

Strengthening Somalia's Health System: Merging Non-Communicable Disease and Mental Health Strategies for UHC Amidst Fragility

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Abstract

Somalia's health system is defined by extreme, chronic fragility, exemplified by a critically low Universal Health Coverage (UHC) index of 25% and a severe health workforce shortage, with only **0.11 clinicians per 1,000 population**. This systemic weakness, a legacy of three decades of conflict and humanitarian crisis, intersects with an accelerating dual burden of Non-Communicable Diseases (NCDs) and Mental Health (MH) disorders. NCDs account for approximately **42% of total mortality**, while the pervasive impact of violence and displacement means MH disorders affect an estimated **one in three individuals**. This manuscript presents a comprehensive health systems analysis and prospective economic projection of Somalia's strategic shift toward an integrated Primary Health Care (PHC) model designed for resilience in fragile, conflict-affected settings (FCAS). Utilizing the rigorous One Health Tool (OHT) for the EPHS 2020 Implementation Strategic Plan (EPHS-ISP), we model the resource needs required to achieve 80% coverage by 2030. The analysis projects a total investment of **US\$3.1 billion** over the decade. Critically, the economic findings confirm a profound structural transformation: the costs required for continuous chronic care—specifically essential medicines and supplies—will surge to constitute **60% of total implementation costs by 2030**. This finding mandates immediate operationalization of the strategic purchasing model, aggressive, utilization-driven task-sharing leveraging Female Health Workers (FHWs) trained in WHO-PEN/MhGAP protocols, and robust digital health integration for resilient supply chain management. We conclude that sustainable UHC and long-term health security in Somalia rely on institutionalizing chronic care resilience within the core PHC platform, supported by stable domestic financing and rigorous, performance-based governance.

Keywords: Health System Resilience, Universal Health Coverage, Non-Communicable Diseases, Mental Health, Primary Health Care, Essential Package of Health Services, Health Financing, Task-Sharing, Digital Health

1. Introduction

1.1. Background: The Acute Crisis of Chronic Care in FCAS

Global public health efforts have historically defaulted to an acute, crisis-driven response in Fragile and Conflict-Affected States (FCAS), prioritizing immediate trauma care and infectious disease control. This approach is now structurally insufficient. Prolonged instability, coupled with global demographic and epidemiological shifts, means that FCAS populations are increasingly susceptible to a chronic disease burden that existing systems are incapable of managing.

In Somalia, three decades of civil war, weak governance, and continuous humanitarian shocks have resulted in a system characterized by profound fragility. This environment severely restricts access to continuous, life-long chronic care, including essential medications and mental health support, leading to significantly higher mortality rates among people living with NCDs (PLWNCDS). The inability to maintain the continuity of essential services—a core requirement for NCD and MH management—during periods of shock highlights a critical systemic vulnerability: the lack of health system resilience. Addressing mental health is critical in fragile settings, as emphasized by international health

organizations [1].” The paradigm shift mandated by the EPHS 2020, transitioning from fragmented aid to an integrated PHC platform, is a direct response to this failure, aligning Somalia’s strategy with the global call to integrate health security and long-term PHC resilience in FCV settings [2].

1.2. Somalia’s Structural Deficits and Dual Burden

The structural crisis is evidenced by Somalia’s UHC index of only 25% and a health workforce density of only 0.11 clinicians per 1,000 population, contrasting sharply with the WHO target of 2.28 per 1,000. The average life expectancy is approximately 56 years. Frameworks for health in fragile settings are crucial for sustainable development, providing a roadmap for countries like Somalia [3].”

While the historical burden of communicable diseases (CDs), maternal, neonatal, and nutritional disorders still account for 68.8% of total Disability-Adjusted Life Years (DALYs), the nation is undergoing a rapid epidemiological transition toward chronic illness. Non-Communicable diseases (NCDs) are

responsible for approximately **42% of total mortality** in 2019 [4]. This burden is inextricably linked to a massive mental health crisis, with depression and anxiety estimated to affect **one in three individuals**—a prevalence significantly exceeding global averages. Mental disorders rank thirteenth among the top health problems causing long-term disability, as measured by Years Lived with Disability (YLDs).

The immediate necessity for comprehensive service expansion and integration is detailed in the baseline health indicators below table (1). The structural crisis is evidenced by Somalia’s UHC index of only 25% and a health workforce density of only 0.11 clinicians per 1,000 population, contrasting sharply with the WHO target of 2.28 per 1,000. The average life expectancy is approximately 56 years.” This systemic weakness is illustrated in **(Table 1)**, which summarizes key health indicators, including maternal mortality rates and coverage of skilled birth attendance, highlighting the urgent need for comprehensive health reforms.”

Indicator	2006	2016	2019/2020 (Baseline)
Maternal Mortality Ratio (per 100,000 LBs)	1040	865	692
Under-five Mortality Rate (per 1,000 LBs)	170.5	128.4	122
Births Attended by Skilled Personnel (Coverage)	N/A	N/A	32%
Children Fully Immunized (Coverage)	N/A	N/A	11%
UHC Index	N/A	N/A	25%

Table 1: Somalia’s Key Health Indicators and Service Coverage (2006-2020) | Source: Federal Ministry of Health, Global Health Estimates, Somalia UHC Index (Approx. 2020 Baseline) | Location: Somalia

1.3. Financial Instability: The Impasse of Out-of-Pocket Payments

Low public investment (annual per capita health expenditure of US\$13) translates directly into a crippling financial burden on citizens. Out-of-Pocket Payments (OOP) constitute a staggering 46% of total health expenditure. This level of catastrophic spending severely restricts access to long-term chronic care, The COVID-19 pandemic has further exacerbated these barriers, leading to significant disruptions in the availability of essential medicines [1].

Compromising the financial protection pillar of UHC. Financial stability is further undermined by high reliance on fragmented external donor contributions (38% share) and insufficient domestic government expenditure (15% share), leading to a volatile and unsustainable financing environment.

The financial structure that necessitates transformation through strategic purchasing is summarized below.

Metric	Value	Implication for UHC
Annual Per Capita Health Expenditure (Total)	US\$13	Critically low compared to regional averages (SSA average \$204).
Out-of-Pocket Payments (OOP) Share	46%	Major barrier to access; compromises UHC financial protection pillar.
Donor Contribution Share (Off-treasury)	38%	High reliance on fragmented, unpredictable external funding.
Government Expenditure Share	15%	Insufficient domestic commitment for sustainable health system.

Table 2: Health Financing Structure and Barriers (Approx. 2020 Baseline) | Source: Federal Ministry of Health, National Health Accounts (Approx. 2020 Baseline) | Location: Somalia

This (table 2) outlines the annual per capita health expenditure, out-of-pocket payment share, donor contribution share, and government expenditure share, reflecting the financial landscape affecting health access in Somalia.

1.4. Objectives

This study performs a rigorous analysis and quantification of Somalia's strategic shift to integrate chronic care into its PHC system via the [2]. The specific objectives are:

- To evaluate the systemic fragilities and epidemiological drivers (YLD vs. YLL analysis) mandating the integration of NCD and MH services into the core PHC platform.
- To analyze and elaborate the operational frameworks of the EPHS 2020, focusing on the mandated adoption of WHO-PEN/MhGAP protocols, utilization-driven task-sharing, and digital health as foundations for service resilience.
- To present and interpret the economic projections from the One Health Tool (OHT) Costing Scenario (2020–2030), specifically quantifying the total investment, the structural cost shift toward chronic supplies, and the projected efficiency gains required to achieve the UHC target.

2. Methods

2.1. Study Design: Health Systems Analysis and Prospective Economic Modeling Review

The research employs a robust Health Systems Analysis and Prospective Economic Modeling Review design. This design was chosen as the most appropriate methodology for national policy planning in a complex, data-scarce, and fragile setting like Somalia. Unlike a retrospective systematic review or an empirical study, this design synthesizes qualitative findings on governance and operational challenges with quantitative, forward-looking economic forecasts to create an evidence-based roadmap for systemic transformation.

The design's primary function is to interpret and validate the Federal Government of Somalia's policy intent—the EPHS 2020—against the actual projected resource requirements and health impact [2].

2.2. Setting, Scope, and Data Sourcing Rationale

2.2.1. Setting and Scope

The study setting is the Federal Republic of Somalia, characterized by a decentralized, federal governance structure that frequently contributes to service fragmentation and coordination challenges. The study scope is national, encompassing all Primary Health Care (PHC) interventions and community-level services defined by the EPHS 2020 [2].

The economic modeling component is framed over a ten-year projection period, from baseline (2020) to the UHC target year (2030). The goal of the modeling is to quantify the costs associated with scaling service coverage from the baseline of 25% to the ambitious national UHC target of 80% coverage for the Core EPHS package by 2030.

2.2.2. Data Sources and Rationale

Data were synthesized from authoritative sources, explicitly chosen to address the epidemiological, financial, and planning

requirements of a resilient health system:

- **Epidemiological Data:** Baseline disease burden data, including YLL, YLD, and DALYs, were extracted from the **Global Burden of Disease (GBD) estimates for Somalia (2019)** [14]. This data source provided the intellectual justification for the NCD/MH integration, demonstrating that chronic disability (YLD) is dominated by NCDs and Mental Health disorders, necessitating a shift away from a sole focus on acute mortality (YLL) (Table 3).
- **Health Financing Metrics:** Baseline financial data (per capita expenditure, OOP share, government allocation) were sourced from **National Health Accounts (NHA) reports and Ministry of Finance budget execution reports** (Table 2). These data quantify the severity of the financial protection gap and establish the baseline fiscal space that must be expanded.
- **Policy and Operational Documents:** The EPHS 2020 and its **Implementation Strategic Plan (EPHS-ISP)** served as the foundational operational blueprint [2]. These documents provided the qualitative inputs regarding the mandated clinical protocols, task-sharing models, and governance strategies (Table 4, Table 5).

2.3. Economic Modeling Methodology: The One Health Tool (OHT) Application

The core quantitative analysis relies on the **One Health Tool (OHT)**, an internationally standardized software platform used by WHO and partners for national health sector strategic planning and resource forecasting. The OHT is a deterministic model that calculates resource requirements based on target populations, desired service coverage levels, and established unit costs.

2.3.1. Key Modeling Parameters and Inputs

The OHT was applied to the EPHS 2020 Costing Scenario using meticulously defined parameters:

- **Target Coverage:** The model explicitly scaled the EPHS interventions to reach 80% coverage by 2030, reflecting the official national UHC commitment.
- **Intervention Integration:** The model inputs systematically incorporated the full resource costs of the newly mandated chronic care interventions: the WHO Package of Essential Non-Communicable Disease Interventions (WHO-PEN) and the Mental Health Gap Action Programme (MhGAP). This integration included the procurement of standardized essential medicines (e.g., insulin, anti-hypertensive, and psychotropic), specialized NCD/MH diagnostics, and the cost of non-physician health worker (NPHW) training modules (MhGAP training).
- **Workforce Costing:** The model utilized the utilization-driven staffing model mandated by the EPHS 2020, which links staffing levels to projected patient volume in specific geographic areas [2]. This methodology accurately costed the expanded deployment and supervision of lower-cost resources, such as Female Health Workers (FHWs), ensuring a rationalized cost for the task-sharing approach.

2.3.2. Cost Components and Analysis Output

Total costs were rigorously broken down across five categories to

identify the source and trajectory of expenditure (Tables 7, 8):

- **Human Resources (Salaries):** Initial investment in training and salaries for the expanded workforce.
- **Infrastructure:** Costs for facility rehabilitation and new builds (e.g., PHUs, Health Centers).
- **Medicines and Supplies:** This component captured the entire pharmaceutical load, critically including the continuous supply required for chronic care management (NCDs, MH, and Nutrition).
- **Logistics:** Transportation, storage, and distribution costs. In Somalia, this component is disproportionately important due to high insecurity, distance barriers, and the need for resilient, frequent distribution to remote areas (reflected in the projected 10% proportional increase by 2030, Table 8).
- **Programme Costs:** Management, supportive supervision, and quality assurance overhead.

The primary output analyzed was the **structural shift in cost composition**, specifically the proportional increase of the Medicines and Supplies component, which served as the quantitative evidence of the system's shift toward a chronic care footing.

2.4. Integrated Analytical Frameworks

The EPHS 2020 operates as the primary integrated framework, built on the principle of **Progressive Realization**, dividing services into a mandatory **Core Package** and a long-term **Extended Package** [2].

2.4.1. Clinical Methodology: WHO-PEN and MhGAP Integration

The mandated integration of chronic care utilizes two internationally validated clinical methodologies:

- **WHO-PEN:** The Package of Essential Non-Communicable Disease Interventions provides a standardized, simplified clinical algorithm for NCD diagnosis and management at the PHC level. The EPHS emphasizes the total cardiovascular risk approach—a cost-effective strategy that targets limited resources (e.g., essential anti-hypertensives) to individuals with the highest calculated absolute risk of a cardiovascular event, maximizing population health impact in a resource-constrained environment.
- **MhGAP:** The **Mental Health Gap Action Programme** provides a framework for task-sharing mental health interventions, using non-specialist health workers (NPHWs and FHWs) to manage priority conditions like depression and anxiety at the community and PHC level. This approach is essential for achieving the required high coverage in Somalia, where specialty services are virtually non-existent.

2.4.2. Governance Methodology: Strategic Purchasing and Accountability

To counteract the fragmentation inherent in the federal structure, the methodology analyzed the shift to a strategic governance model (Table 5):

- **Purchaser-Provider Split (PPS):** This model separates the

stewardship function (policy-setting, financial risk management, quality control by the MoH) from the delivery function (NGOs and private sector providers). This separation enhances accountability, enabling the MoH to enforce standardized EPHS compliance through contracting.

- **Performance Monitoring:** The use of Balanced Score Cards (BSC) and the Performance/Quality Assessment Tool (PQAT) was analyzed as the mechanism for ensuring that contracted providers adhere to EPHS quality standards (including NCD/MH service delivery) and for tracking UHC tracer indicators across FMS, promoting federal-state accountability.

2.5. Ethical Considerations

As this analysis is a review and synthesis of secondary policy data (EPHS 2020) and economic projections (OHT), it was exempt from primary human subjects review [2]. The methodological rigor, however, adhered to the highest standards of transparency and accuracy in representing national strategic data and projections.

3. Results

3.1. Analysis of Systemic Fragility and Barriers to Integration

The integration of NCD and MH services into Somali PHC is obstructed by deep-seated systemic fragilities related to governance, resource management, finance, and socio-cultural factors. The integration of mental health services is crucial for achieving comprehensive care, as highlighted by recent policies advocating for such approaches (WHO, 2021) [1].

3.1.1. Governance and Fragmentation

The decentralization inherent in federalism leads directly to the fragmentation of healthcare services, disparities in resource allocation, and complex coordination challenges. Key governance weaknesses include:

- **Regulatory Fragility:** The National Health Professionals Council (NHPC) struggles with financial unsustainability, relying solely on registration fees, compromising its ability to enforce quality standards and combat standard care.
- **Implementation Gaps (EPHS 2009):** The previous package suffered from partial implementation, fragmentation, and duplication, as implementing partners selected aspects aligned with their funding priorities, leading to unequal service delivery and inadequate capacity building.

3.1.2. Critical Resource Deficits and Distribution Failure

The workforce density is critically low (0.92 joint health workers per 1,000 persons, versus WHO goal of 2.28). Staff are highly concentrated in urban centers, exacerbating geographic barriers.

3.1.3. Burden of Disease Analysis: Justification for Chronic Care Integration

The GBD 2019 analysis confirms that the primary challenge is tackling chronic disability (YLD) to improve quality of life and productivity, complementing ongoing efforts to reduce acute mortality (YLL).

Top 5 Causes of Years of Life Lost (YLL)	Primary Disease Group	Top 5 Causes of Years Lived with Disability (YLD)	Primary Disease Group
Neonatal disorders	Maternal/Neonatal	Depressive disorders	Mental Health/NCD
Lower respiratory infections	Communicable Disease	Low back pain	NCD
Diarrheal diseases	Communicable Disease	Gynecological diseases	NCD
Tuberculosis	Communicable Disease	Headache disorders	NCD
Measles	Communicable Disease	Age related and other Anxiety disorders	Mental Health/NCD

Table 3: Burden of Disease Analysis: Top 5 Causes of Years of Life Lost (YLL) and Years Lived with Disability (YLD) (2019) | Source: Global Burden of Diseases estimates (2019) | Location: Somalia

Source: Global Burden of Diseases estimates (2019)

This table 3 details the leading causes of years of life lost (YLL) and years lived with disability (YLD) in Somalia, providing insights into the health priorities and challenges faced by the population.

The YLD data confirms that Depressive disorders, Low back pain, Headache disorders, and Anxiety disorders dominate the chronic disability metrics, providing the epidemiological mandate for the systematic integration of WHO-PEN and MhGAP protocols within the EPHS 2020 framework [2].

3.1.4. Socio-Cultural and Contextual Impediments

Effective integration must navigate cultural factors that undermine clinical interventions:

- Stigma and Misconceptions: Pervasive stigma surrounding NCDs, especially mental health conditions, deters individuals from seeking formal care.
- Competition from Traditional Healing: Deeply entrenched traditional practices often compete with or undermine conventional services, delaying appropriate medical care.
- Health Worker Safety: The chronic threat to the safety of healthcare workers (HCWs) and infrastructure impacts staff well-being and, ultimately, the system's ability to maintain service continuity.

3.2. The Conceptual Framework: Integrated PHC and Resilience in FCAS

3.2.1. Defining Resilience for Chronic Care in the Somali Context

Health system resilience in Somalia must be defined as the system's capacity for absorption, adaptation, and transformation to manage the impact of constant disturbance. For NCD and MH care, resilience means maintaining the continuity of essential services (medication supply, diagnostics, follow-up) despite shocks.

This approach aligns directly with the WHO Framework for health in the Humanitarian-Development-Peace Nexus (HDPN) in Africa, providing immediate life-saving services (Humanitarian) while strengthening national institutions (Development) and promoting equitable access (Peace).

3.2.2. The Essential Package of Health Services (EPHS) 2020

The EPHS 2020 serves as the standardized operational blueprint for all primary care delivered in Somalia [2]. Its design supports Progressive Realization, dividing services into a Core (minimum service entitlement, short-term capacity) and Extended package (additional interventions, medium- to long-term expansion).

The EPHS 2020 explicitly embeds NCDs and Mental Health through:

- NCDs: Health promotion, cardiovascular and pulmonary diseases, diabetes, cancer, mental health and substance use disorders, injuries, and other NCDs.
- Rehabilitation.

3.2.3. The Integrated PHC Model for NCD/MH

The model mandates embedding the WHO Package of Essential Non-Communicable Disease Interventions (WHO-PEN) and the Mental Health Gap Action Programme (MhGAP) into the general PHC flow. This unification ensures NCD patients are screened for depression/anxiety, and vice versa.

The NCD management strategy prioritizes a total cardiovascular risk approach, which is substantially more cost-effective in low-resource settings because it targets scarce resources (medications) toward individuals who have the greatest potential to benefit from treatment.

3.3. Operational Pillar I: Workforce and Task-Sharing

I. Mandate for Task-Shifting: MhGAP and WHO-PEN

Given the severe workforce shortage, adopting a task-shifting model is a strategic necessity. The WHO pyramid framework shows that most mental health care can be achieved at the community level by training non-specialist health professionals (nurses, midwives) in MhGAP and leveraging Community Health Workers (CHWs). Task-sharing has been proven effective and economically beneficial for NCD and MH management in low- and middle-income countries (LMICs).

II. Leveraging Community Health Workers (FHWs) for NCD/MH Care

Community Health Workers, known as Marwo Caafimaad Female Health Workers (FHWs), are the critical anchor for continuous, community-based care and The integration of community health workers into the healthcare system is vital for improving service delivery (WHO, 2022) [5]. The EPHS mandates strengthening this program, expanding the number of FHWs, and utilizing them for:

- Education on prevention and management of NCDs.
- Referral of suspected NCD cases.

- Counselling and behavioural modification on nutrition and physical activity.
- Education on mental health and providing family support.

III. Rationalization and Retention Strategy

The workforce strategy must counter the existing urban concentration bias. The EPHS 2020 implementation strategy mandates utilization-driven staffing, allowing service providers to hire a minimum number of staff based on service utilization while strictly adhering to the recommended skill mix.

Strategic Component	Targeted Intervention Area	Key PHC/FCAS Implementation Strategy	Resilience Gain
Human Resources (Task-Shifting)	NCD/MH Diagnosis and Management	Training non-specialist staff (nurses, FHWs) in standardized WHO MhGAP/PEN protocols	Decentralizes specialized knowledge, rapidly closing the coverage gap
Service Delivery Model	Prevention and Community Outreach	Establish FHW-led home visits for risk factor screening and adherence support (Marwo Caafimaad Program)	Builds community trust and ensures continuity of care in volatile areas
Information Systems	Data Collection and Monitoring	Use of mHealth platforms for real-time reporting, supply stock monitoring, and remote patient follow-up	Overcomes physical access barriers and ensures data flow during periods of shock
Essential Supplies	Medication and Diagnostics	Implement standardized essential drug lists and strengthen the Pharmaceutical Regulatory Authority	Stabilizes the supply chain for chronic medication, reducing patient financial risk

Table 4: Integrated Care Strategies Mapped to WHO-PEN/MhGAP Implementation

This table 4 summarizes key strategic components for integrating NCD and mental health care into primary health services, along with the expected resilience gains from each intervention.

3.4. Operational Pillar II: Digital Health, Supply Chain, and Data

3.4.1. Harnessing Digital Health for Coverage Expansion

Digital health, particularly mobile health (mHealth), leverages Somalia’s telecommunications network to overcome barriers of distance, cost, and mobility in fragile states. Digital health solutions, particularly mobile health initiatives, can significantly enhance care delivery for NCDs, as evidenced by successful case studies in similar contexts (WHO, 2024) [6].”

- **Telemedicine:** Services like Hello! Caafi provide remote medical consultations, extending specialized and efficient care vital for chronic NCD/MH management when physical access is compromised by security or climate shocks.
- **Regulatory Tool:** Digital platforms enforce standardization by integrating clinical guidelines directly into the technology, bypassing systemic governance weaknesses and ensuring consistent quality of care.

3.4.2. Strengthening the Chronic Care Supply Chain

For life-long NCD patients, supply chain interruptions are often fatal. Resilience demands the continuous availability of essential NCD/MH medications.

- **Standardization:** The EPHS-ISP mandates the standardization of essential drugs and supplies, developing a standard core list of minimum needs for different levels of services.
- **Forecasting and Distribution:** Supply chains must transition to dynamic forecasting and standardized procedures, coordinating and tracking needs-based distribution linked to digital patient data.

3.4.3. Data and Monitoring for Accountability and Resilience

Effective accountability requires data systems that can track service continuity and quality.

- **Integrated HIMS:** The National Health Information Management System (HIMS) must be standardized, building on the use of the DHIS2 platform. It must incorporate systematic data collection to assess NCD/MH prevalence and management outcomes, tracking UHC tracer indicators.
- **Quality Metrics:** The EPHS-ISP mandates strengthening

monitoring and evaluation mechanisms, including the use of Balanced Score Cards (BSC), Standard Monitoring Checklists (SMC), and the Health Facility Performance and Quality Assessment Tool (PQAT) for quality assurance and facility standards.

Tool / Mechanism	Level	Purpose in EPHS-ISP
Balanced Score Card (BSC)	National/State/District	Standardize monitoring of results; benchmark performance trends over time
Standard Monitoring Checklist (SMC)	Facility/District	Facilitate quarterly monitoring visits of EPHS health facilities
Performance/Quality Assessment Tool (PQAT)	Facility/DHMT	Assess and monitor implementation of health facility standards; develop quality improvement plans
Resource Mapping & Expenditure Tracking (RMET)	National/State	Identify financial gaps and improve expenditure efficiency annually
National Health Accounts (NHA)	National	Framework for collection and analysis of health expenditures (origins and utilization)

Table 5: Essential EPHS Monitoring and Accountability Metrics

This table 5 lists various monitoring tools and mechanisms used to assess the effectiveness and quality of health services delivered under the EPHS, emphasizing their purpose at different health system levels.

3.5. Policy Pillar III: Sustainable Financing and Governance

3.5.1. Strategic Health Financing

To counter high OOP (46%), Somalia needs to create significant fiscal space for health.

- **Increased Domestic Commitment:** Policy must target a measurable increase in government budget allocation for health, for example, from 6% to 12% by 2030 in Somaliland.
- **Strategic Purchasing:** The Ministry of Health (MoH) will adopt a strategic purchasing approach incorporating a purchaser-provider split model, where the MoH provides stewardship for purchasing while NGOs and the private sector provide services through a contracting mechanism.

3.5.2. Governance and Implementation Strategy

Harmonization and integration are mandated to overcome federal fragmentation:

- **Geographic Harmonization:** Only a single NGO (service provider) will be allocated per region to reduce transaction costs and improve accountability. Primary EPHS donors will likewise be assigned to particular geographic regions.

- **Delivery System Harmonization:** Vertically implemented interventions (TB, HIV, Malaria, Nutrition) will be gradually integrated into the EPHS platform.

- **Flexible Service Delivery:** Flexible contracts will be awarded to partners to develop creative solutions for service provision to hard-to-reach populations, including utilizing mobile clinics and outreach activities for nomadic and IDP groups.

3.6. Economic Findings: Total Costs and Structural Cost Transformation (2020–2030)

3.6.1. Total Projected Costs and Per Capita Expenditure

The OHT model projects a required total investment of US\$3.1 billion over 2020–2030 to achieve 80% coverage, requiring annual per capita spending to increase from \$7.4 in 2020 to \$33.3 by 2030. The financial implications of the proposed health reforms are significant, requiring a substantial investment over the next decade. The projections for per capita costs and total investment from 2020 to 2030 are detailed in (Table 6). This table outlines the expected increase in funding needs, emphasizing the importance of strategic health financing to achieve the UHC target.”

Year	Per Capita Cost (US\$)	Grand Total Cost (US\$ million)
2020	7.4	104.54
2025	14.1	231.56
2030	33.3	625.47
Total (2020-2030)	N/A	3106.03

Table 6: EPHS 2020 Per Capita Costs and Total Projected Cost (US\$ Million) | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Costing Scenario (2020-2030) | Location: Somalia).

3.6.2. Composition of Costs: The Definitive Shift to Chronic Care Supplies

The most significant finding validating the EPHS 2020 strategy is the structural shift in cost composition: Medicines and Supplies

cost is projected to increase from 34% in 2020 to 60% by 2030. This quantitatively confirms that the long-term cost of the Somali health system will be dominated by the sustained, consumption-based requirements of managing chronic NCD and MH patients.

Cost Component	2020 (US\$ Million)	2030 (US\$ Million)	Total (2020-2030) (US\$ Million)
Total Human Resources (Salaries)	48.22	118.58	895.34
Total Infrastructure Cost	10.49	13.04	128.93
Total Medicines and Supplies Cost	36.03	375.06	1594.26
Total Logistics Cost	9.63	117.33	474.22
Total Programme Costs	0.18	1.46	13.29
Grand Total	104.54	625.47	3106.03

Table 7: Composition of EPHS 2020 Implementation Costs (US\$ Million) from 2020 to 2030 | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Costing Scenario (2020-2030) | Location: Somalia.

This table 7 outlines the projected costs for human resources, infrastructure, medicines, logistics, and program costs, illustrating the shift towards chronic care management in Somalia’s health system.

Cost Component	2020 (%)	2030 (%)	Change (%)	Implication for Chronic Care
Human Resources (Salaries)	46%	19%	-27%	Decreasing relative importance post-initial investment.
Medicines and Supplies	34%	60%	+26%	Dominant driver by 2030; reflects sustained chronic medication needs.
Infrastructure	10%	2%	-8%	Decreasing relative importance post-initial rehabilitation.
Logistics	9%	19%	+10%	Increase proportional to drug/supply distribution scale.

Table 8: Percentage Distribution of EPHS Cost Components (Visualizing the Shift) | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Costing Scenario (2020-2030) | Location: Somalia.

This table 8 visualizes the changing distribution of costs among various components of the Essential Package of Health Services, highlighting the increasing importance of medicines and supplies over time.

3.6.3. Resource Allocation, Efficiency, and Dominant Cost Drivers

3.6.3.1. Resource Allocation by Facility Type and Efficiency Gains

The decentralized nature of the EPHS is reflected in the allocation, with Health Centres (HCs) consuming the largest absolute resource amount, confirming their status as the PHC delivery hub. Healthcare facilities play a crucial role in service delivery and are central to the implementation of the EPHS 2020 [2]. The financial allocation required for each type of facility is summarized in (Table 9), which presents the total implementation costs for community health units, health centers, and hospitals. This breakdown is essential for understanding resource distribution across the healthcare system.”

Facility Type	2020 Cost (US\$ Million)	2025 Cost (US\$ Million)	2030 Cost (US\$ Million)
Community	3.8	13.5	28.6
Primary Health Unit (PHU)	8.4	18.9	57.3
Health Centre (HC)	39.1	89.9	259.0

District Hospital (DH)	27.9	59.0	144.9
Regional Hospital/Office	23.5	47.0	107.2

Table 9: Total EPHS Implementation Cost by Facility Type (US\$ Million) - Selective Years | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Costing Scenario (2020-2030) | Location: Somalia.

Note: Health Centres utilize the largest amount of EPHS resources over the period.

The efficiency gains derived from the task-sharing model are confirmed by the decline in the average Cost per Patient Visit (CPPV) across most facility types by 2030, signifying successful diversion of routine care to lower-cost settings.

Facility Type	2020 Cost Per Patient Visit (US\$)	2030 Cost Per Patient Visit (US\$)	Average Cost Per Patient Visit (2020-2030) (US\$)
Community	0.45	0.32	0.40
Primary Health Unit (PHU)	0.42	0.44	0.37
Health Centre (HC)	3.41	2.51	2.63
District Hospital (DH)	4.25	2.42	2.81
Regional Hospital (RH)	14.39	9.37	10.78

Table 10: EPHS Implementation Cost Per Patient Visit by Facility Type (US\$) | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Costing Scenario (2020-2030) | Location: Somalia.

Assessing the cost-effectiveness of health services is vital for sustainable health financing. The average cost per patient visit across various facility types, as illustrated in (Table 10), shows how resource allocation impacts service delivery efficiency. This table highlights the changes in cost dynamics as patient volume increases.”

The cost per patient visit declines in all facility types (except PHU) by 2030, confirming the efficiency gain of successfully scaling PHC access.

3.6.4. NCD and Nutrition Cost Driver Analysis

By 2030, the financial dominance of chronic NCD medication is clearly established, with Asthma and Diabetes management consuming 21% of the total drug budget. Identifying cost drivers in the health system is essential for effective budgeting. (Table 11) presents the primary drug and supply cost drivers at baseline (2020), highlighting the areas where financial resources are most heavily allocated. As illustrated in (Table 12), the projected drug and supply cost drivers for 2030 indicate a significant shift in health priorities, particularly with the increasing burden of Non-Communicable diseases (NCDs). This combined analysis underscores the necessity for strategic financial planning to adapt to the evolving healthcare landscape and ensure sustainable health service delivery.

Intervention	Cost (US\$)	Cost % of Total Drugs/Supplies
Supplementary feeding for pregnant women with MAM	3 214 454	9%
Management of asthma	2 928 811	8%
Management of diabetes	2 592 647	7%
Supplementary feeding for lactating women with MAM	2 539 221	7%
Maternal nutrition assessment, counselling, and MMN	1 420 753	4%

Table 11: Top 5 Drug and Supply Cost Drivers at Baseline (2020) | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Costing Scenario (2020-2030) | Location: Somalia.

Intervention	Cost (US\$)	Cost % of Total Drugs/Supplies
Management of asthma	31 437 983	11%
Management of diabetes	27 859 289	10%

Management of moderate acute malnutrition (children)	12 829 574	5%
Abdominal pain, gastritis, and GI bleeding	10 613 015	4%
Management of injuries	9 895 010	4%

Table 12: Top 5 Drug and Supply Cost Drivers at the End Line (2030) | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Costing Scenario (2020-2030) | Location: Somalia.

By 2030, NCD management interventions (Asthma and Diabetes) become the undisputed top two cost drivers, consuming 21% of the total drug/supply budget, demonstrating the structural transformation of the system toward chronic care.

3.7. Projected Impact on Mortality and Morbidity

The scale-up of EPHS 2020 interventions is projected to save an estimated **3,444 maternal lives and 56,265 child lives** (0–59 months) in the year 2030 alone, confirming the massive potential return on the US\$3.1 billion investment. The expected impact of health interventions is significant, particularly regarding

maternal and child health outcomes. Projected reductions in mortality rates are summarized in **(Table 13)**, which outlines the anticipated decreases in maternal and child mortality as a result of implementing the EPHS 2020 [2].”

3.7.1. Maternal and Child Mortality Reduction

Indicator (per 1,000 or 100,000 LBs)	Baseline (2020)	Projected (2030)	Expected Reduction (%)
Maternal Mortality Ratio (MMR) (per 100,000 LBs)	692	331.6	~52%
Neonatal Mortality Rate (per 1,000 LBs)	38	20	~47%
Under-Five Mortality Rate (U5MR) (per 1,000 LBs)	122	63	~48%
Indicator (per 1,000 or 100,000 LBs)	Baseline (2020)	Projected (2030)	Expected Reduction (%)
Maternal Mortality Ratio (MMR) (per 100,000 LBs)	692	331.6	~52%
Neonatal Mortality Rate (per 1,000 LBs)	38	20	~47%
Under-Five Mortality Rate (U5MR) (per 1,000 LBs)	122	63	~48%

Table 13: Projected Reduction in Child and Maternal Mortality Rates (2020 vs. 2030) | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Impact Projections | Location: Somalia

This reduction is projected to save thousands of lives annually: an estimated 3,444 maternal lives and 56,265 child lives (0–59 months) saved in the year 2030 alone.

3.7.2. Nutritional and Chronic Disease Outcomes

Significant investment in nutrition and NCD interventions is expected to improve population health metrics dramatically. The NCD interventions included in the EPHS 2020 are projected to increase the number of healthy life years lived among NCD patients and reduce the annual probability of dying due to NCDs

in the 30-70 year age bracket. “Improvements in nutrition are paramount for health outcomes, especially among vulnerable populations. The expected changes in global stunting and wasting rates among children are detailed in (Table 14), highlighting the anticipated benefits of the integrated health interventions outlined in the EPHS 2020 [2].”

Indicator	Baseline (2020)	Projected (2030)	Expected Reduction (Percentage Points)
Global Stunting Rate (Children 0-59 months)	41.0%	36.6%	4.4%
Global Wasting Rate (Children 0-59 months)	13.5%	6.3%	7.2%

Table 14: Projected Reduction in Global Stunting and Wasting Rates (2020 vs. 2030) | Source: Essential Package of Health Services (EPHS) 2020 One Health Tool (OHT) Impact Projections | Location: Somalia

4. Discussion

4.1. Interpretation of Findings: The Structural Mandate for Resilience

The OHT economic analysis confirms that the EPHS 2020 is not a mere service expansion but a fundamental system transformation. Metrics and indicators are essential for assessing health system resilience, enabling effective monitoring and evaluation [5].” The projected surge of costs toward **60% on medicines and supplies by 2030** is the financial definition of resilience, indicating that the system’s long-term success hinges entirely on continuous pharmaceutical supply stability.

This mandate for continuity validates the EPHS-ISP’s operational pillars:

- **Task-Sharing and Workforce Resilience:** The system must rely on utilization-driven task-sharing, utilizing non-specialist health workers (NPHWs) trained in WHO-PEN/MhGAP to manage the majority of chronic cases. The Female Health Workers (Marwo Caafimaad) are the crucial anchor, providing continuous community-based adherence support and screening, which is essential for preserving treatment regimens during shocks.
- **Digital Health and Standardization:** Digital platforms are mandatory, not only for telemedicine but primarily as a regulatory tool to enforce standardized clinical protocols (WHO-PEN/MhGAP) and provide resilient supportive supervision and dynamic supply chain monitoring across fragmented FMS boundaries.

4.2. Governance Transformation and Financial Accountability Imperatives

The EPHS-ISP’s shift to a strategic purchasing model with a purchaser-provider split is the core governance strategy for resilience, enabling the MoH to enforce standards, eliminate duplication (Geographic Harmonization), and ensure accountability across the federal structure. However, the sustainability of this entire model is immediately threatened by the 46% Out-of-Pocket Payment (OOP) burden. Policy must target a measurable increase in the domestic government budget (e.g., aiming for 12% by 2030) and urgently scale subsidized health insurance schemes to protect chronic patients from catastrophic health expenditure and ensure adherence to medication.

5. Conclusion, Policy Recommendations and Phased Roadmap

Somalia’s health system transformation requires a fundamental shift to integrated chronic care resilience, validated by economic modeling which projects that 60% of all future costs will be dedicated to sustaining continuous chronic medication and supply. This finding defines the primary challenge and policy priority: establishing stability in supply chains and financial access. Achieving the projected US\$3.1 billion investment impact, including saving thousands of maternal and child lives annually, necessitates immediate political commitment, a radical reduction in the 46% OOP burden, and the rigorous enforcement of task-sharing and strategic purchasing mechanisms. Integrating NCD and MH care is the central imperative for establishing a stable,

equitable, and sustainable health system in a chronically fragile state.

B. Phased Roadmap [7].

A structured, phased approach, informed by the National Transformation Plan (NTP), is required to institutionalize integrated PHC resilience across the Federal Government of Somalia and its member states.

Phase I (Stabilization, Policy Alignment, and Core Implementation)

- Secure non-fee based, sustainable funding for key regulatory bodies (NHPC) and establish clear contractual frameworks for Public-Private Partnerships (PPPs).
- Formalize, fund, and launch the professional integration of Female Health Workers (FHWs) into the updated EPHS structure, implementing utilization-driven staffing models at all facilities to ensure resource rationalization.
- Launch decentralized MhGAP and WHO-PEN training hubs to initiate the task-shifting model.
- Implement the EPHS-ISP’s geographic harmonization plan (single NGO/donor per region) and begin the integration of vertical programs into the EPHS platform.

Phase II (Expansion, Digitization, and System Strengthening)

- Scale mHealth infrastructure for remote consultation, supply chain monitoring, and resilient supportive supervision of PHC staff and FHWs.
- Prioritize the rehabilitation of rural PHC facilities and ensure the continuous, forecasted supply of essential WHO NCD/MH medications using standardized procurement procedures.
- Establish the National Health Accounts (NHA) and Resource Mapping and Expenditure Tracking (RMET) systems, and roll out the strategic purchasing model.
- Operationalize the Balanced Score Card (BSC) and PQAT to track performance and enforce facility standards.

Phase III (Transformation and Sustainability)

- Enforce a significant increase in domestic government health expenditure (e.g., targeting 12%) and roll out pilot community-based health insurance models to reduce out-of-pocket payments (OOP).
- Enforce joint federal-state accountability frameworks, utilizing the strengthened Health Sector Coordination Committee (HSCC) and joint inspection audits to ensure EPHS standards and equitable resource deployment.
- Achieve 80% service coverage for the core EPHS package interventions, ensuring chronic care resilience is fully integrated [8-20].

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Competing Interests

The authors declare that they have no competing financial or non-financial interests in the subject matter or materials discussed in this manuscript.

Data Availability Statement

The datasets supporting the conclusions of this article are derived from publicly available national strategic documents and global health estimates cited throughout the manuscript, including the EPHS 2020 Costing Scenario (One Health Tool), Global Burden of Disease estimates 2019, and Federal Ministry of Health policy documents.

Ethical Considerations

This study constitutes a secondary analysis and policy review based on publicly available strategic documents and economic models. As it did not involve the collection of new primary human subject data, formal ethical approval was not required. The study maintains adherence to the principles of transparency and academic rigor in the representation of all sourced national data.

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