meet professionally defined levels of acceptable care.¹³ The successful implementation of the WHO-PEN framework relies on these institutional mechanisms, as they underscore the importance of using effective information dissemination techniques to ensure that the framework is adopted by front-line workers across both rural and urban areas.

In addition to information dissemination, institutional theory helps explain the GHS’s monitoring and evaluation (M&E) practices by highlighting how organizations conform to established norms and standards to gain

legitimacy and ensure long-term success. In the context of healthcare, institutional theory suggests that hospitals and health facilities adopt certain practices not just because they are effective, but because they are seen as necessary to meet externally imposed expectations and standards.

Monitoring and evaluation within the GHS, such as annual framework reviews and peer reviews, are examples of practices that reinforce these norms. By regularly assessing whether healthcare facilities are adhering to established protocols, M&E ensures that these organizations conform to professional standards and government regulations. This alignment helps healthcare facilities maintain their legitimacy in the eyes of regulators, peers, and the public, which is essential for their continued operation and funding.

For example, the display of protocols in treatment rooms and the use of peer reviews are practices that institutional theory would describe as mechanisms for embedding and reinforcing norms within the healthcare system. These practices ensure that all facilities are following the same guidelines, thereby creating a consistent standard of care across the country. This consistency not only improves the quality of healthcare services but also legitimizes the practices of healthcare facilities by compliance with recognized standards.

Major Challenges Affecting Framework Implementation

Implementing the WHO-PEN framework in Ghana has been challenging because of inefficiencies in the current information dissemination, human resource and financial constraints, as well as issues with the actors involved.

13 Thomas R. Campion Jr. and Cynthia S. Gadd, “Peers, Regulators, and Professions: The Influence of Organizations in Intensive Insulin Therapy Adoption,” *Quality Management in Health Care* 18, no. 2 (2009): 115–19.

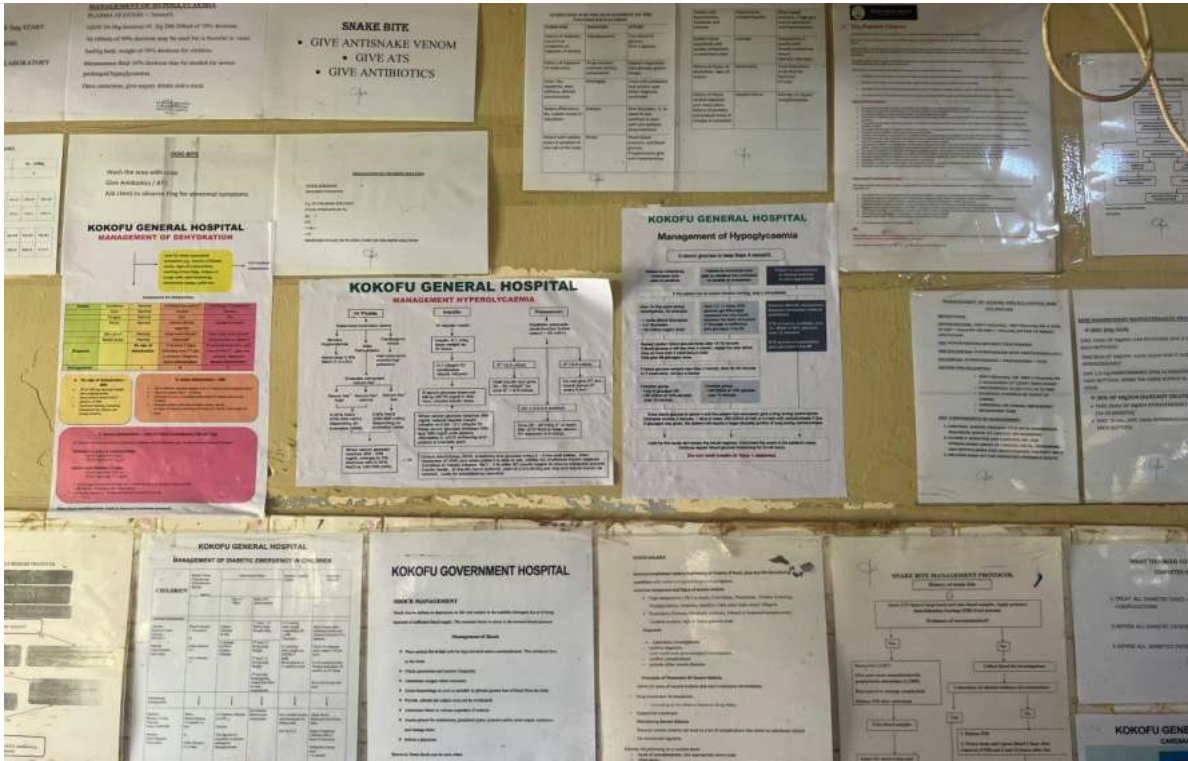


Figure 4. Protocols posted on facility walls

Inefficiencies in the current information dissemination methods. The Training of Trainees (TOT) model can be hindered by three key factors, as one interviewee explained: “The first is the person sent for the training and the implementation of the policy. The second is the receptiveness of the management. And the third is the ongoing support from policymakers.” The effectiveness of information transfer from the training relies heavily on the credibility and reliability of the individual attending the workshops. If the selected staff member is unreliable, the information may be transferred incompletely or inaccurately. Additionally, the involvement of hospital management and the structures in place to support the diffusion of new information play a critical role. Facilities that are unreceptive to trainers or do not provide them with opportunities to share their knowledge will impede the implementation of the new framework.

An interviewee from one facility noted, “The trainings are very helpful, but sometimes it’s difficult to implement them because we lack the necessary equipment and materials to practise what is taught.” This lack of resources significantly hampers the adoption of new frameworks and techniques. Finally, rigorous follow-up systems are essential to ensure compliance and address any inconsistencies that arise during the implementation process. As one interviewee emphasized, “You can’t just introduce a policy, say implement it, and then not follow up. That wouldn’t work.” Many healthcare workers observed irregularities and inconsistencies in the external TOT programs, with one noting, “There are financial constraints from the government, and we don’t have a consistent, annual training schedule.”

Human resource constraints. As part of the implementation requirements for the WHO-PEN, facilities are supposed to establish an NCD unit

to provide exclusive care to patients dealing with NCDs. Six months into the initial pilot at a facility in Sekyere South, Ashanti Region, there was still no such unit in the facility. Workers mentioned staff attrition as the driving factor. The staff shortage stems from two main factors: the local brain drain and the bottleneck of healthcare workers appointed by the GHS. There's a steady outflow of trained and accredited health workers from Ghana to foreign countries, with people emigrating to seek "greener pastures." A staff member who may be trained on a protocol today won't necessarily remain in the facility, and their departure results in a loss of skills and efficiency in the health system.

In the case of Sekyere South, an NCD unit cannot exist if there is no staff to furnish it. A rather obvious approach to dealing with high emigration rates may be to increase the inflow of healthcare workers in facilities. Ghana has more than three teaching hospitals that graduate more than 500 physicians annually.¹⁴ Rather than a lack of staff, the real problem is a systematic failure in their assignment to various districts, especially in hard-to-reach areas. The personnel from the regional directorate noted that political reasons may be a dominating factor causing the slow uptake of health workers in facilities across the country.

The low number of staff was evident in our study, where we witnessed high doctor-to-patient ratios across all facilities accessed in both Bekwai and Nkawkaw. This affected the reception of NCD patients across facilities in both communities. Holy Family Hospital and Bekwai Municipal Hospital, both district-level hospitals, had a higher number of doctors and nurses compared to other facilities. These facilities were able to facilitate specialized care and management of chronic diseases, with the Holy Family Hospital having a dedicated NCD department for patients.

Agyakwa Hospital and Kokofu General Hospital faced significantly more staffing challenges. Some facilities had dedicated staff for basic NCD care but are deficient in terms of specialized workers, thereby affecting the quality of care delivered there for comprehensive NCD management. Across most of the facilities, NCD patients were managed within the general outpatient departments, although each facility ensured a regular "clinic day," dedicated to assessing patients with NCD symptoms, diagnosed conditions, and referrals where necessary. Addressing the low-staff-to-patient ratio in hard-to-reach communities will increase compliance and quality of NCD health care delivery.

Financial constraints. The availability of finances determines the availability of the equipment and medication needed to implement the framework. Lack of funding leads to the unavailability of critical drugs and equipment and incomplete health care for patients. On average, the facilities we assessed had 83.3 per cent of the essential equipment listed in the WHO-PEN document. Although all facilities we visited had a majority of the essential medication stated in the WHO-PEN framework, most indicated a lack of electrocardiograms (ECG) or insufficient equipment for the volume of patients they received.

The government, particularly the Ghana Health Service (GHS), along with the administrative boards of healthcare facilities, bears responsibility for securing funds to purchase the necessary drugs and equipment indicated by various frameworks. Resource personnel from the regional health directorate emphasized that the GHS is tasked with providing the financial resources, structural support, and overall funding required for hospitals to effectively implement these frameworks, including covering the costs of

14 Frank W. Drislane, Albert Akpalu, and Harry H. Wegdam, "The Medical System in Ghana," *The Yale Journal of Biology and Medicine* 87, no. 3 (2014): 321–26.

district or regional training workshops. However, the GHS is severely financially constrained, which significantly limits the reach and effectiveness of framework implementation across the country.

The lack of adequate funding from the GHS directly undermines the ability of healthcare facilities to adhere to these frameworks, compromising the quality of care provided. One private hospital director noted that “the hospital receives donations from benevolent groups — societies — which they heavily rely on since they cannot fully depend on GHS.” This reliance on sporadic donations highlights the GHS’s inability to consistently provide the necessary financial support, which leaves hospitals vulnerable when donations are insufficient or absent. The chronic underfunding from the GHS starkly reveals the inadequacies in the system, making it clear that without a more reliable and substantial financial commitment, the successful implementation of healthcare frameworks remains in jeopardy.

The director general of the GHS also mandates that administrators and facility-management boards should acquire all drugs, equipment, and other resources needed in framework implementation. Most hospitals depend on income from patient charges to cover operating expenses, with the salaries of physicians and nurses, among other staff, paid for by the government. The National Health Insurance Scheme (NHIS) pays for the hospitalizations, medications, and outpatient visits for patients in the program, constituting a large percentage of patient charges the hospital depends on. A facility director remarked that both salaries and patient charges for those on the NHIS barely come on time, and payment is sometimes delayed for months on end, further restricting the facilities’ ability to finance their day-to-day operations.

These conditions call to mind resource dependency theory and how it underpins successful framework implementation. This theory describes the limited and valuable resources available to organizations in their environment, the uncertainties that arise from accessibility to these resources, and the steps and strategies employed to mitigate them. Resource dependency can predict that healthcare service delivery will respond to external stakeholders’ demands when the supply of critical inputs or outputs is concentrated in relatively few sources.¹⁵ In the Ghanaian setting, healthcare facilities are limited in their access to drugs and equipment, with the infrequent payouts from the NHIS further increasing the uncertainty of steady and sufficient resource supply. Communities with large urban poor populations will have low client reserves because many patients cannot afford expensive medical care. Alternative sources have been identified as charitable organizations, NGOs, and partnerships such as the ICARE by Novo Nordisk, which was being leveraged by the Holy Family Hospital in Nkawkaw. However, many of these do not have any governing structures that determine the frequency and consistency of support provided, thereby failing to reduce the uncertainty with regard to resource acquisition.

One foreseeable outcome is an overreliance on the referral system. In Nkawkaw, for example, facilities such as Agyakwa hospital that lack the necessary drugs and equipment to carry out frameworks will refer patients to the next-level hospital, which in this case is Holy Family; similarly, Kokofu healthcare will refer patients to the Bekwai Municipal hospital. Interviewees across many districts in the country mentioned this example. Such a condition will quickly lead to patient overcrowding in upper-level facilities, lowering quality of care and increasing morbidity. To enable the implementation of the WHO-PEN

15 Kudret Celtekligil, “Resource Dependence Theory,” in *Strategic Outlook for Innovative Work Behaviours: Contributions to Management Science*, edited by H. Dincer and S. Yüksel (Cham: Springer, 2020), 131–48.

and subsequent frameworks, deliberate work must be done to identify opportunities and linkages that will reduce resource uncertainties.

Actor involvement. The Ministry of Health (MOH) and all its subsidiaries are primary, if not critical, stakeholders in the success of framework adoption and use. The ministry's inability to fulfill its supportive role has co-led the financial and resource constraints faced by facilities in implementation. The government tends to "jump from one program to another," discontinuing support to a previous program once a new one starts. This lack of commitment burdens the staff because it's the same small number of workers who move from one program to another. Successful adoption can be achieved only once there has been a dedicated period to its implementation, monitoring and evaluation, and improvement.

Other Insights

Ghana's WHO-PEN readiness. An additional study's review on the level of readiness in treating NCDs in Ghana supported our findings.

- *Readiness index score.* Ghana's readiness index score for WHO-PEN implementation is 39.8 per cent, which is below the 80 per cent threshold considered adequate for full readiness. This score places Ghana slightly above the average among the countries surveyed but still indicates significant room for improvement.
- *Essential medicines availability.* Ghana's health facilities showed varied availability of essential medicines required for NCD management. For example, only 26.1 per cent of facilities had Atenolol, 26.1 per cent had Enalapril,

and 47.8 per cent had Metformin.¹⁶ This limited availability suggests that the country's public health sector may struggle to meet the WHO-PEN standards for managing NCDs effectively.

- *Comparison with other countries.* Although Ghana's readiness score of 39.8 per cent is higher than countries like Nepal (10.9%) and Syria (13.5%), it still falls short of the scores seen in countries like Suriname (51%). This comparison underscores the varying degrees of WHO-PEN implementation success across different contexts, with Ghana lagging in certain areas.
- *Diagnostic investigations.* The availability of diagnostic tests, which are crucial for NCD management, was also limited in Ghana. The study suggests that many facilities lack the necessary diagnostic tools to support WHO-PEN, further hampering the effective implementation of the guidelines.¹⁷

Patient education. All the facilities we visited indicated that they conduct health education sessions for their patients. These sessions, typically held on clinic days with a special focus on newly diagnosed patients, aim to educate patients about their conditions, medication adherence, lifestyle modifications, and self-monitoring techniques, which are crucial for effective NCD management. Patients expressed appreciation for the hospital's efforts in organizing educational sessions on various illnesses. One patient shared, "The counselling session was very helpful. They explained everything about my condition and how I should take my medication properly." Another patient said, "When I was diagnosed, they taught me about the changes I needed to make, like reducing my salt intake and eating smaller

16 Our calculations.

17 Ahmed Hassan Albelbeisi, Ali Albelbeisi, Mahmoud Taleb, Amirhossein Takian, and Ali Akbari-Sari, "Public Sector Capacity to Prevent and Control of Noncommunicable Diseases in Twelve Low- and Middle-Income Countries Based on WHO-PEN Standards: A Systematic Review," *Health Services Insights* 14 (2021). [🔗](#)

portions.” A third patient articulated, “If I had known earlier about how these diseases could be prevented, things might have been different. It’s important to understand the causes and how to stop them early on.”

Patients’ constraints. Patients also face significant financial barriers in managing their NCDs. This was a challenge that multiple healthcare workers across facilities in both communities mentioned, where “patients are not able to follow up on their care because of financial issues” (N3, N2). Despite hospitals’ provision of essential healthcare services, many patients reported deteriorating health outcomes because they can’t afford their prescribed medications and treatments. This situation often meant that they discontinued their treatment, which led to having to restart the therapeutic regimen or else experiencing exacerbation of their underlying condition. During follow-ups at the clinic, doctors highlighted how “[patients] will come the next month, telling you I didn’t get money to buy the medication” after a prescription had been given. Although the NHIS is available, “it’s not everything the insurance covers.” These financial barriers subsequently affect access to key tests, for example, kidney function tests to complete a diagnosis or in the treatment plan and even transportation to the facilities for regular check-ups.

As we noted, most of the NCD patients we interviewed were older people. A doctor confirmed this, stating that “because of financial restraints, most of our patients are older people who have been neglected.” They come in without relatives to provide the necessary financial and emotional support needed during their diagnoses.

Ghana’s healthcare facilities face financial constraints that limit the acquisition of essential drugs and equipment. This limitation impacts the effective implementation of healthcare frameworks.

These challenges underscore the critical need for accessible and affordable healthcare solutions tailored to address the unique financial constraints faced by patients managing NCDs.

Internal facility practices. Healthcare professionals stay updated on the latest advancements through regular clinical meetings, in-house and external training, and online resources, ensuring they are equipped to provide the best care to their patients. In the communities we visited, doctors and other healthcare professionals emphasized the importance of these regular clinical meetings — often held every morning — as crucial for discussing complex

cases, sharing insights, and learning from each other’s experiences. One healthcare worker noted, “These meetings help us stay on top of new treatments and techniques, which we can then

apply directly to our patients’ care.” Another added, “The collaborative environment allows us to draw from each other’s knowledge, which is especially valuable in dealing with the diverse health challenges we face in our community.” These platforms for continuous learning and knowledge exchange are directly linked to the quality of care provided in these specific communities because they enable healthcare professionals to adapt and respond to their patients’ unique needs.

Healthcare facilities also organize in-house training sessions, though these are not always regular. These sessions cover advanced treatment protocols on NCD management and practical skills. Doctors and nurses participate in external training organized either by their districts, medical associations, or international health organizations.

This training provides advanced skills in NCD management and other specialized areas based on the level of service delivery. Healthcare practitioners also use e-learning platforms that offer updates on recent research, new innovations, and expert knowledge.

Lessons Learned / Recommendations

One of the significant challenges facing the implementation of the WHO-PEN Framework in Ghana is the overwhelming workload on physicians caused by understaffing in NCD clinics. To address this issue, we recommend enhancing the role of nurses in healthcare facilities. This can be achieved through tailored training programs, placement of more nurses in dedicated NCD units, career development for specialized nurses, and technical integration for extended care. Technologies such as the Akoma Care app, a newly developed app that concentrates the National Guidelines for the Management of Cardiovascular Disease (which we discovered in emerging use in one facility only), can be better integrated into care delivery for nurses to develop increased competencies. This will also enable nurses to provide more continuous care for patients with NCDs. This approach alleviates the pressure on physicians and ensures the effective implementation of the WHO-PEN Framework, ultimately improving patient care and outcomes.

There is also a need for a more structured approach to ensure effective learning and implementation. One health worker highlighted how training sessions often overwhelm participants with too much information within a short time frame, leading to the risk of overlooking critical details or policies. Additionally, the connection between newly adopted policies and their relation to existing, proven models, such as those from the WHO,

is not sufficiently highlighted. This oversight can hinder staff understanding certain policies' rationale and applicability in real-world scenarios. The Ghana Health System should consider revising its training programs for hospital staff when introducing new policies or frameworks. This revision should focus on allocating sufficient time for training sessions to allow for thorough comprehension and discussion of the material, enabling participants to absorb the information more effectively. The training should clearly articulate the origins of new policies, including referencing established models like those from WHO.

To further enhance information dissemination methods, we recommend exploiting internal methods of information dissemination already in use across health facilities. These are the continuous professional development and the in-service trainings held by various departments in a facility. Due to the increased frequency of these meetings and their integration with the existing health facility structure, framework implementation can leverage these internal methods for better information reach and adoption. For example, framework sensitization can be incorporated into mandatory courses provided by CPDs for license renewal of health workers directly providing care for NCD patients. Trainings can be recorded online where possible and disbursed on shared platforms accessible by healthcare providers for use in in-service trainings and clinical meetings. As most health care workers were introduced to the Standard Treatment Guidelines during their educational years, the government can consider including new frameworks and policies in the syllabus and instruction content at health training centres across the country.

Lack of funding is a debilitating systematic problem that plagues the country, limiting the acquisition of essential drugs and equipment and impacting the effective implementation of

healthcare frameworks. To mitigate this problem, one facility had identified sponsors, such as ICARE by Novo Nordisk, to support in equipment acquisition. Similarly, health care facilities can be assisted by developing a robust system of support reception through an extensive list of sponsors and partnerships with organizations both locally and internationally. By building and maintaining relationships with such organizations, facilities can overcome the financial barriers they face and pave the way for more consistent and effective implementation of healthcare frameworks across Ghana.

Research Team



Kezia Asare recently graduated from Ashesi University with a bachelor of science degree in mechanical engineering. She is passionate about revolutionizing healthcare systems in Ghana through local technological innovation. With her background in engineering, she hopes to create an impact by developing sustainable healthcare technologies across Africa and helping make healthcare more accessible to patients in rural areas.

"The immersive research experience has significantly deepened my understanding of the healthcare system in low-resource communities. This case study is just the beginning of efforts to address the systematic factors that degrade healthcare delivery in these communities. It's not enough to formulate policies. We need to systematically evaluate and refine their implementation to eliminate the barriers preventing access to quality healthcare."



Nice Cailie Ineza is a recent computer science graduate from Ashesi University with a passion for research-driven projects. She's particularly interested in leveraging machine-learning and security technologies to create positive societal impact. Beyond her technical pursuits, Cailie is a Christian and keen writer with a strong interest in environment, politics, and international relations.

"I am proud of the effort we dedicated to this research. Despite lacking prior experience in healthcare, being in the field allowed us to fully engage with the workflow and translate our findings into accessible terms for future studies. This unparalleled experience has deepened my commitment to community-based research, particularly in hard-to-reach areas, while incorporating a global perspective. It also confirms that researching is indeed seeing what everybody else has seen and thinking what nobody else has thought."



Hannah Pohmahmbuh is a dedicated leader and problem solver with a passion for addressing complex global challenges through innovative technology and community engagement. With a background in computer science and technology, she applies her technical expertise to develop solutions that enhance service delivery and improve access. Hannah seeks to apply her technical expertise and leadership skills to develop sustainable solutions for underserved communities, driving positive change in critical sectors like healthcare and education.

"My investigation into the WHO's essential interventions in Ghana has shed light on the complexities of integrating global health frameworks within local systems, reinforcing the importance of continuous evaluation and adaptation for effective CVD management."



Disraeli Asante-Darko is an associate professor with over a decade of experience in teaching and research. His expertise lies in supply chain management, sustainable development, and procurement strategy. He has published extensively in top-tier academic journals and is a recognized thought leader in urban resilience and inclusive development. Disraeli integrates practical problem solving and innovative approaches into his teaching, making significant contributions to both academia and industry.

“This case study delves into the fundamental complications of implementing WHO principles in Ghana’s hard-to-reach locations. These findings provide a foundation for building effective implementation methods that include both national and global impact.”



Theodora Ekuu Aryee has a strong expertise in accounting, with a BSc, MPhil, and PhD all in accounting. She is passionate about research making an impact in society. Her research interests span sustainability, not-for-profit governance, professional identity, and change management. She considers Reach a fine platform to support emerging scholars bring change to the hard-to-reach communities through their research. She believes that anything worth doing is worth doing well.

“Globally, good health and well-being is one of the SDGs that the world is hoping to make strides in by 2030. With six years to go, NCDs keep plaguing many developing economies like Ghana. Understanding how these NCDs are managed within global frameworks is important. Thus, through this research, we hope that the results will drive meaningful change, impact society, and shine the light on the implementation of global frameworks in local NCD management in developing country contexts.”



Ashesi University, located in Ghana, is renowned for its academic excellence and emphasis on ethical leadership. The university stands out for its research in technology, sustainable development, and social innovation, addressing critical challenges across Africa. Through global partnerships, Ashesi's faculty and students collaborate on impactful, solution-driven research that tackles issues like climate change, public health, and education reform. This research not only contributes to solving pressing problems but also equips students with the skills to become future leaders and innovators in their fields.

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Published by the Reach Alliance, October 2024
Munk School of Global Affairs and Public Policy | University of Toronto

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