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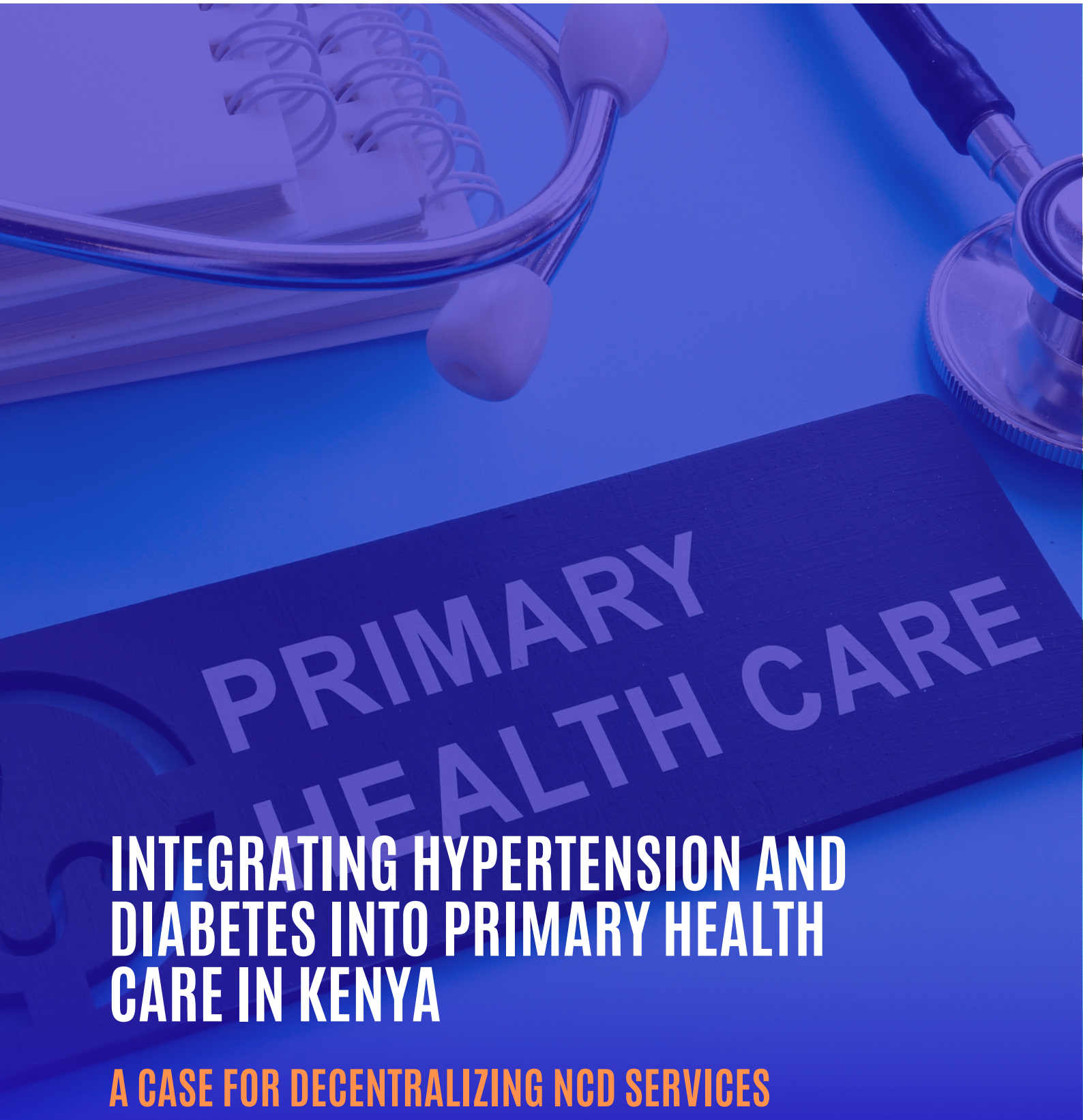

INTEGRATING HYPERTENSION AND DIABETES INTO PRIMARY HEALTH CARE IN KENYA

A CASE FOR DECENTRALIZING NCD SERVICES

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EXECUTIVE SUMMARY

Non-communicable diseases (NCDs), especially hypertension and diabetes, contribute a significant burden of morbidity and mortality in Kenya. Historically, diagnosis and management of these conditions has been concentrated at sub-county and county referral hospitals, which form less than 10% of health facilities, limiting access for much of the population. This case study argues for decentralizing NCD services to lower-tier primary health care (PHC) facilities, supported by digital technology, structured supervision and task-sharing. We draw on programmatic experience from the Empower Health Program (2019–2025), which was implemented in 245 health facilities across 18 counties and enrolled 89,363 patients. Programmatic insights suggest that with adequate support, health centers and dispensaries (constituting 67% of all program sites; managing 28% of the enrolled patient population) can deliver quality hypertension and diabetes care, translating to improved patient outcomes.

Among patients with hypertension, consistent follow-up rates at 6 and 12 months were higher at health centres and dispensaries (34%) than at sub-county hospitals (22%) and county referral hospitals (28%) ($p<0.001$). They also achieved greater systolic blood pressure (BP) reductions (12.9 mmHg) compared to sub-county hospitals (6.4 mmHg) and county referral hospitals (4.4 mmHg) ($p<0.001$). Among patients with 6- & 12-month BP data, control rates (<140/90mmHg) improved from 37% to 56% (+19 percentage points), with health centres and dispensaries showing the greatest gains (+31 percentage points), followed by sub-county hospitals (+16 percentage points) and county referral hospitals (+5 percentage points).

For diabetes, glycaemic control improved modestly from 44% to 50% at six months ($p<0.001$) before reducing to 48% at twelve months ($p=0.139$). All three facility types showed similar improvements (4-5 percentage points) over the 12 months. This marginal improvement is likely due to limited structured lifestyle interventions and challenges in medication availability observed during micro stock status activities carried out during implementation. County referral hospitals had better 6- & 12-month follow-up rates (42%) compared to health centres/dispensaries (23%) and sub-county hospitals (17%), potentially reflecting resource disparities for glycaemic monitoring.

While concerns about quality at lower-tier facilities have been raised, citing weak diagnostic infrastructure and human resource training gaps, the Empower Health experience demonstrates that appropriately supported decentralization achieves the opposite. Health centres/dispensaries equipped with digital technology, training, mentorship, and basic equipment achieved clinical outcomes matching or exceeding hospitals, with better care continuity and improved control rates. However, with about a quarter of patients maintaining follow-up, retention is a critical bottleneck that requires further investigation and intensified interventions. Further, achieving optimal outcomes demands strengthened supply chains and structured lifestyle programs to complement medical care.

BACKGROUND

Kenya's health system comprises six levels, from community health services (Level 1) through national referral hospitals (Level 6).[1] Sub- County (district-level) hospitals and above (Levels 4-6) constitute less than 10% of public health facilities[2]; however, they have historically been the dominant providers of Non-Communicable Disease (NCD) services, requiring most patients to travel long distances for care. This centralized approach is increasingly untenable as Kenya faces a growing NCD epidemic: hypertension affects a quarter (24%) of the adult population,[3] diabetes prevalence stands at 3.1%,[4] and NCDs are responsible for 39% of deaths, up from 27% in 2014.[5]

The 90% of health facilities that are dispensaries and health centres (Level 2-3), located within walking distance of most villages, have traditionally had insufficient capacity to provide NCD services,[6,7] thereby creating a fundamental mismatch between disease burden and service availability.

NCDs now account for 39% of all deaths, up from 27% in 2014.

The case for decentralization and task-sharing

The Kenya National NCD Strategic Plan 2021/22-2025/26 explicitly calls for strengthening of primary health care (PHC) as a key pillar of NCD management. Specifically, it targets 85% of Level 2-3 facilities to provide integrated NCD services by 2025.[5]

Kenya's Primary Care Network Guidelines provide the institutional framework for operationalizing this decentralization, establishing a hub-and-spoke model with sub-county hospitals supporting health centres, dispensaries and community units through multi-disciplinary teams.[8]

This approach aligns with global recommendations and evidence supporting decentralization, including task-sharing and task-shifting as priority approaches for expanding NCD service coverage in resource-constrained settings. The World Health Organization (WHO) Package of Essential NCD (PEN) interventions for PHC provides protocols enabling non-physician health workers to deliver quality NCD care.[9] Regional evidence shows that task-sharing for hypertension management is feasible in Africa without compromising clinical outcomes.[10]

Service integration

Comorbid hypertension and diabetes constitute a significant proportion of Kenya's NCD burden.[11,12] For this population, the burden and inconvenience of traveling to distant hospitals for separate clinic visits creates significant hardship, potentially impacting adherence to appointments and ultimately outcomes. Integrating services through a 'one-stop shop' approach at PHC reduces fragmentation, lowers care-seeking costs, improves patient experience and enhances continuity of care. Integrated service delivery models, where care for diverse conditions is offered during single visits, under one roof have been shown to improve patient experience and clinical outcomes.[13,14]

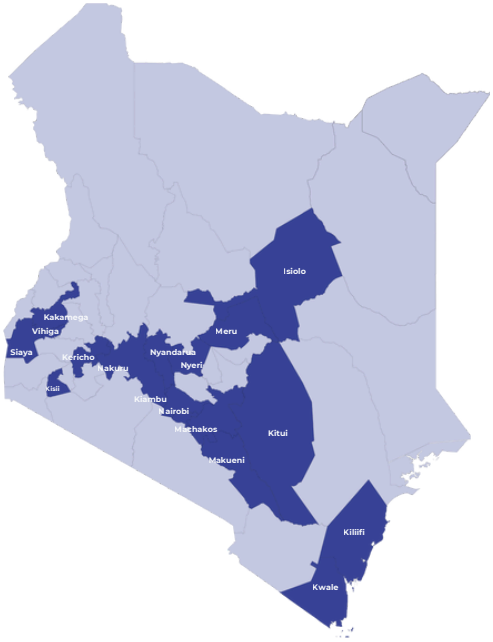
Addressing quality concerns

Concerns have been raised about decentralizing and task sharing/shifting NCD care, citing inadequate capacity and potential quality risks.[15,16] In a recent facility readiness assessment study in Kenya, 24% of sampled health facilities were ready to offer integrated cardiovascular disease and diabetes services, with PHC facilities significantly less prepared than hospitals.[7] However, these concerns can be mitigated when decentralization is accompanied by support systems such as digital technology, reliable supply chain systems, point-of-care diagnostics, and structured training and mentorship.[15,17]

The Empower Health program demonstrates that effective decentralization through sustained capacity building, integrated services and digital support systems can simultaneously address both access and quality challenges.

PROGRAM DESIGN AND IMPLEMENTATION

Since July 2019, the Empower Health program has been implemented across 245 health facilities in 18 counties, including 57 dispensaries, 107 health centres, 69 sub-county hospitals, and 12 county referral hospitals (Figure 1).



Program Implementation Sites

- 18 Counties Implementing
- 57 Dispensaries
- 107 Health Centres
- 69 Sub-County Hospitals
- 12 County referral Hospitals

Figure 1.Distribution of program implementation counties and facilities

Decentralization approach

The program's core approach involved shifting basic NCD services from the traditional concentration in hospitals to lower-level PHC facilities, closer to communities. This strategy aimed to transform health centres/dispensaries, previously considered inadequately prepared for chronic disease management, into functional NCD service delivery points. This was in recognition that most patients with uncomplicated hypertension and diabetes could be effectively managed at these primary care facilities if appropriately supported through the following strategies:

Health workforce capacity building: Decentralization required fundamental shifts in who could provide NCD care. Providers at health centres and dispensaries, even those with minimal prior NCD experience, received structured training on Ministry of Health (MoH) guidelines. Training covered screening, diagnosis, treatment initiation and titration, and identification of situations requiring specialist consultation.

Service integration and structured clinic operations: To address the limited human resources and infrastructure at lower-tier facilities and given that 20% of patients had both hypertension and diabetes, the program implemented structured, integrated 'one-stop shop' NCD clinics on a weekly or bi-weekly basis. Rather than propagating different vertical programs that would strain the available resources, patients received comprehensive care for both diseases during single visits, by the same clinician.

Referral pathways: Protocols adopted from the National MoH Guidelines for cardiovascular diseases and diabetes defined which patients PHC facilities could manage, and which required referral for hospital care. This was aimed at ensuring that decentralization did not compromise patient safety and quality for those with complex conditions.

Community-based screening and linkage to care: Household and community camp screening reached over 300,000 people. Individuals with elevated readings were referred to nearby PHCs instead of distant hospitals, thus making the decentralized model functional.

Digital as an enabler: The SPICE digital platform made decentralization possible by enabling structured patient management and decision support as per the Kenya MOH standards. It also automated data aggregation and reporting to reduce documentation burden, relieving the already overstretched PHC personnel, allowing them to focus more on patient care.

Equipment and commodity redistribution: Decentralization required ensuring lower-tier facilities had basic diagnostic equipment and medications. The program supplemented facilities with blood pressure (BP) machines, glucometers, and anthropometric measurement tools. For medications, the program used SPICE platform data to facilitate demand forecasting, quantification and redistribution of essential medicines to lower-level facilities, addressing the historical concentration of resources at hospitals.

Continuous support systems: Recognizing that decentralization could not succeed through one-off trainings alone, the program established ongoing support through frequent supervision, mentorship visits from national, county and sub-county health leadership and family physician networks, and regular data review meetings for performance monitoring and problem-solving.

KEY FINDINGS

Patient enrolment and distribution

The program enrolled

89,363 Patients

67% with Hypertension

13% with Diabetes

20% with both conditions

While 32% of patients with hypertension were managed at health centres/dispensaries, only 19% of those with diabetes were enrolled at this level, suggesting persistent centralization of diabetes care. The distribution of enrolled patients by condition across facility types is detailed inTable 1.

Table 1 Patient enrolment by condition and facility type

	Dispensaries/ Health centres	Sub-county hospitals	County referral hospitals	Total
Hypertension	19,197 (76%)	33,377 (66%)	7,472 (55%)	60,046 (67%)
Diabetes	2,279 (9%)	6,949 (14%)	2,506 (19%)	11,734 (13%)
Hypertension + Diabetes	3,624 (15%)	10,496 (20%)	3,463 (26%)	17,583 (20%
Total	25,100	50,822	13,441	89,363

Hypertension

Among patients with hypertension enrolled for ≥12 months (n=65,517), 26% had documented BP at both 6 and 12 months. However, significant variations were observed across facility types: health centres/dispensaries had the highest consistent (both 6 and 12 months) follow-up rates at 34%, compared to 22% at sub-county hospitals and 28% at county referral hospitals (p<0.001) as shown in Figure 2.

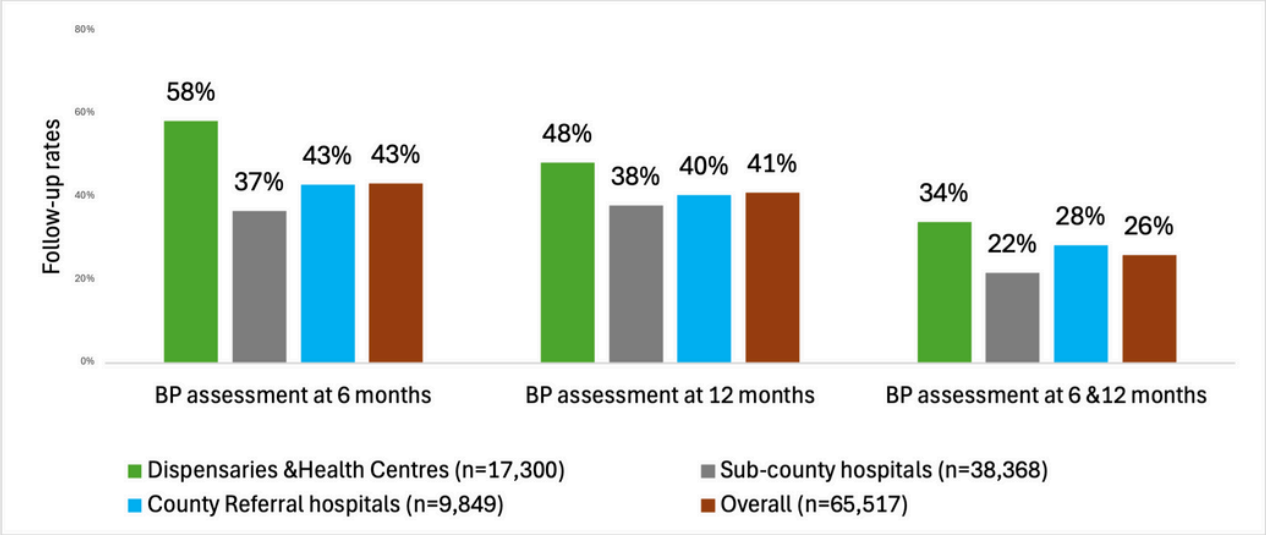


Figure 1. Hypertension follow-up rates

Among patients with documented 6- & 12-month follow-up (n=16,970), overall control rates (<140/90mmHg) improved from 37% at baseline to 56% at 12 months (p<0.001). This included progressive reduction in patients with more severe grade of hypertension: those with Grade 3 reduced by 54%, while Grade 2 and 1 reduced by 44% and 18% respectively (Figure 3).

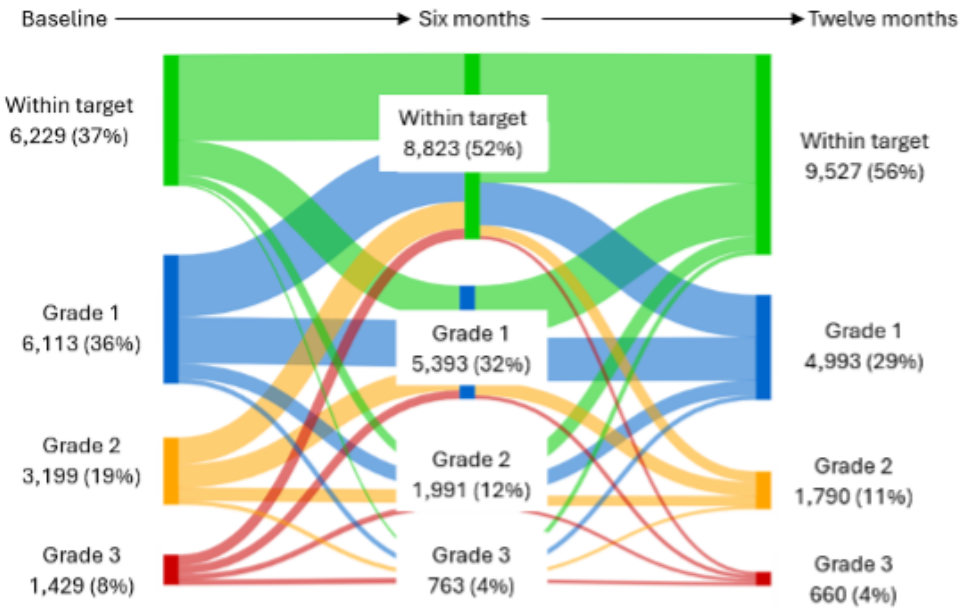


Figure 3 Overall changes in hypertension severity

The improvements varied substantially by facility type (Figure 4): health centres/dispensaries had the highest improvements, with control rates rising by 31 percentage points (from 32% to 63%), sub-county hospitals improved by 16 percentage points (from 37% to 53%), while county referral hospitals showed minimal improvement of 5 percentage points (from 46% to 51%) (p<0.001).

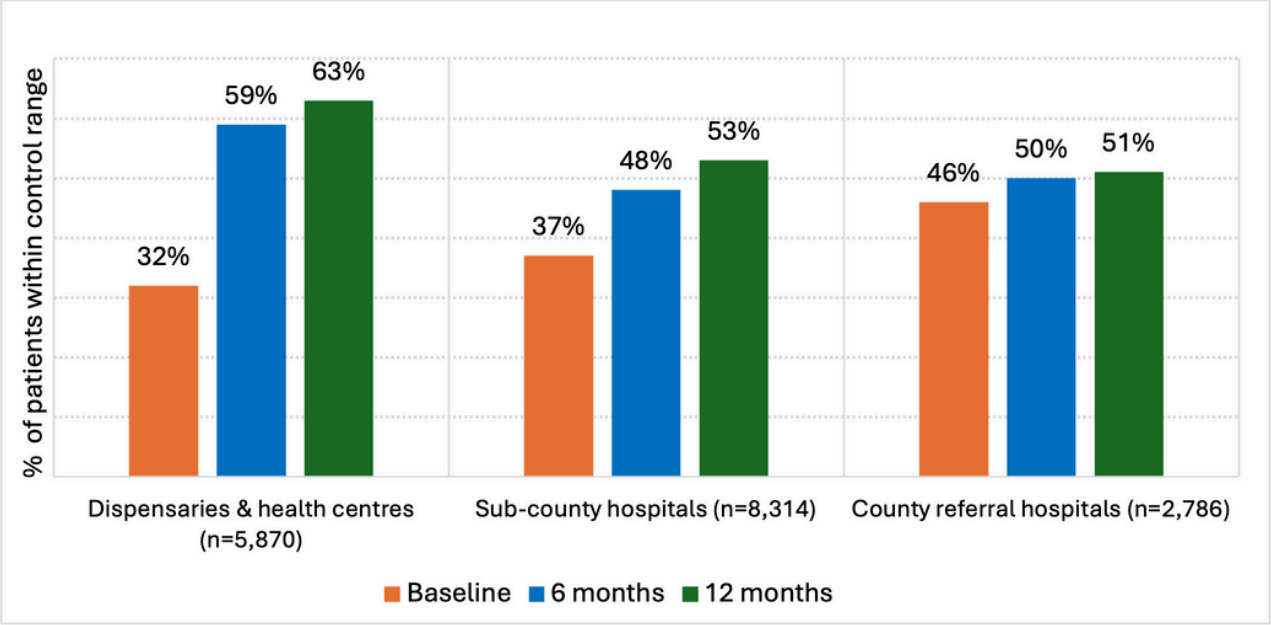


Figure 4 Longitudinal changes in control rates by facility type

Patients at health centres and dispensaries experienced mean systolic BP (SBP) reduction of 12.9 mmHg and diastolic BP reduction of 5.9 mmHg. These reductions were approximately double those observed at sub-county hospitals (6.4/3.2 mmHg) and nearly triple those at county referral hospitals (4.4/0.6 mmHg), as detailed in Table 2.

Table 2 Changes in blood pressure levels by level of care

	Systolic BP (mmHg) Mean (SD)			Diastolic BP (mmHg) Mean (SD)		
	Dispensaries & Health centres	Sub-county hospitals	County Referral Hospitals	Dispensaries & Health centres	Sub-county hospitals	County Referral Hospitals
Baseline	147.8 (21.5)	145.4 (22.0)	140.9 (22.0)	85.6 (12.9)	83.7 (12.8)	82.8 (12.6)
6 months	136.2 (18.0) Δ -11.2	141.2 (20.7) Δ -4.2	138.6 (21.1) Δ -2.3	80.3 (11.4) Δ -5.3	81.3 (11.7) Δ -2.4	81.7 (12.5) Δ -1.1
12 months	134.9 (17.5) Δ -12.9	139.0 (20.1) Δ -6.4	136.5 (21.2) Δ -4.4	79.7 (11.0) Δ -5.9	80.5 (11.5) Δ -3.2	82.2 (12.2) Δ -0.6

Δ: BP changes from baseline

Diabetes

Among

25,190
Patients

with diabetes enrolled for ≥12 months

23%

had documented blood glucose (BG) at both 6 and 12 months.

The pattern across facility levels differed from hypertension: county referral hospitals had the highest consistent follow-up at 42%, while health centres/dispensaries had 23%, and sub-county hospitals 17% (p<0.001) as shown in Figure 5.

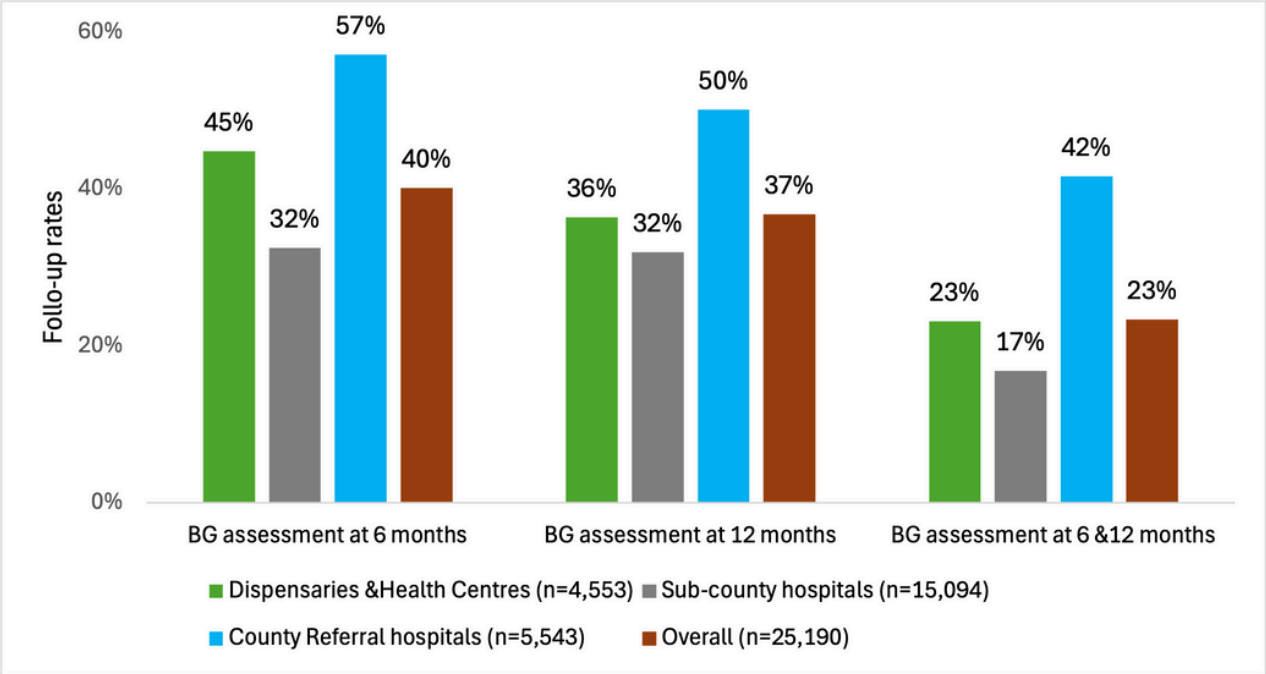


Figure 5 Proportion of patients with documented blood glucose

Glycaemic control improved modestly from 44% to 50% at six months (p<0.001) then reduced to 48% at twelve months (p=0.139) as shown in Figure 6.

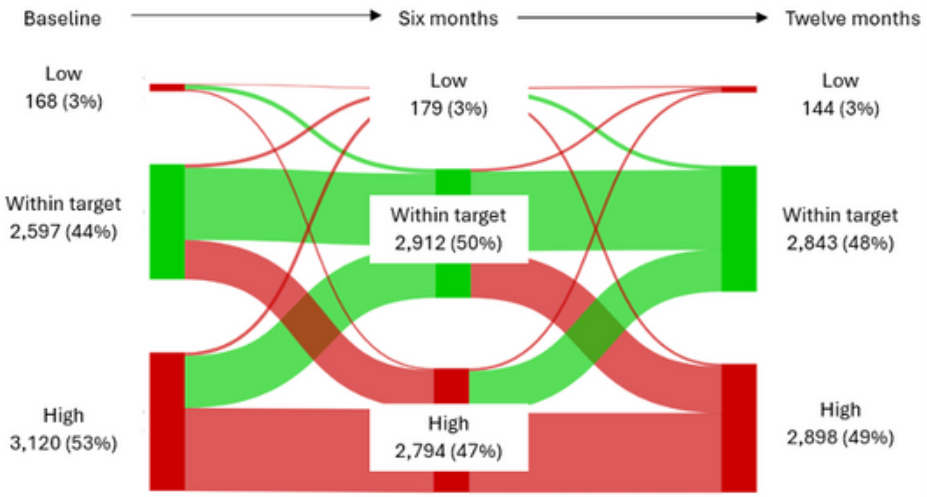


Figure 6 Overall changes in glycaemic control

Unlike hypertension, there was minimal variation across the three facility levels, with 5 percentage point improvement at health centres/dispensaries, and 4 percentage points at both sub-county hospitals and county referral hospitals between baseline and 12 months (Figure 7).

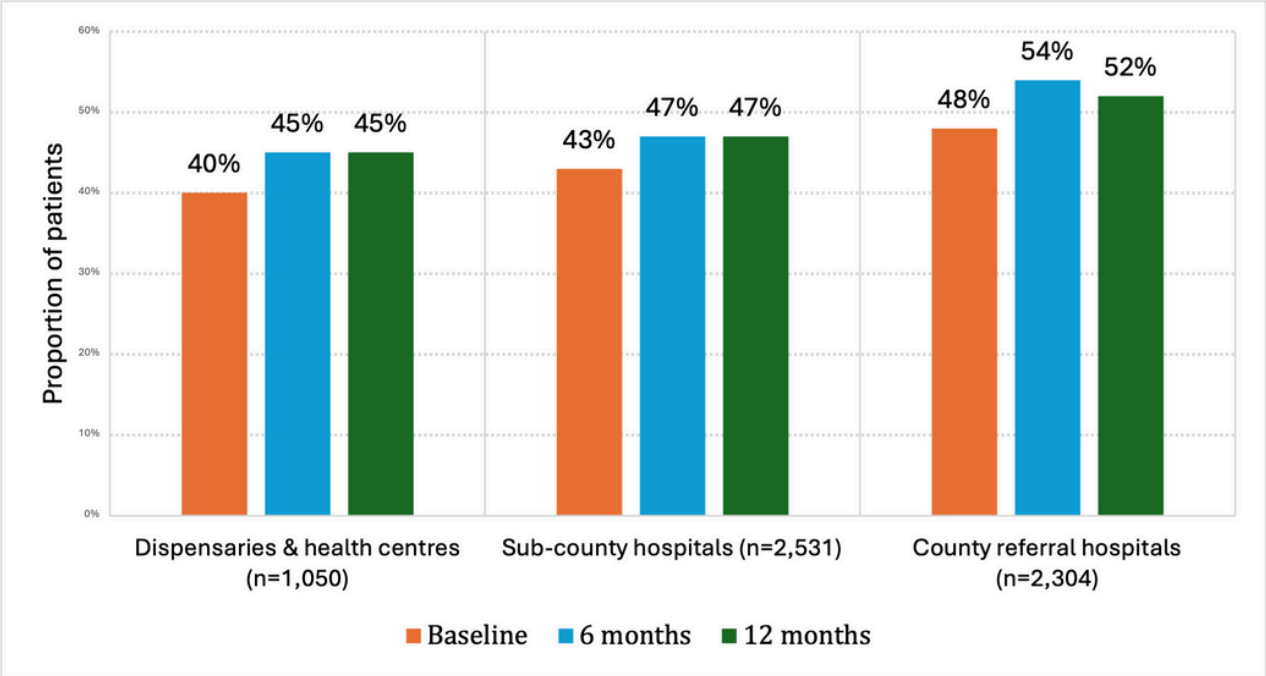


Figure 7. Changes in glycemic control by facility type

Despite similar control rates, patients at health centres/dispensaries demonstrated greater fasting glucose reductions (-1.6 mmol/L) compared to sub-county hospitals (-0.7 mmol/L) and county referral hospitals (+0.2 mmol/L) as presented in Table 3. However, these differences were not statistically significant (p=0.111), and overall control remained suboptimal across all levels.

Table 3 Changes in blood glucose levels

	Fasting blood glucose (mmol/L)			Random blood glucose		
	Dispensaries& Health centres (n=111)	**Sub-county Hospitals (n=336)**	**County Referral Hospitals (n=63)**	**Dispensaries& Health centres (n=422)**	**Sub-county Hospitals (n=806)**	**County Referral Hospitals (n=1,255)**
Baseline	11.1 (6.0)	9.3 (4.5)	8.5 (4.2)	12.2 (6.2)	11.1 (5.3)	10.6 (6.0)
6 months	10.1 (4.6) Δ -1.0	8.6 (4.1) Δ -0.7	7.5 (3.5) Δ -1.0	10.7 (5.2) Δ -1.5	10.6 (5.1) Δ -0.5	9.9 (5.2) Δ -0.7
12 months	9.5 (4.7) Δ -1.6	8.6 (3.9) Δ -0.7	8.7 (4.6) Δ +0.2	11.2 (5.5) Δ -1.0	10.7 (5.1) Δ -0.4	10.2 (5.3) Δ -0.4

Δ: BG changes from baseline

DISCUSSION AND IMPLICATIONS

Demonstrating PHC capability with appropriate support

The observed outcomes at health centres/dispensaries challenge conventional assumptions regarding the relationship between facility sophistication and care quality. When equipped with digital tools, standardized protocols, regular mentorship, and basic equipment, these lower-tier facilities achieved BP and glycaemic reductions and control rates matching or exceeding those of hospitals. The findings suggest that with structured support systems, primary care facilities can deliver quality NCD care, validating WHO PEN approaches and African frameworks for task-sharing and task-shifting.[9,10,16]

The mean systolic BP reduction of 12.9 mmHg achieved at health centres and dispensaries has substantial population health implications. A reduction of 10-mmHg in SBP has been shown to reduce the risk of major cardiovascular events by 20%, stroke by 27%, heart failure by 28%, and all-cause mortality by 13%.[18] Therefore, the 12.9 mmHg reduction observed at these lower-level facilities could potentially reduce adverse cardiovascular events by 20-30%, representing significant population health gains from decentralization.

The proximity advantage in retention

The better follow-up rates at health centres/dispensaries suggests that proximity matters compared to sophistication for chronic disease retention. This proximity advantage was especially evident for hypertension, where regular monitoring is essential but technically simple. Studies from similar settings confirm that reducing geographic barriers significantly improves NCD care continuity.[16,19]

The inverse pattern observed with diabetes likely reflects the greater resource requirements for glycaemic monitoring, including glucose testing supplies more available at high-level facilities.

Potential population differences

The improvements at health centres/dispensaries relative to hospitals may partially reflect the potentially different patient populations they enrolled. Lower-tier facilities likely managed newly diagnosed, uncomplicated patients identified through community screening (as intended in the program design), presenting with higher baseline BP (147.8 vs 140.9 mmHg at county referral hospitals) and lower baseline control rates (32% vs 46%). In contrast, hospitals likely managed more complex cases involving complications, treatment resistance, and longer disease duration. Further, given the already higher baseline control rates and lower mean BP, the magnitude of change was likely to be less pronounced among the cohort of patients managed in these higher-level facilities. However, even accounting for these differences, achieving 63% control rates, nearly doubling from baseline at the lower-tier facilities represents clinically meaningful outcomes that supports decentralization without quality compromise.

The Sub-County hospital paradox

The relative low performance at sub-county hospitals, traditionally the backbone of NCD care demands attention. These facilities may be experiencing system strain from serving as both primary NCD providers and referral centres, creating congestion (given that they hosted majority-57% of patients) that compromises care quality. Evidence suggests that vague role definition and insufficient resources to match the transitioning roles of mid-level hospitals can undermine entire health systems.[20]

Health system-wide challenges

Despite the relative advantages at health centres and dispensaries, overall patient follow-up gaps were noted across all levels. Further, the clinical outcomes, particularly for diabetes were sub-optimal. This would be due to persistent supply chain weaknesses observed during implementation. A county-level stock status exercise conducted as part of the program across 19 health facilities revealed stark differences between hypertension and diabetes medicine availability. Amlodipine, a first-line antihypertensive, was available in 74% of these facilities, and hydrochlorothiazide in 95%. In contrast, metformin, the first-line Type 2 diabetes medicine was available in only 21%, and gliclazide in 5%. This differential availability correlates with the observed disparity between hypertension and diabetes control rates. Furthermore, when commodities are not reliably stocked, patients may rationally disengage, creating vicious cycles where lost patients lead to inaccurate forecasting and continued stock

-outs. Without reliable availability of essential medicines, gains in decentralization risk being undermined.

The modest glycaemic control improvements also reflect limitations in structured lifestyle interventions in the initial program design. While hypertension may respond to medication-based protocols, diabetes requires intensive lifestyle interventions, components now being integrated into the program.

Recommendations for scale up

Successful decentralization requires comprehensive support systems beyond simply shifting services to lower levels. Digital clinical decision tools, accompanied by structured mentorship programs and continuous professional development are critical components to maintain quality. Clear stratification protocols should direct uncomplicated patients to these facilities while maintaining hospital capacity for complex management.

Supply chain system strengthening is a key priority, encompassing ring-fencing NCD commodities based on demand-based ordering and ensuring adequate buffer stocks.

Patient follow-up strategies should address not just proximity, but other health system factors. Approaches that have worked for other disease areas and settings include differentiated service delivery with 3–6-month clinical reviews for stable patients, SMS reminders with community-based defaulter tracing, and telemedicine services. Enhanced interoperability across the multiplicity of digital systems and patient-held records would enable continuity across facilities.

For diabetes specifically, structured lifestyle interventions should be integrated into routine care, encompassing standardized counselling protocols, peer-to-peer support systems, and digital-enabled individualized behavioural interventions.

Finally, the paradoxical low performance of sub-county hospitals requires further investigation and targeted support to clarify their role as functional referral hubs rather than overcrowded primary care service providers.

CONCLUSION

Empower Health provides insights for NCD decentralization in resource-limited settings. It demonstrates that lower-level PHC facilities, when equipped with digital technology, training, mentorship, and basic infrastructure, can achieve clinical outcomes matching or exceeding those of higher-level facilities.

Although population differences between levels of care may partially explain the significant improvements at health centres/dispensaries relative to hospitals, the fundamental conclusion remains valid: decentralization can improve access without compromising quality, provided it is implemented with appropriate support systems. The superior follow-up rates at PHC facilities suggest that proximity trumps sophistication for chronic disease management.

However, systemic challenges were apparent. With a quarter of patients maintaining follow-up, and modest diabetes outcomes highlighting gaps in lifestyle interventions and commodity availability, comprehensive health system strengthening remains essential.

As Kenya pursues universal health coverage and aims to reduce premature mortality from NCDs, these lessons offer a path forward. Adequately equipped and supported primary health facilities can serve as the foundation for NCD care, bringing quality services closer to communities and enabling hospitals to focus on complex patients requiring specialized expertise.

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