

Modelling the Cost of Community Health Services in Malawi: the Results of Piloting a New Planning and Costing Tool



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Modelling the Cost of Community Health Services in Malawi: the Results of Piloting a New Planning and Costing Tool

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COVER PHOTO: “HSAs in Dedza District,” Sara Wilhelmsen (Management Sciences for Health)



MATERNAL, NEWBORN AND CHILD HEALTH
WORKING PAPER
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Modelling the Cost of Community Health Services in Malawi

The results of piloting a new planning and
costing tool

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Keywords: Community Health Services, Malawi, Costing, Finance, Planning

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Executive Summary

With increasing recognition of the important and necessary role that community health workers need to play for countries to achieve the goal of universal health coverage, it has become clear that there is a need for a methodology and tool for planning and costing comprehensive packages of community health services so they can be provided in cost-effective ways and so they can be adequately financed and sustained.

UNICEF engaged Management Sciences for Health to develop a methodology and tool for planning and costing community health services and this tool was piloted in Malawi and Sierra Leone. Community health services have a long history in Malawi and the core of community health service delivery has been the Health Surveillance Assistants (HSAs). Initially the HSAs provided only immunizations to children in communities, but their role has expanded over time to include a larger package of services and interventions. With this well established community health system, Malawi was an ideal country to pilot the new methodology and tool and the Ministry of Health and UNICEF/Malawi were supporting of this exercise, knowing also that the completed models and results could be beneficial in terms of improving and expanding community health services.

In February and March 2016, a team of MSH staff and consultants worked with the Ministry of Health, UNICEF/Malawi and other stakeholders to collect data that could be used to pilot the methodology and tool. Interviews were held and data were collected at all levels of the health system, including visits to health centres in two districts where facility staff and community health workers were interviewed. The data were then analyzed using the tool. The piloting was extremely successful lessons were learned which have been incorporated in the final version of the methodology and tool.

The exercise also provided an interesting analysis of the cost of community health services in Malawi. While, as stated above, the time and resources available for the study were too limited to produce results that are definitive or that represent the country as a whole, some of the findings are worthy of comment. These comments are mainly applicable to the two districts.

- Utilization of HSA services: Based on the utilization data reported in the DHIS and iCCM data from other sources it appears that HSA services were under-utilized in 2015, only using 9% of their available time in Ntcheu and 8% in Dedza. It also appears that the HSAs are only providing 14 of the package of 43 services in Ntcheu and 12 of the 43 in Dedza. However, these findings are based on the completeness and accuracy of the DHIS data, which appears questionable.
- HSA Services Provided: Most of the services provided are family planning and iCCM and these are provided in reasonable quantities, although in some cases the figures actually seem quite high.
- Projected HSA Service Provision Time: If the full package of services is provided and utilization is increased by 5% per year, it is projected that they would be occupied with these services for 77% of their time by 2025 in Ntcheu and for 69% of their time in Dedza.

- Expansion of HSA Services: Unless the identified geographic access and human resource bottlenecks are resolved, they are likely to impede the expansion of utilization of the full package of services to populations in harder-to-reach areas and to improve or maintain the quality of services. These constraints could not be quantified and solutions were not explored but this is worthy of further study.
- HSA Unit Costs: The average cost per capita in 2015 for the two districts was USD 3.88 in Ntcheu and USD 3.97 in Dedza. This is relatively low because of the under-utilization of the package of services. With the projected increases in utilization , the cost per capita would increase to USD 7.16 in Ntcheu and USD 7.25 in Dedza
- Services Costs: In 2015 the programs with the highest costs were iCCM and Reproductive Health/ Family Planning in Ntcheu and Dedza. With the projected increases in utilization, the programs with the highest costs in 2025 would be Reproductive Health / Family Planning and Immunizations in both districts, with iCCM third. In 2015 most of the costs in the two districts went on HSA salaries. With the projected increases in utilization, most of the costs would be for medicines, supplies and commodities by 2025. This assumes that there would be no need to increase the numbers of HSAs.

As noted in the discussion section, the costs of expanding community health services in the two districts relate mainly to increases in medicines, supplies and commodities. These costs may not all be incremental, since, to some, degree they may be replacing medicines, supplies and commodities that are currently provided at facilities. If that is the case then the expansion of services may be reducing health system unit costs and household costs and allowing for a more cost effective use of health facilities.

List of Acronyms

ANC	Antenatal Care
ARI	Acute respiratory infection
BCC	Behavior change communication
CBDA	Community Based Distribution Agent
CHAM	Christian Health Association of Malawi
CHS	Community Health Services
CHW	Community health worker
DEHO	District Environmental Health Officer
DHO	District Health Office
DHS	Demographic Health Survey
GFF	Global Financing Facility
FP/RH	Family Planning/Reproductive Health
HCT	HIV Counselling and Testing
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
HMIS	Health Management Information System
HSA	Health Surveillance Assistant
iCCM	Integrated community case management
IMCI	Integrated Management of Childhood Illness
ITN	Insecticide Treated Nets
MOH	Ministry of Health
MSH	Management Sciences for Health
MUAC	Mid-upper arm circumference
NGO	Non-governmental organization
ORS	Oral rehydration salts
RACe	Rapid Access Expansion Program Project
TB	Tuberculosis
UNICEF	United Nations Children's Fund
VHC	Village Health Committee
WASH	Water, Sanitation, and Hygiene

Background: Importance of Costing and Community Health Services

There is growing evidence on the benefits of community health services (CHS) as a key strategy to promote healthy behavior and improve access to high-impact services, such as maternal, newborn, and child health (MNCH) interventions from pregnancy to adolescence. Such services are often fragmented, both in terms of provision – with different community health workers (CHWs) providing different packages of care – and in terms of financing. As the need for improved and expanded community health services grows, it is important that they be integrated for greater efficiency, effectiveness and sustainability. Little is known, however, of the cost of integrated, comprehensive community health services and, without this information, these services are often under-funded and financially unsustainable. Additionally, opportunities to include CHS financing in insurance packages or in new global funding mechanisms (such as the Global fund to fight AIDS, Tuberculosis, and Malaria or the Global Financing Facility) are frequently missed or under-supported.

Adequate financing can only be achieved if costs are known and while certain elements of CHS (e.g. malaria case management and prevention, family planning, reproductive health, and integrated community case management) have sometimes been costed individually, there is little or no information on the cost of comprehensive CHS services. Effective CHS depends on a well-functioning overall health platform which ensures that training, equipment, medicines and supplies, management and supervision, transport, financing, information systems, quality control, demand generation, governance, and other key elements are integrated and function well. These resources must be combined in the most efficient manner possible to maximize outputs and outcomes. Demand generation is particularly important, as several studies have shown that services are not cost-effective unless they are properly utilized. The use of financial and non-financial incentives for CHWs can also be important to ensure they are motivated and well-performing since programs with high rates of CHW attrition are generally neither cost-effective nor sustainable.

Recognizing the need to support countries in the development and scale up of effective community health services, Management Sciences for Health (MSH) was engaged by the United Nations International Children's Emergency Fund (UNICEF), to develop a methodology and tool for planning and costing these services. These processes can be used to develop national policies and plans for community health services and to support the creation of investment cases. Although it is recognized that community health services are an integral part of primary health care services, the lack of a methodology and tool for costing community health services meant that there was an important gap in the planning and costing of primary health care packages. MSH, therefore, developed a new methodology and tool building on previous work on costing integrated Community Case Management (iCCM) services.¹ The new approach and tool were piloted in Malawi and Sierra Leone, countries which were selected because of the important role of CHWs in their health systems. The purpose of this pilot was to test the methodology and tool in real situations and, at the same time, to provide an analysis of costs that could be useful for the countries.

¹ The iCCM costing tool and reports can be found on the MSH web site.
<http://www.msh.org/resources/integrated-community-case-management-costing-financing-tool>

This report describes the process and results of the pilot study conducted in Malawi in February – March 2016. The results of this study will hopefully serve to support the Malawi Ministry of Health (MoH) and partners in their continued development of community health services, and the experiences may also be useful to other countries which are developing community health strategies and investment cases. The lessons learned from the piloting were valuable in the development of the final methodology, tool and guidelines, which are available from UNICEF and MSH.

Country Introduction: Malawi’s Health Situation and Health Care System

Malawi’s 17.6 million people have a national health care system that has been in place since 1964 when the country achieved its independence. Malawians can attend free government-run health facilities or private sector facilities operated by Christian Health Association of Malawi (CHAM) members that charge small fees. CHAM members provide nearly 40% of the country’s health care services.

Malawi is one of only six countries to achieve Millennium Development Goal 4 for child survival, reducing under-5 deaths by a remarkable one-half since 2010.² Malawi has also achieved a 53% reduction in maternal mortality from 1990 to 2015, and an increase in the contraceptive prevalence rate for married women from 7.4% in 1992 to 42% in 2010 (Table 1).³ While child survival rates have improved, progress has, however, lagged for newborns. Malawi has a neonatal mortality rate of 22 per 1,000 live births – demonstrating little change since 2011 when the rate was 25. This is especially disappointing because the country has seen improvements in skilled birth attendance, early initiation of breastfeeding, and postnatal care—each one serving as a window of opportunity for improving a baby’s chance at survival.

Structural and systemic challenges play a major role in inhibiting Malawi from efficiently managing and delivering health services. One crucial factor is the persistent shortages of staff, medicines, and supplies due partly to a decentralization effort—begun in 2002—that was intended to empower districts to set their own health priorities to meet local needs, budgeting with funds under their control. Transfer of power and funds has not, however, been realized, hampering the ability of district health teams to effectively tackle the needs in their local areas. Despite the decentralization challenge, Malawi has showed great promise with its structured community health system.

² <http://data.worldbank.org/indicator/SH.DYN.MORT>

³ Malawi Demographic and Health Survey, 2010

Table 1. Overview of Health Status in Malawi

Indicator	National Value
Total fertility rate	5
Contraceptive prevalence rate	42%
Any ANC visits	96%
4 ANC visits	45%
Births assisted by a skilled provider	87%
Maternal mortality ratio	574/100,000 live births
Adolescent birth rate	143/1000 girls
12-59 month mortality rate	33/1000 live births
Infant mortality rate	43/1000 live births
Neonatal mortality rate	22/1000 live births
Under-5 children sleeping under ITN	78%

Source: Malawi Demographic and Health Survey 2010

With 86.2% of the population living in rural areas, community health services are critical to reaching the majority of the population⁴. The MOH's 2008-2012 Accelerated Child Survival and Development Strategic Plan established a professional cadre of community health workers, among whose responsibilities is the provision of integrated Community Case Management (iCCM) services. These Health Surveillance Assistants (HSAs) are trained, deployed and supported to provide services in hard-to-reach areas where access to health services is restricted by distance (more than 8km) from a health centre or hospital⁵. HSAs are intended to be the link between the health centres and the communities they serve and are a key element of Malawi's Child Health Strategy (2014-2020), which aims to bring high impact interventions to the community.

Community Health Services

Cadres of Community Health Workers

Community health services have a long history in Malawi and the core of community health service delivery has been the Health Surveillance Assistants (HSAs). Initially the HSAs provided only immunizations to children in communities, but their role has expanded over time to include a larger package of services and interventions. In addition to HSAs, other types of community health volunteers were introduced, however their numbers and roles have since faded due to a variety of issues outlined in the examples below:⁶

- *Traditional birth attendants*: who were recently banned from providing deliveries at home,

⁴ Malawi Demographic and Health Survey 2010

⁵ It is understood that Malawi is moving to expand the area considered hard-to-reach from beyond 8 km to beyond 5km.

⁶ From "Community Health Worker Incentives in Malawi: Lessons Learned" Technical Brief of African Strategies for Health, 2015.

- *Community-Based Distribution Agents (CBDAs)*: introduced in 1999 in eight districts and promoted by the Family Planning Association of Malawi. They continue today, though their coverage is unknown and HSAs now provide most family planning counseling and commodities.
- *Volunteer groups*: provide IEC and supported by a few NGOs in the areas they work. The number and coverage is unknown.
- *Village Health Committees (VHC)*: groups facilitated by the government in each of the 3,138 hard-to-reach-areas of the country.

With the exception of CBDAs, most of these cadres are involved in information provision and community promotion and not in the provision of health services. The reach of their activities is unknown and their coverage is only in a limited number of small areas, rather than throughout the entire country. For this reason, this exercise focused exclusively on the HSAs as they are the main providers of basic health education and services at the community level.

Community Health Services in Malawi

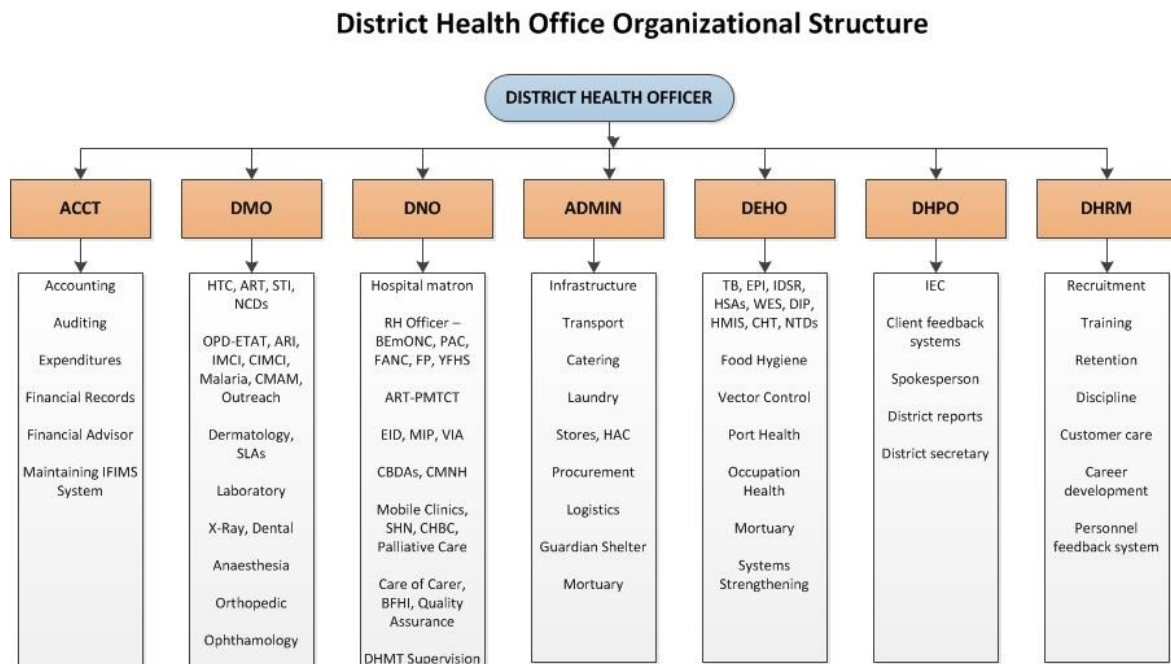
The structure of the community health services is provided in Table 2.

Table 1. Community Health Service levels roles and responsibilities

Health System Level	Responsible Officers or government department	Responsibilities
National	Department of Primary Health Care	Funding
		Policies
		Procurement of supplies & medicines
		Organize training of HSAs
District	<ul style="list-style-type: none"> • District Health Officer (DHO) • District Environmental Health Officer (DEHO) • Assistant DEHO • IMCI Coordinator 	Coordination with Village Councils (VCs) and Village Health Councils (VHCs)
		Receive monthly reports and submit to MOH
		Oversight of HSA work with communities
Health Centre	<ul style="list-style-type: none"> • Environmental Health Officer (EHO) • Health Centre Officer in Charge (OIC) • Senior HSA 	Treat patients and children referred to health center
		Antenatal, well-baby clinics, and immunization
		Support HSAs through supervision
		Receive monthly HSA reports
		Receive and hold drugs
Community	Health Surveillance Assistant (HSA)	Treat children under 5
		Treat adults
		Screening
		IEC/Campaigns
		Organize and work with VHCs
		Complete register and submit report monthly

Figure 1 illustrates the organizational structure of the District Health Office. HSAs report to the District Environmental Health Officer (DEHO) to the District Health Officer (DHO).

Figure 1. District Health Office Structure



Services Provided by HSAs

The HSAs are deployed from the health centers to provide services in the villages that are further than 5km from the health center. There is supposed to be one HSA per 1,000 population based on the total population of the district.

Services provided by the HSAs can be categorized as:

- Treatment of children under 5 years of age and adults
- Prevention
- Screening
- IEC and campaigns
- Working with Village Health Committees and
- Administration

The specific activities under each of these areas are shown in Figure 2.

Figure 2. Services provided by HSAs at community level

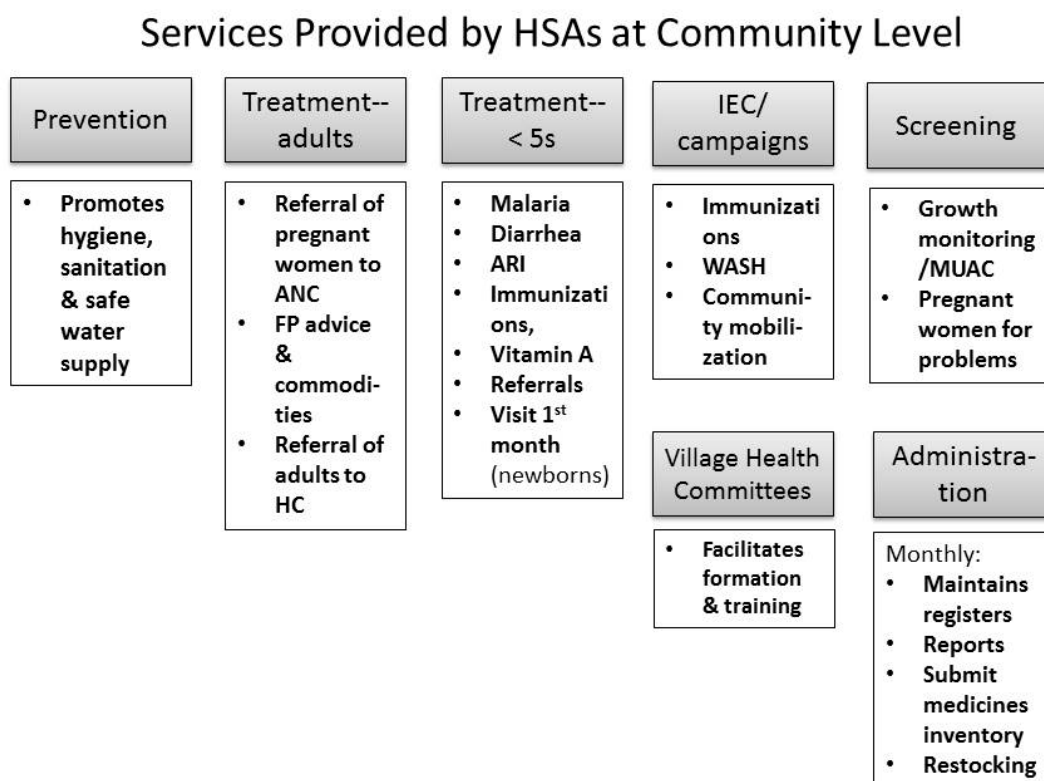


Table 3 defines services from the Essential Health Package (EHP) provided by HSAs according to the primary health care areas shown in Figure 2. HSAs are the main implementers of the EHP at the community level. Additionally, Annex 3 provides the MOH job description for the HSAs. The job description for the supervisors of HSAs, Senior HSAs, is provided in Annex 4. Since 2008, the emphasis has been on training HSAs in iCCM activities, which comprise most of the curative services provided by HSAs. The MOH hopes to expand the activities and treatment services provided by HSAs in the future to cover all activities shown both in the job description and in Figure 2, including additional health services provided to adults. Currently there are no specific plans or dates in place for when the provision of health services to adults will be added into the HSA package, or in what sequence they will be phased in.

Table 2. Community Health Services Provided by HSAs, by Program Area

Program Area	Service/Intervention
1. Reproductive Health / Family Planning	Birth control (pills, condoms, Injectable/ Depo Vera)
2. Maternal and newborn health	Antenatal Care
	Postnatal Care
	HSA Newborn Care kit (thermometer, timer, weighing scale and counselling card)
	Growth monitoring - MUAC
3. Child health	Vitamin A supplementation
	Diarrhea treatment/ORS and Zinc
	Acute Respiratory Infection (ARI)
	Malaria treatment/ Lumefantrine Artemether (LA)
	Fully Immunized Child - rotavirus, measles, Hib, DPT, pneumococcus, polio, BCG, pentavalent
	De-worming/tablets
	Eye treatment/Tetracycline ointment
	Co-Trimoxazole
	Paracetamol
	Growth monitoring - MUAC
4. Malaria	Malaria treatment/ Lumefantrine Artemether (LA)
5. TB	N/A
6. HIV/AIDS	HIV Counseling and Testing (HCT)
	Condom provision
7. Nutrition	Management of children with Severe Acute Malnutrition
8. Community mobilization, IEC/BCC, Campaigns	Polio, nutrition, immunization campaigns
	Community mobilization
	IEC/BCC (i.e. School health talks, Child health days)
9. Other	Water, Sanitation and Hygiene (WASH) interventions (i.e. Community talks, water chlorination, promoting hand Washing and clean birth practices)

Funding of Community Health Services

All HSAs are employed by the Government of Malawi and the salaries are paid for in full by the government. There are sometimes top-ups to salaries paid by church health centers under the CHAM, but these are not consistent. Supplies, initial equipment, and medicines are generally provided by the government. The MOH partners, including UNICEF, Global Fund, Save the Children, and other donors, provide much of the funding for the training, supplies, equipment and medicines, and vaccines utilized by the HSAs in the performance of their responsibilities. This funding is provided to the Ministry of Health, which then distributes the money to CHS programs accordingly. The sources of funding for various elements of training, posting and support to HSAs in provision of community health services are:

- Salaries of HSAs and senior HSAs: government
- Salaries of district and zonal officers: government
- Training of HSAs in pre-service: primarily partners (e.g. Global Fund Facility), small portion by government
- Training of HSAs in CCM: MOH partners
- Medicines and vaccines: MOH partners
- Supplies: MOH partners
- Initial Supplies for HSAs: Government and MOH partners

Details of funding levels could not be obtained at the time of this study. A 2010 report found that, of total iCCM costs, 14% was funded by government, 43% was funded by a mix of government and partners and 42% funded exclusively by donor partners.⁷

CHS Focus for the Future

Government policy mandates that iCCM will continue to be the focus of Malawi's community health services. At the end of 2015 only 46% (4,572 of 9,907) of the HSAs had received iCCM training, with the priority for the near term to have completed the training for the remaining HSAs. Additionally, there is a concerted effort by the MOH and its partners to make iCCM services available in all hard-to-reach-areas. As of the beginning of 2015, the MOH had identified 4,592 hard-to-reach areas that are beyond 8 kilometers (km) of a health center or hospital. They are also working to identify communities that are within 8km of a health facility but have problems with the terrain that impedes access.

The government, reportedly, has no plans to increase the establishment of HSAs due to financial constraints. Due to this decision, training in pre-service HSA training is focused on two groups: (1) HSAs who are currently providing education and community services but have never been trained formally as HSAs; and (2) HSAs who replace ones that stop working. Attrition of HSAs is low (less than 5%) so pre-service training for replacements is not significant.

⁷ Jarrah, Z., Lee, A., Wright, K., Schulkers K, and D. Collins 2013. *Costing of Integrated Community Case Management: Malawi*. Submitted to USAID by the TRAction Project: Management Sciences for Health.

Methodology

The data for the analysis was obtained over a three week period from several primary sources:

- Review of relevant documents of the MOH, journals, partner data, and reports and research,
- Discussion with MOH and partners at central level, and
- Field data collection in two districts with interviews of HSAs, Senior HSAs (supervisors), District Health Officers, District Medical Officers, District Environmental Health Officers, Assistant District Environmental Health Officers, District IMCI Coordinators and officers-in-charge, midwives and matrons at health centres.

Data was collected at the central, district and sub-district levels. The Ministry of Health and a selection of partners were interviewed in order to determine what level of support they provide for iCCM implementation. These interviews were done through face-to-face meetings, e-mail follow-up and telephone conversations seeking the information required by the tool being tested. An expert group meeting was held with representatives from the MOH, UNICEF, Save the Children, World Vision and other NGOs that are familiar with CHS's generally or directly supervise HSA programs. The meeting included introductions for central-level, key informants to the MSH team, a presentation of the wider UNICEF picture, as well as this specific assignment, and a discussion on CHS in the past, present and the vision for the future. The meeting served to clarify norms for the HSA package of services. The field visits to districts by the team gathered HSA-specific information in more detail and confirmed normative findings, such as the range of services provided by HSAs, HSA time spent in providing various services, available incentives, work conditions, supervision, support of communities, regularity of supplies and medicines re-stocking.

Ntcheu and Dedza Districts were chosen for the field data collection at the suggestion of the MOH IMCI unit and UNICEF. These districts are among the priority RMNCH districts that receive support from the WHO's Rapid Access Expansion (RACE) Project (Ntcheu) and were accessible from Lilongwe. HSAs were interviewed in a group setting at two health centres each in both Ntcheu and Dedza. In each district, the selected health centres comprised one government facility and one facility operated by a CHAM member, in order to ensure representation of both. In each district, the team met with the DHO or DMO, HMIS Officer and relevant Program Coordinators. At each facility, the team met with the Officer in Charge, HSA Supervisor, and the HSAs. In total, interviews were conducted with 23 HSAs and 5 supervisors at 4 health centres. Structured questionnaires were used for the interviews and can be found in the Community Health Planning and Costing Tool Guidelines.

The data was analyzed using the new planning and costing tool. The Community Health Planning and Costing Tool is a spreadsheet-based tool that helps planners and managers to determine the costs and finances of comprehensive community health services packages. The tool allows users to calculate the costs and financing elements linked to all aspects of the CHS packages, including service delivery, training, supervision, and management from community to central levels. It can also

include the cost of removing bottlenecks if those figures have been calculated. Additionally, the tool can produce a set of figures that can be entered into the Lives saved Tool (LiST) to calculate the impact of increasing numbers of key MNCH services.

Limitations

This analysis was conducted primarily to pilot the new methodology and tool it was anticipated that the model and results would be useful for the Malawian government, UNICEF and other partners. However, there are several limitations that need to be taken into account when reviewing the results. These are mainly due to the lack of time and resources to collect and analyze more data. The main limitations are as follows:

- Data were only collected for two districts and interviews were only conducted with 23 HSAs and 5 supervisors at 4 health centres. This sample size was sufficient for piloting the approach and tool but would not be sufficient for providing a comprehensive analysis of community health services in Malawi.
- The two sampled districts were close to Lilongwe and were not representative of the country as a whole.
- The prices for medicines and supplies were taken from international sources since we did not have access to local prices at the time of the study.
- The costing methodology used in the tool calculates the cost of medicines, supplies, and commodities in the baseline year, multiplying the reported numbers of each service provided by the standard unit cost of the medicines, supplies or commodities for that service. This assumes that the numbers of services reported were only reported if the full service, including the medicines, supplies and/or commodities, was provided. If that was not the case then the cost of medicines, supplies and commodities in that year is more than was actually spent.
- We were unable to obtain actual and projected contributions of funds and/or in kind from donors and so we were unable to conduct a meaningful analysis of financing sources.
- Reducing the numbers of malaria and pneumonia treatments and BCG vaccinations actually reported to 100% of the expected utilization would have underestimated the total cost if the reported figures were correct.
- The quality of the DHIS data on community health services is a recognized issue in Malawi⁸. In Ntcheu and Dedza, facility reporting rates in the DHIS2 were high at 94% and 97%, respectively, and routine HSA reporting rates were 92% for Ntcheu and 100% for Dedza. However, data quality issues include lack of completeness, timeliness, integrity and accuracy. A recent article in *Health Policy and Planning*⁹ shares results from a data quality assessment of the Rapid Access Expansion (RACE) Programme in Malawi which focused on

⁸ The team participated in a CCM Technical Working Group meeting while in country and the issue of data quality as it relates to CHS was discussed.

⁹ Yourkavitch et al. "How Do We Know? An assessment of integrated community case management data quality in four districts in Malawi". *Health Policy and Planning*, 2016.

five districts, including Ntcheu and Dedza. Although the assessment indicates a strong reporting system, it is recognized that data quality issues persist.

Findings

The results of the analysis are outlined in the following tables and descriptions. They are presented first for Ntcheu and then for Dedza and lastly, compared across the two districts.

The national package of services was used as the basis for the scenarios for both districts for 2016 – 2018 (Annex 6, Table 4).

The analysis was conducted using estimated resources used in 2015 and with scenarios for each year between 2016 and 2025.

- 2015: Utilization rate at baseline of all services in the package (reported actual number of services in 2015 divided by the expected number of services in 2015);
- 2016-2025: Utilization rate was increased by 5% per year for all services in the package;
- For all services with reported 100% or more utilization rate at baseline, the rate for 2015 was set at 100% and no increase was calculated for following years. Also once a service in the package reached 100% utilization level, no further increase was calculated.

For the modeling, a 5% coverage increase was used per year from 2016-2025, however, the utilization rate could be set at any increased rate, with population growth being the only variance affecting the rate. The rates used do not represent targets set by the government or partners and were selected by the piloting team merely to test the tool.

The estimates of actual resources for each year are based on three main components:

- Costs related to CHWs and supervisors training, relevant equipment, meetings and payments, which vary with the numbers of CHWs and supervisors¹⁰;
- Costs related to medicines, supplies and commodities, which vary with the numbers of services;
- Costs related to management and management equipment and other costs which are treated as fixed.

Since each district is believed to be fully covered by community health services, it was assumed that for the modeling that no geographic scaling-up is needed, and so the increases in coverage only represent expanded utilization of the existing HSAs.

¹⁰ Since the numbers of CHWs and supervisors were held constant over the years there was actually no variation from year to year based on such numbers.

Ntcheu District

In the baseline year of 2015, Ntcheu District had a population of 558,942 (Annex 6, Table 5). Of this total, 184,451 (33%) were considered to be beyond 5 kilometers¹¹ from a health facility. This “hard-to-reach” population is determined the catchment population for the HSAs by the MOH. Each HSA is supposed to be based at a village clinic, and there were 308 village clinics in the district so we assumed there were 308 HSAs

According to the DHIS, HSA’s provided a reported total of 221,294 services in 2015. Figures were reported in the system for 14 of the 43 services laid out in the national package of services (Annex 6, Table 6). It is unknown if other services were provided but not reported but this seems likely (See Limitations). There were some anomalies between the actual and numbers of services reported in the DHIS2 system and the expected numbers of services calculated using the population figures and the expected number of services per person, In particular, the numbers of reported pneumonia and malaria treatments was higher than the expected and so was the number of BCG vaccinations. We did not have the time to investigate these differences which could be due to people from other districts or children over 5 years old using these services, presumptive treatment for malaria or pneumonia, or incorrect population figures or faulty recording and/or reporting in the DHIS. For the purposes of the modeling, the actual 2015 utilization figures were set at 100% of the expected utilization for those three interventions. This resulted in an adjusted total of 187,150 services in 2015.

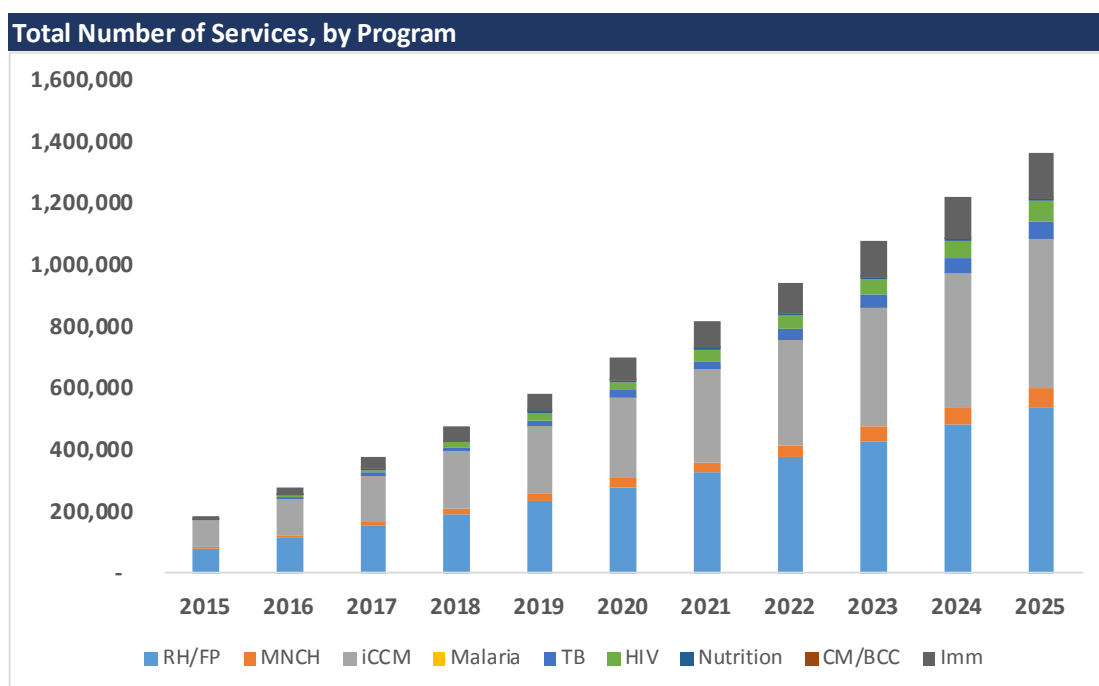
In 2015, the majority of the services reported were for iCCM, Family Planning, and BCG immunizations (Note: iCCM services appear to be high because iCCM assessments, RDTs and treatments are counted as separate services).

The figures for 2016-2025 represent a coverage increase of 5% per year of the total expected utilization of services based on the target population and the normative incidence / intervention rates. These increases were capped at 100% of the expected utilization levels. These annual increments result in a substantial increase from the current numbers of services, with 1,365,796 expected services by 2025 (Figure 3 and Annex 6, Table 7). While iCCM and Family Planning services would still represent the majority of the services in 2025, there would also be significant numbers of immunizations and HIV/AIDS and TB services.

The programmatic breakdown of services emphasizes the dominance of reproductive health (which includes family planning), iCCM, and immunizations, with 44%, 46% and 7% of all services, respectively, in 2015 (Figure 3 and Annex 6, Table 7). As noted above iCCM services are artificially high due to the way in which services are recorded. Without this, the numbers of TB and HIV/AIDS services would be relatively more significant and immunization services would be much higher proportion of total services.

¹¹ The GIS study conducted by UNICEF used the proposed 5 km radius instead of the current 8 km radius.

Figure 3. Ntcheu District – Total Number of Services, by Program



In this district there were 308 HSAs in 2015. According to the policy there should be 1 HSA for every 1,000 people in the total population, which would mean that 559 HSAs are needed for the total population of 558,942. However, if only 184,451 of these people live further than 5 km from a health centre it would mean that a minimum of 184 HSAs would be needed. It would, therefore, seem that there may be enough HSAs in the district.

Based on the numbers reported in the DHIS, and taking into account that we reduced the numbers of some services to 100% of the expected need, the HSAs would have only spent an average of 9% of their time providing services in 2015.¹² However, it is possible that this figure may be higher if, as appears likely, some of their services were not recorded in the DHIS. If the utilization of services increases in line with the modeling, they would need to spend 77% of their time providing the package of services by 2025 (Annex 6, Table 7).

On average each Senior HSA in Ntcheu supervises 8.6 HSAs (Annex 6, Table 7). They do not provide services themselves.

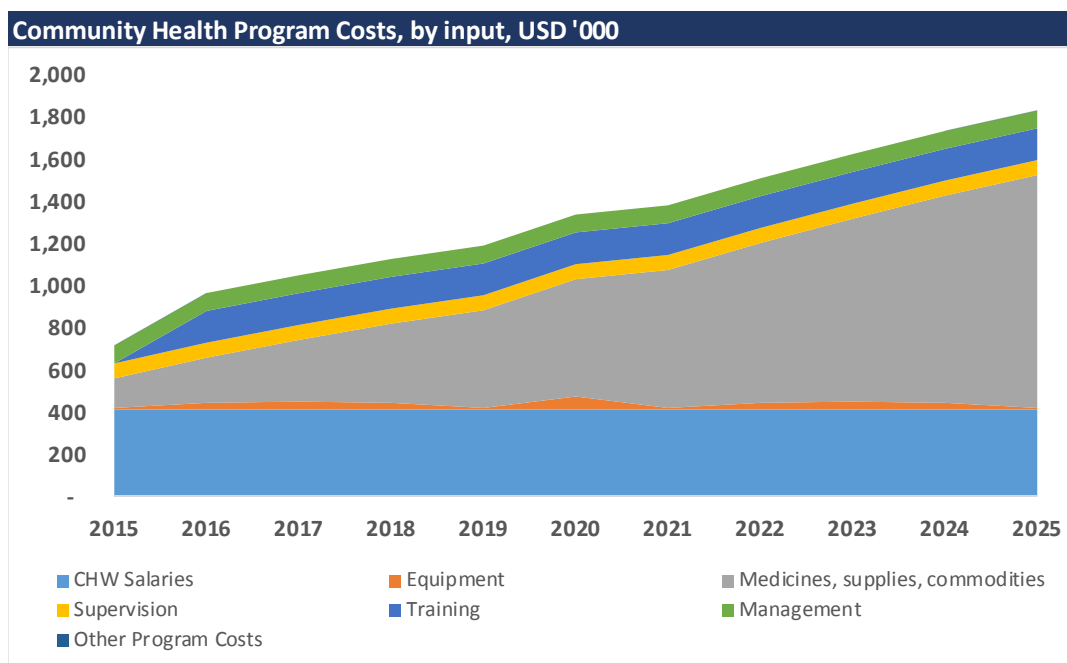
¹² This is after reducing the malaria and pneumonia treatments and BCG immunizations to 100% of expected need. Without that reduction the apparent utilization of HSA services would be higher.

All services provided by HSAs are categorized as promotional, preventative, or curative. At baseline, 54% of services provided by HSAs were preventative and 36% were curative. By 2025, with projected coverage increases, 72% of services will be preventative and 28% curative (Figure 4 and Annex 6, Table 7). Note: Each service provided by an HSA is counted as “one” interaction, regardless of whether or not it is one immunization, one iCCM treatment, or one promotional health talk.

The total cost of the amount of resources used for the services reported in 2015 was USD 715,443, which comes to USD 3.88 per capita (Annex 6, Table 8). Increasing the coverage by 5% per year, taking into account capping at 100% for some services, would result in a total cost of needed resources of USD 1.830 million by 2025 (USD 7.34 per capita).¹³

The main cost element in 2015 was the salaries of the HSAs (57.6%) followed by medicines and supplies (19.6%). By 2025, the HSA salaries would reduce to 22.5%, but the cost of medicines and supplies would increase from 19.6% of total cost in 2015 to 60.3% in 2025 (Figure 4 and Annex 6, Table 8). This is because the modeled scenario assumes increases in numbers of services but no increases in the numbers of HSAs, supervisors or managers. This means that the increases in costs are mainly for medicines, supplies and commodities, which are variable costs. Vaccines and family planning commodities represent the bulk of the increased cost of medicines, supplies and commodities.

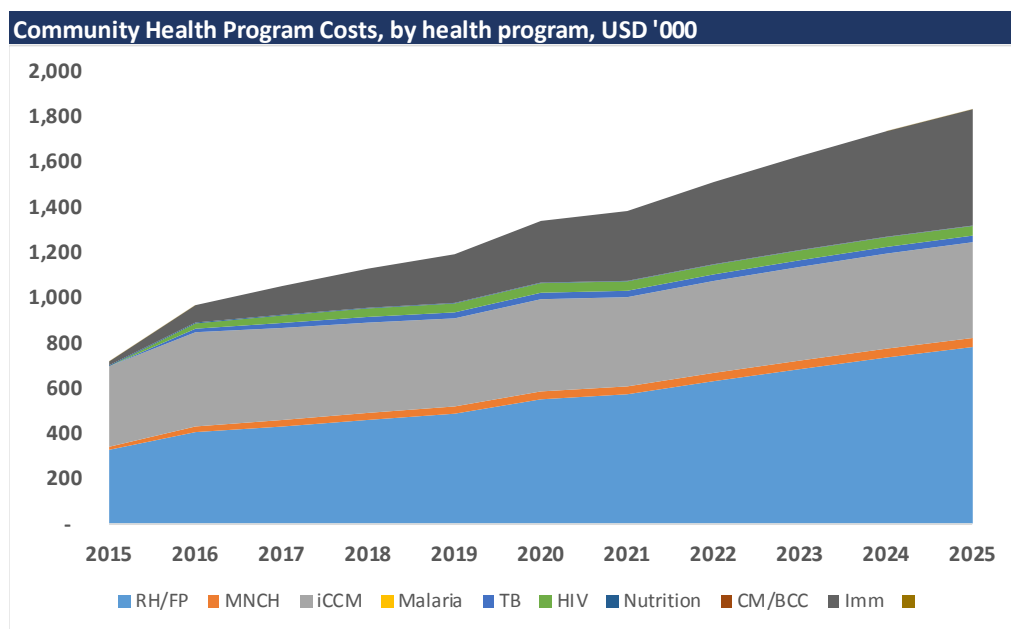
Figure 4. Ntcheu District-Community Health Program Recurrent Costs, by input, USD, 2015-25



¹³ Note that the tool does not show the average cost per service across all services. This is because that figure is greatly affected by the mix of services and can lead to incorrect conclusions regarding efficiency.

In 2015 the highest cost programs were iCCM (49.7%) and Reproductive Health (45.5%), but by 2025 Reproductive Health would still be the highest cost program (42.6%) but Immunizations would be second highest (28.1%) (Figure 5 and Annex 6, Table 8).

Figure 5. Ntcheu District-Community Health Program Recurrent Costs, by health program, USD, 2015-25



We were unable to quantify the actual and projected funding commitments of the government and donors so we could not conduct that analysis.

Dedza District

In 2015, the population for Dedza district was 735,411 (Annex 6, Table 9). Of this total population, 242,686 (33%) were considered to be beyond 5km from a health facility and were, thus, determined to be the catchment population for the HSAs. There were 439 village clinics in the district (each HSA is supposed to be based at a village clinic).

According to the DHIS, HSA's provided a total of 411,548 services in 2015. Figures were reported in the system for 12 of the 43 services laid out in the national package of services (Annex 6, Table 10). It is unknown if other services were provided but not reported (See Limitations). There were some anomalies between the actual and numbers of services reported in the DHIS2 system and the expected numbers of services calculated using the population figures and the expected number of services per person, In particular, the numbers of reported pneumonia and malaria treatments was higher than the expected and so was the number of BCG vaccinations. We did not have the time to investigate these differences which could be due to people from other districts or children over 5 years old using these services, presumptive treatment for malaria or pneumonia, or incorrect population figures or faulty recording and/or reporting in the DHIS. For the purposes of the

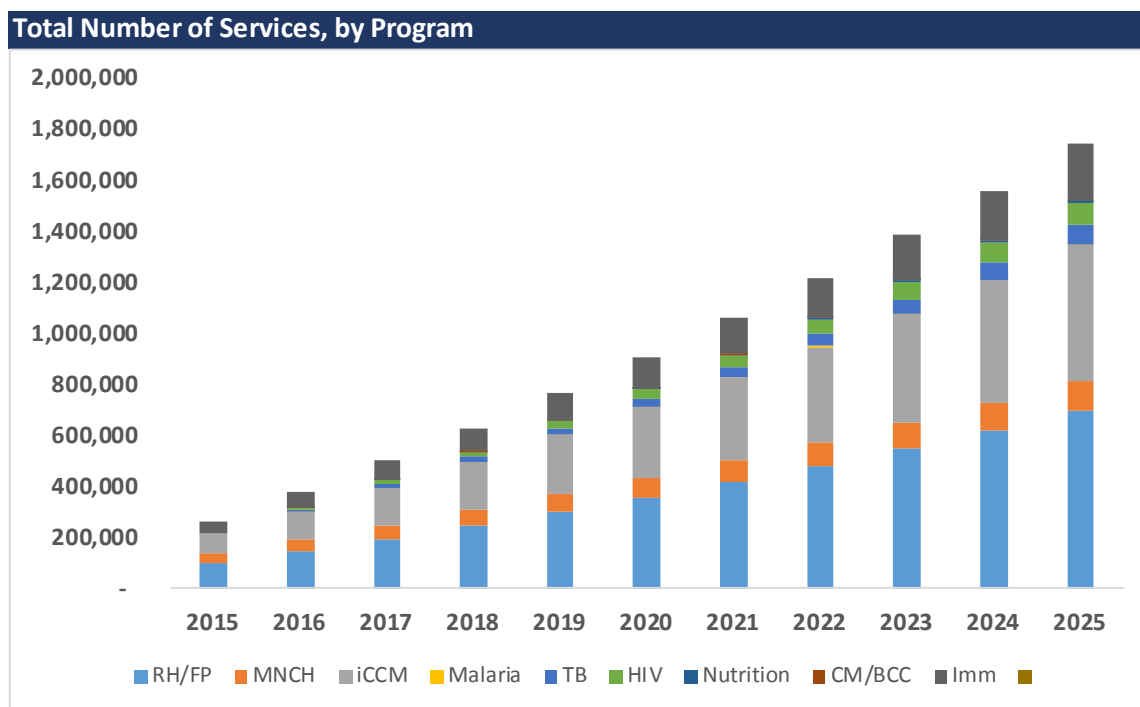
modeling, the actual 2015 utilization figures were set at 100% of the expected utilization for those three interventions. This resulted in an adjusted total of 260,057 services in 2015.

In 2015 the majority of the services reported were for iCCM and Family Planning plus BCG immunizations (Figure 6 and Annex 6, Table 10). Note: iCCM services appear to be high because iCCM assessments, RDTs and treatments are counted as separate services.

The figures for 2016-2025 represent a coverage increase of 5% per year of the total expected utilization of services based on the target population and the normative incidence / intervention rates. These increases were capped at 100% of the expected utilization levels. These annual increments would result in a substantial increase from the current numbers of services, with 1,740,379 expected services by 2025. While iCCM and Family Planning services would still represent the majority of the services in 2025, there would also be significant numbers of immunizations and HIV/AIDS and TB services.

The programmatic breakdown of services emphasizes the dominance of Reproductive Health/Family Planning and iCCM services, which represented 38% and 29% of services in 2015, respectively (Figure 6). These services would still dominate in 2025, with 41% and 31% of services, respectively, in 2025. As noted above iCCM services are artificially high due to the way in which services are recorded. Without this, the numbers of TB and HIV/AIDS services would be relatively more significant and immunization services would be much higher proportion of total services.

Figure 6. Dedza District – Total Number of Services, by Program, 2015-2025



There was a total of 439 HSAs in the district in 2015. According to the policy there should be 1 HSA for every 1,000 people in the total population, which would mean that 735 HSAs are needed for the total population of 735,411. However, if only 242,686 of these people live further than 5 km from a health centre it would mean that a minimum of 242 HSAs would be needed. Since there are actually 439 HSAs it would, therefore, seem that there may be enough HSAs in the district.

Based on the numbers of services reported in the DHIS, and taking into account that we reduced the numbers of some services to 100% of expected utilization, the HSAs would have only spent an average of 8% of their time providing services in 2015.¹⁴ However, it is possible that this figure may be higher if, as seems likely, some of their services were not recorded in the DHIS. If the numbers of services increase as portrayed in the model, they would need to spend 69% of their time providing the package of services by 2025. On average each Senior HSA supervises 12.9 HSAs (Annex 6, Table 11).

All services provided by HSAs are categorized as promotional, preventative, or curative. At baseline, 71% of services provided by HSAs are preventative and 29% are curative. By 2025, with projected coverage increases, 76% of services will be preventative and 23% curative (Annex 6, Table 11). Note: Each service provided by an HAS is counted as “one” interaction, regardless of whether or not it is one immunization, one iCCM treatment, or one promotional health talk.

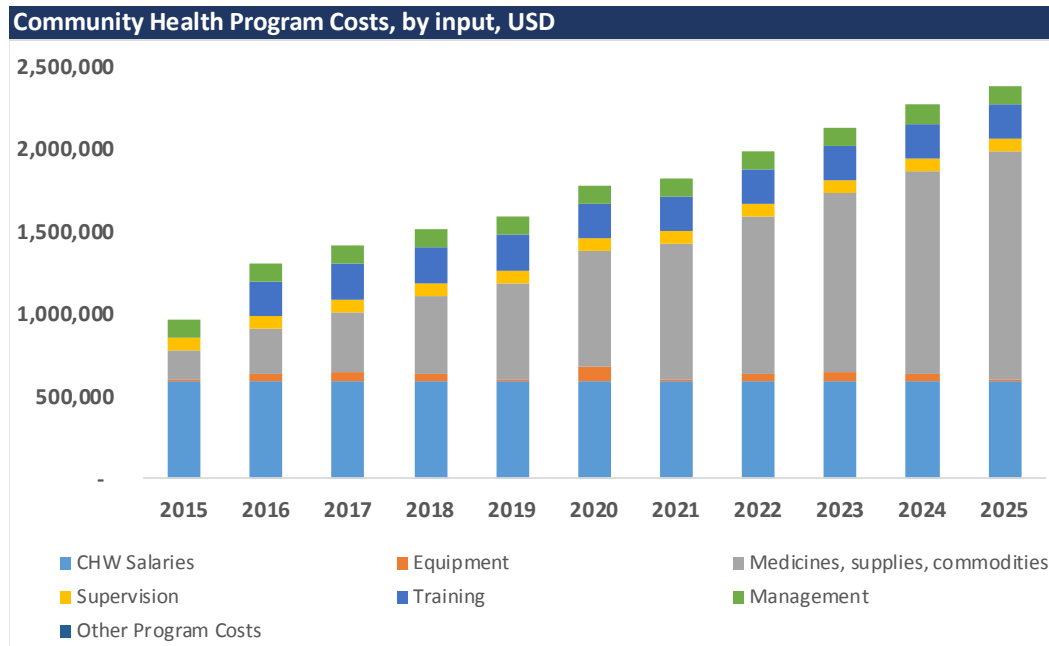
The total cost of the amount of resources used for the services reported in 2015 was USD 962,298, which comes to 3.97 per capita (Annex 6, Table 12). Increasing the coverage by 5% per year, taking into account capping at 100% for some services, would result in a total cost of needed resources to USD 2.38 million by 2025 (USD 7.25 per capita).¹⁵

The main cost element in 2015 was the salaries of the HSAs (61%) followed by medicines and supplies (18.4%). By 2025, HSA salaries would reduce to 24.7%, but the cost of medicines and supplies would increase from 18.4% of total cost in 2015 to 58.1% (Figure 7 and Annex 6, Table 12). This is because the modeled scenario assumes increases in numbers of services but no increases in the numbers of HSAs, supervisors or managers. This means that the increases in costs are mainly for medicines, supplies and commodities, which are variable costs. Vaccines and family planning commodities represent the bulk of the increased cost of medicines, supplies and commodities. (Annex 6, Table 12).

¹⁴ This is after reducing the malaria and pneumonia treatments and BCG immunizations to 100% of expected need. Without that reduction the apparent utilization of HSA services would be higher.

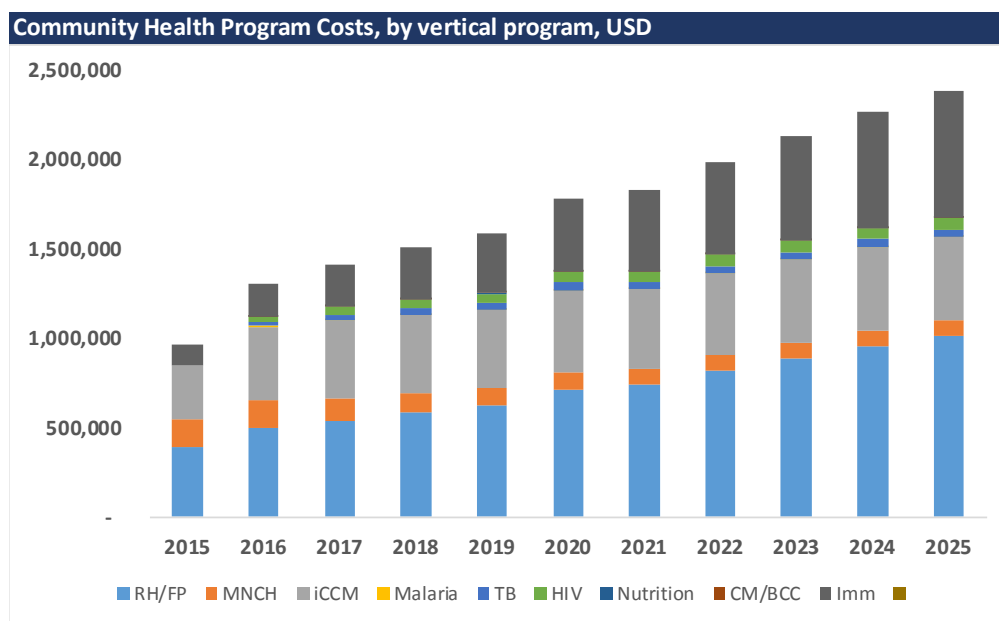
¹⁵ Note that the tool does not show the average cost per service across all services. This is because that figure is greatly affected by the mix of services and can lead to incorrect conclusions regarding efficiency.

Figure 7. Dedza District – Community Health Program Recurrent Costs, by input, USD, 2015-25



In 2015 the highest cost programs were iCCM (32%) and Reproductive Health (40%), but by 2025 Reproductive Health would still be the highest cost program (42.7%) with Immunizations as the second highest (29.7%) (Figure 8) (Annex 6, Table 12).

Figure 8. Dedza District – Community Health Program Recurrent Costs, by health program, USD, 2015-25



We were unable to quantify the actual and projected funding commitments of the government and donors so we could not conduct that analysis.

Bottlenecks to Service Delivery

The persons interviewed for the study indicated that community health services have improved over the past few years. Questions on bottlenecks related to supply and demand were asked at all levels of the system – national, district, facility and community.

The results of the bottleneck analysis conducted for the two districts are described below by determinant of coverage.¹⁶

Initial utilization

Initial utilization can be measured by comparing the numbers of initial contacts (eg first visits) with the expected utilization levels for those services. According to the data from the DHIS2, the initial utilization of community health services appears to be low in most cases, with some services not utilized at all and some others with only low utilization levels. Exceptions were the numbers of malaria and pneumonia treatments and BCG immunizations, which were reportedly higher than the expected need.

¹⁶ This bottleneck analysis aligns with UNICEF’s approach to use an adapted Tanahashi model used to structure the analysis of bottlenecks. Tanahashi T. Health services coverage and its evaluation. Bulletin of the World Health Organisation 1978; 56:295–303.

Continuous utilization

Continuous utilization is measured when a service requires a specific follow up intervention, such as a positive RDT requiring malaria treatment. This is only a relevant measure for certain services. We were not able to measure this due to the challenges of the DHIS2.

Effective coverage

This requires data related to the outcome of the intervention, such as a successful delivery at a facility following ANC services provided by a HSA. This is also a feasible indicator for certain services and we were unable to measure it for the two districts.

Geographical access

Community health services should be available to all people living beyond 5 km from a health facility but the majority of the HSAs are based at the health centres and reportedly live outside the communities that they serve. In addition, many of them do not have functioning bicycles which they need to access those communities. Further research would be needed to determine how many households do not have adequate access to HSA services. The impact of this problem would be felt on timely utilization of services, such as a mother's ability to access an HSA within 24 hours for a child with fever. This could be one of the reasons for the apparent under-utilization of HSA services.

Human resources

All HSAs should have the competency to provide all the services in the package. However, although all HSAs receive 12 weeks of pre-service training, many do not receive sufficient in-service training to update and/or acquire new skills required to implement appropriate interventions. HSAs tend to be specialized in iCCM, for example, and not trained to also offer HIV Counseling and Testing. As a result many HSAs are not able to provide the full package of services and/or or quality of care may be sub-optimal.

Commodities

In order to deliver an intervention at adequate coverage levels, there can be no period of stock outs. In the two districts, stock outs appear to have been prevented, partly through the use of a mobile application (i.e. C-Stock). No bottlenecks were identified in terms of supplies of medicines and commodities.

Economic access

A patient's financial situation can also decrease coverage of critical interventions, e.g. the presence of user fees which can help to explain low utilization figures. No bottlenecks were identified in terms of economic access.

A summary of the analysis is provided in Table 13.

Table 3. Summary of determinants and bottlenecks identified

Type	Bottleneck findings
------	---------------------

Initial utilization	Services appear to be under-utilized
Continuous utilization	Could not be measured due to lack of time and resources
Effective coverage	Could not be measured due to lack of time and resources
Geographic access	Bottleneck identified
Human resources	Bottleneck identified
Commodities	No bottleneck identified
Economic access	No bottleneck identified

The bottleneck analysis was only intended to identify the bottlenecks and, if possible, to quantify them (the latter was not possible in the time available). An analysis of causality, the identification and costing of possible solutions and the selection of a solution are a separate process conducted outside the planning and costing analysis. However, when a solution is determined the cost of that solution should be included in the cost analysis.

It is important to note that in Malawi, the UNICEF-funded District Health Performance Improvement (DHPI) approach has identified bottlenecks through systematic data collection and analysis. At the time of pilot, Ntcheu and Dedza had not yet completed their analysis and plans. As part of DHPI's planning process, districts would go through a causality analysis to identify solutions which would then be costed.

Discussion

The results of this piloting show the costs and necessary financing that would be needed to expand the utilization of community health services in Malawi. In the models developed for the two districts we assumed that there would be no need to increase the numbers of HSAs, supervisors or management costs and that other supervision costs would also remain the same. The only costs that we assumed would increase were for training of replacement HSAs, which was not included in the baseline year costing, and the cost of medicines, supplies and commodities, which would increase directly with the numbers of services that use them. The cost of removing the bottlenecks was not identified and was, therefore, not included.

The cost of replacing HSAs who stop working is incremental but necessary to prevent the community health system from slowly collapsing. And the bottleneck costs are also incremental but necessary to allow the system to expand.

The "true" incremental costs in the models relate to the medicines, supplies and commodities. But these may not, in fact, be incremental costs. If the expanded community health services will replace services provided at facilities then there should be no additional cost of medicines, supplies and commodities, since they are currently being used at the facilities. So the only true incremental costs would be those related to services not currently obtained at the health facilities and these should have a significant positive impact on morbidity and mortality and should result in a reduction of the

economic burden of households in terms of out-of-pocket costs, productivity losses due to illness and productivity losses due to premature mortality.

If the medicines, supplies and commodities used in the community health services in these two districts are offset by reductions of the same quantity at the health facility, then the only change is the shifting of the cost and budget from the facility to CHS. And a reduction in the number of services at the health facility will allow staff and equipment to be used to expand other necessary services that cannot be provided at the community level.

Also if the medicines, supplies and commodities are replacing those used at a health facility – the only additional costs relate to the cost of transporting them to the community, which is likely to be minimal and offset anyway by the saving to the households.

Conclusions

The analysis was extremely useful in terms of piloting the methodology and tool and useful lessons were learned which have been incorporated in the final version.

The exercise also provided an interesting analysis of the cost of community health services in Malawi. While, as stated above, the time and resources available for the study were too limited to produce results that are definitive or that represent the country as a whole, some of the findings are worthy of comment. These comments are mainly applicable to the two districts.

- Based on the utilization data reported in the DHIS and iCCM data from other sources it appears that HSA services were under-utilized in 2015, only using 9% of their available time in Ntcheu and 8% in Dedza. It also appears that the HSAs are only providing 14 of the package of 43 services in Ntcheu and 12 of the 43 in Dedza. However, these findings are based on the completeness and accuracy of the DHIS data, which appears questionable.
- Most of the services provided are family planning and iCCM and these are provided in reasonable quantities, although in some cases the figures actually seem quite high.
- If the full package of services is provided and utilization is increased by 5% per year, it is projected that they would be occupied with these services for 77% of their time by 2025 in Ntcheu and for 69% of their time in Dedza.
- However, unless the identified geographic access and human resource bottlenecks are resolved, they are likely to impede the expansion of utilization the full package of services to populations in harder-to-reach areas and to improve or maintain the quality of services.

These constraints could not be quantified and solutions were not explored but this is worthy of further study.

- The average cost per capita in 2015 for the two districts was USD 3.88 in Ntcheu and USD 3.97 in Dedza. This is relatively low because of the under-utilization of the package of services. With the projected increases in utilization, the cost per capita would increase to USD 7.16 in Ntcheu and USD 7.25 in Dedza
- In 2015 the programs with the highest costs were iCCM and Reproductive Health/ Family Planning in Ntcheu and Dedza. With the projected increases in utilization, the programs with the highest costs in 2025 would be Reproductive Health / Family Planning and Immunizations in both districts, with iCCM third. In 2015 most of the costs in the two districts went on HSA salaries. With the projected increases in utilization, most of the costs would be for medicines, supplies and commodities by 2025. This assumes that there would be no need to increase the numbers of HSAs.

As noted in the discussion section, the costs of expanding community health services in the two districts relate mainly to increases in medicines, supplies and commodities. These costs may not all be incremental, since, to some degree they may be replacing medicines, supplies and commodities that are currently provided at facilities. If that is the case then the expansion of services may be reducing health system unit costs and household costs and allowing for a more cost effective use of health facilities.

Annexes

Annex 1. References

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Annex 2. Key Informants

MOH
Dr Storn Kabuluzi (Director of Preventive Health)
Precious Phiri (National PHC Coordinator, Department of Preventive Health Services)
Humphreys Nsona (MOH, Head of IMCI program)
Newton Temani (MOH, IMCI program)
Emmanuel Chimbalanga, Clinical Officer, MOH IMCI (seconded from Save the Children)

IMCI, Malaria, EPI, TB, HIV, Department coordinates HSAs and relevant departments
MOH Partners
Save the Children: David Melody, Director of Health Tiyese Chimuna, Senior Advisor Child Health
John Snow International (JSI): Phillip Kamutenga, Country Director
World Vision: Alexander Chilronga
Population Services International (PSI) – Felix Chinguwo
UNICEF: Kyaw Myint Aung, Chief of Health Indrani Chakma, Health Specialist Texas Zamasiya, Health Specialist

Annex 3. Health Surveillance Assistant Job Description

Job Title: Health Surveillance Assistant

Qualification: Malawi School Certificate of Education or Junior Certificate and successful Completion of Ministry of Health approved health surveillance assistants training programme.

Grade: M

Description: The Health Surveillance Assistants is a community based health worker who promotes Primary Health care interventions at the community level. He/she also serves as a linkage between health facilities and the community.

Relationships: The HSA works directly with village leaders, Village Health Committees, and other community structures, also works with other extension workers in providing promotive, preventive, and to a limited extent, curative and rehabilitative services in the assigned catchment area.

Responsible to: The Assistant Environmental Health Officer (AEHO) in an assigned catchment area. In his/her absence, the HSA is responsible to enrolled community health nurse, in-charge of the health facility or a senior HSA.

Place of deployment: In community setting according to an assigned catchment area.

Functions / Duties:

- a) Conducts Community Assessment within an assigned catchment area, and facilitates in solving health and health-related problems.
- b) Facilitates the promotion of hygiene and sanitation by conducting regular village inspection and giving feedback to the community.
- c) Facilitates the formation and training of Village Health Committees.
- d) Supervises Village Health Committees and other available community health support groups.
- e) Promotes Information, Education and Communication to individuals, families and communities on health maintenance.
- f) Promotes and supports delivery of Tb and HIV and AIDS services at the community level
- g) Promotes and participates in the delivery of Accelerated Child Survival and Development (ACSD) of under-five children as outlined below:
 - Environmental hygiene practices
 - Safe water supply
 - Food Hygiene practices
 - Good Nutrition practices
 - Antenatal Care including PMTCT
 - Infant and young child feeding.
 - Vector and Vermin Control
 - Family health
 - Community Home-based and palliative care

- Priority Health Problems i.e. Malaria, HIV and AIDS, Anaemia, Diarrhoea, STIs, Malnutrition, and ARI.
- h) Provides immunizations, Vit. A, de-worming drugs and conducts growth monitoring of under-five children and give T.T.V. to women of child bearing age.
 - i) Conducts Disease Surveillance and response on disease outbreaks.
 - j) Facilitates provision of safe water supply, chlorination of water at household level, and monitors quality of water.
 - k) Conducts village clinics on specified days for the treatment of minor ailments, and referring of severe cases to the nearest health facilities.
 - l) Maintains equipment utilised on the job.
 - m) Records data in relevant registers and instruments i.e. Village Health Register; HMIS registers and shares the information to relevant stakeholders within his/her catchment areas.
 - n) Conducts tracing, monitoring of treatment and follow-up of patients and clients.
 - o) Inspects public facilities such as schools, markets, water sources, public toilets, health facilities, restaurants for maintenance of hygiene.
 - p) Writes monthly work plans and reports.
 - q) Motivates communities about RH and provides selected RH services.
 - r) Promotes the control of vector and vermin at household level.

Performs any other duties deemed reasonable for the post by the immediate supervisor.

Annex 4. Senior Health Surveillance Assistant Job Description

POST: Senior Health Surveillance Assistant

Job Title: Senior Health Surveillance Assistant

Grade: L

Description: The senior health surveillance assistant, as a community based health worker, provides supportive supervision to HSAs (M) within an assigned area.

Relationships: The senior health surveillance assistant works directly with the HSAs and village/community leaders in finding solutions for the identified health problems.

Responsible to: Assistant Environmental Health Officer in an assigned catchment area. In his/her absence enrolled community health nurses or in-charge of a health facility. (This area, to be revisited in terms of Managerial and Technical).

Qualifications: Junior certificate or Malawi School Certificate of Education and Completion of Ministry of Health approved health surveillance assistants training programme with a minimum of four years' experience at grade M.

Place of deployment: In community setting according to assigned catchment area.

Duties:

- ◇ Supervises and evaluates activities of health surveillance assistants
- ◇ He organizes and supports the community through HSAs in matters pertaining to health programmes in the assigned catchment area.
- ◇ Participates in health promotion activities, e.g. open day shows, clean village competitions, advocacy meetings etc.
- ◇ Participates in the implementation of the activities set by the health facility in administering community essential health care package.
- ◇ Collaborates with stakeholders in providing health and health-related interventions in the assigned catchment area.
- ◇ Compiles data from all HSAs within his/her area of jurisdiction and report to the Assistant Environmental Health Officer.
- ◇ Performs any other duties deemed reasonable for the post by the immediate supervisor.

Annex 5. Tables

Table 4. National package of community health services, related programs, target population and normative numbers of episodes/interventions per year

Service / Intervention	Program	Target population	Incidence Rate (episodes/interventions per target population per year)	CHW Category providing service
Male condom distribution	Reproductive Health / Family Planning	Male Adult	4	HSA
Oral Contraceptives	Reproductive Health / Family Planning	Female Rep Age	4	HSA
Depo Provera Injections	Reproductive Health / Family Planning	Female Rep Age	4	HSA
Family Planning Counseling	Reproductive Health / Family Planning	Fem + Male Rep Age	1	HSA
ANC Visit 1	Maternal, Newborn and Child Health	Pregnant Women	1	HSA
ANC Visit 2	Maternal, Newborn and Child Health	Pregnant Women	1	HSA
ANC Visit 3	Maternal, Newborn and Child Health	Pregnant Women	1	HSA
Referral of pregnant women with problematic preg	Maternal, Newborn and Child Health	Pregnant Women	10%	HSA
PNC Visit 1	Maternal, Newborn and Child Health	Postpartum Women	1	HSA
PNC Visit 2	Maternal, Newborn and Child Health	Postpartum Women	1	HSA
PNC Visit 3	Maternal, Newborn and Child Health	Postpartum Women	1	HSA
Referral of unhealthy baby to health center	Maternal, Newborn and Child Health	Postpartum Women	10%	HSA
Monitoring of breathing	Maternal, Newborn and Child Health	Newborns	10%	HSA
iCCM assessment	iCCM	Children <5	6	HSA
Referral of children requiring health center manage	iCCM	Children <5	0.6	HSA
Vitamin A Supplementation	Maternal, Newborn and Child Health	Children <5	1	HSA
Diarrhea Treatment	iCCM	Children <5	4.5	HSA
Pneumonia treatment	iCCM	Children <5	0.28	HSA
Growth Monitoring	iCCM	Children <5	4	HSA
Rotavirus Immunization	Immunization	Children <1	3	HSA
Measles Immunization	Immunization	Children <1	2	HSA
WASH Messaging and Providing HTH	Community Mobilization / BCC / Messaging	Village Clinic	2	HSA
DPT Immunization	Immunization	Children <1	5	HSA
Pneumococcus Immunization	Immunization	Children <1	1	HSA
Polio Immunization	Immunization	Children <1	4	HSA
Nutrition Campaigns/Messaging	Nutrition	Village Clinic	2	HSA
Neonatal Conjunctivitis Prevention	Maternal, Newborn and Child Health	Newborns	1	HSA
Malaria /fever diagnosis (RDT)	iCCM	Children <5	0.80	HSA
Malaria treatment	iCCM	Children <5	0.56	HSA
Antenatal Malaria treatment referral	Maternal, Newborn and Child Health	Pregnant Women	10%	HSA
TB Screening	TB	Children <5	1	HSA
TB sputum collection	TB	Children <5	5.0%	HSA
Referral of positive sputum to health center	TB	Children <5	2.5%	HSA
Referral to HIV Counselling Testing (HTC) at Health	HIV/AIDS	All	2.5%	HSA
TB education/sensitization - risk factors, prevention	TB	Female Adult	1	HSA
HIV sensitization - risk factors, education	HIV/AIDS	Fem + Male Rep Age	1	HSA
Growth Monitoring/MUAC	Nutrition	Children <5	0	HSA
Malnutrition Screening	Nutrition	Children <5	10%	HSA
Referral of newborn for LBW	Nutrition	Children <1	10%	HSA
Height Monitoring	Nutrition	Children <5	10%	HSA
National Immunization Campaigns (Monthly, Quart	Immunization	Village Clinic	2	HSA
Malaria Messaging	Malaria (5 years +)	Village Clinic	2	HSA
BCG Vaccine	Immunization	Children <1	1	HSA

Table 5. Ntcheu District Population and Health Service Structure 2015-2018

	Baseline 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sub-national population, if applicable	558,942	576,068	593,719	611,910	630,659	649,983	669,898	690,424	711,578	733,381	755,852
Annual population growth rate	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
% population targeted by community services	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Total population covered by community services	184,451	190,102	195,927	201,930	208,118	214,494	221,066	227,840	234,821	242,016	249,431
Average household size (persons per household)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Crude birth rate (per 1,000 population)	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46
Maternal mortality rate (per 100,000 live births)	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00
All	184,451	190,102	195,927	201,930	208,118	214,494	221,066	227,840	234,821	242,016	249,431
Village Clinic	308	308	308	308	308	308	308	308	308	308	308
Household	40,098	41,327	42,593	43,898	45,243	46,629	48,058	49,530	51,048	52,612	54,224
All Male	92,069	94,890	97,798	100,794	103,883	107,066	110,346	113,727	117,212	120,803	124,505
All Female	92,381	95,212	98,129	101,136	104,235	107,428	110,720	114,113	117,609	121,213	124,926
Children <1	12,975	13,372	13,782	14,204	14,639	15,088	15,550	16,027	16,518	17,024	17,545
Children >1 to <5	18,671	19,244	19,833	20,441	21,067	21,713	22,378	23,064	23,770	24,499	25,249
Children <5	31,646	32,616	33,615	34,645	35,706	36,800	37,928	39,090	40,288	41,522	42,795
Children <15	63,966	65,926	67,946	70,028	72,174	74,385	76,664	79,013	81,434	83,929	86,501
Adolescents 10-19	44,831	46,205	47,621	49,080	50,584	52,134	53,731	55,377	57,074	58,823	60,625
Youth 15-24	38,017	39,181	40,382	41,619	42,894	44,209	45,563	46,959	48,398	49,881	51,409
Adults >5	152,805	157,487	162,312	167,285	172,411	177,694	183,138	188,750	194,533	200,493	206,637
Adults >15	101,158	104,258	107,452	110,745	114,138	117,635	121,239	124,954	128,783	132,729	136,796
Male Adult	50,140	51,676	53,259	54,891	56,573	58,306	60,093	61,934	63,832	65,788	67,803
Female Adult	51,019	52,582	54,193	55,854	57,565	59,329	61,147	63,020	64,951	66,941	68,992
Female Rep Age	42,436	43,736	45,076	46,458	47,881	49,348	50,860	52,418	54,025	55,680	57,386
Fem + Male Rep Age	92,576	95,412	98,335	101,349	104,454	107,654	110,953	114,352	117,857	121,468	125,189
Pregnant Women	7,325	7,549	7,780	8,019	8,265	8,518	8,779	9,048	9,325	9,611	9,905
Postpartum Women	7,278	7,501	7,731	7,968	8,212	8,464	8,723	8,990	9,266	9,550	9,842
Newborns	7,352	7,577	7,809	8,048	8,295	8,549	8,811	9,081	9,359	9,646	9,942

Table 6. Ntcheu District – actual and projected numbers of services – 2015-2025

	Baseline	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TOTAL		187,150	277,791	373,803	475,433	582,926	696,487	816,372	942,940	1,076,501	1,217,338	1,365,796
1 Male condom distribution		2,216	12,619	23,657	35,361	47,759	60,883	74,767	89,445	104,952	121,326	138,603
2 Oral Contraceptives		18,588	27,905	37,775	48,225	59,278	70,964	83,310	96,346	110,104	124,613	139,908
3 Depo Provera Injections		61,042	71,659	82,870	94,702	107,179	120,333	134,191	148,786	164,152	180,317	197,319
4 Family Planning Counseling		-	4,771	9,834	15,202	20,891	26,914	33,286	40,023	47,143	54,661	62,595
5 ANC Visit 1		264	649	1,058	1,492	1,951	2,436	2,950	3,493	4,066	4,671	5,309
6 ANC Visit 2		-	377	778	1,203	1,653	2,130	2,634	3,167	3,730	4,325	4,953
7 ANC Visit 3		-	377	778	1,203	1,653	2,130	2,634	3,167	3,730	4,325	4,953
8 Referral of pregnant women with problematic pregnancy		30	69	110	153	199	248	299	354	411	472	536
9 PNC Visit 1		-	375	773	1,195	1,642	2,116	2,617	3,147	3,706	4,298	4,921
10 PNC Visit 2		-	375	773	1,195	1,642	2,116	2,617	3,147	3,706	4,298	4,921
11 PNC Visit 3		-	375	773	1,195	1,642	2,116	2,617	3,147	3,706	4,298	4,921
12 Referral of unhealthy baby to health center		18	56	96	139	185	233	283	337	394	453	516
13 Monitoring of breathing		-	38	78	121	166	214	264	318	374	434	497
14 iCCM assessment		-	9,785	20,169	31,181	42,847	55,200	68,270	82,089	96,691	112,109	128,385
15 Referral of children requiring health center management		-	978	2,017	3,118	4,285	5,520	6,827	8,209	9,669	11,211	12,839
16 Vitamin A Supplementation		-	1,631	3,362	5,197	7,141	9,200	11,378	13,682	16,115	18,685	21,398
17 Diarrhea Treatment		17,446	25,319	33,658	42,485	51,820	61,687	72,112	83,117	94,729	106,973	119,881
18 Pneumonia treatment		8,861	9,132	9,412	9,701	9,998	10,304	10,620	10,945	11,281	11,626	11,983
19 Growth Monitoring		-	6,523	13,446	20,787	28,565	36,800	45,514	54,726	64,461	74,740	85,590
20 Rotavirus Immunization		-	2,006	4,135	6,392	8,783	11,316	13,995	16,828	19,822	22,982	26,318
21 Measles Immunization		-	1,337	2,756	4,261	5,856	7,544	9,330	11,219	13,214	15,322	17,545
22 WASH Messaging and Providing HTH		-	31	62	92	123	154	185	216	246	277	308
23 DPT Immunization		-	3,343	6,891	10,653	14,639	18,860	23,325	28,047	33,036	38,304	43,863
24 Pneumococcus Immunization		-	669	1,378	2,131	2,928	3,772	4,665	5,609	6,607	7,661	8,773
25 Polio Immunization		-	2,674	5,513	8,522	11,711	15,088	18,660	22,438	26,429	30,643	35,090
26 Nutrition Campaigns/Messaging		-	31	62	92	123	154	185	216	246	277	308
27 Neonatal Conjunctivitis Prevention		3,360	3,842	4,350	4,885	5,450	6,044	6,670	7,329	8,021	8,749	9,515
28 Malaria /fever diagnosis (RDT)		15,950	19,700	23,665	27,855	32,278	36,947	41,873	47,064	52,536	58,297	64,364
29 Malaria treatment		44,304	45,662	47,061	48,503	49,988	51,520	53,099	54,726	56,403	58,131	59,913
30 Antenatal Malaria treatment referral		89	129	172	218	266	316	370	427	486	549	616
31 TB Screening		-	1,631	3,362	5,197	7,141	9,200	11,378	13,682	16,115	18,685	21,398
32 TB sputum collection		-	82	168	260	357	460	569	684	806	934	1,070
33 Referral of positive sputum to health center		-	41	84	130	179	230	284	342	403	467	535
34 Referral to HIV Counselling Testing (HTC) at Health Center		-	238	490	757	1,041	1,341	1,658	1,994	2,348	2,723	3,118
35 TB education/sensitization - risk factors, prevention		-	2,629	5,419	8,378	11,513	14,832	18,344	22,057	25,980	30,123	34,496
36 HIV sensitization - risk factors, education		-	4,771	9,834	15,202	20,891	26,914	33,286	40,023	47,143	54,661	62,595
37 Growth Monitoring/MUAC		-	-	-	-	-	-	-	-	-	-	-
38 Malnutrition Screening		-	163	336	520	714	920	1,138	1,368	1,612	1,868	2,140
39 Referral of newborn for LBW		2,007	2,202	2,408	2,623	2,850	3,018	3,110	3,205	3,304	3,405	3,509
40 Height Monitoring		-	163	336	520	714	920	1,138	1,368	1,612	1,868	2,140
41 National Immunization Campaigns (Monthly, Quarterly)		-	31	62	92	123	154	185	216	246	277	308
42 Malaria Messaging		-	31	62	92	123	154	185	216	246	277	308
43 BCG Vaccine		12,975	13,372	13,782	14,204	14,639	15,088	15,550	16,027	16,518	17,024	17,545

Table 7. Ntcheu District – numbers and percentages of services by program and number of HSA hours required - 2015-2025

	Baseline 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Services by Category											
Promotional	-	92	185	277	370	462	554	647	739	832	924
Preventive	100,589	168,100	239,652	315,433	395,625	480,367	569,844	664,352	764,122	869,371	980,347
Curative	86,561	109,599	133,965	159,723	186,931	215,659	245,974	277,941	311,639	347,136	384,525
Total	187,150	277,791	373,803	475,433	582,926	696,487	816,372	942,940	1,076,501	1,217,338	1,365,796
Services by Program											
Reproductive Health / Family Planning	81,846	116,954	154,136	193,490	235,107	279,093	325,555	374,599	426,352	480,917	538,424
Maternal, Newborn and Child Health	3,761	8,294	13,101	18,196	23,590	29,298	35,333	41,711	48,446	55,556	63,054
iCCM	86,561	117,101	149,428	183,628	219,781	257,979	298,315	340,876	385,769	433,086	482,954
Malaria (5 years +)	-	31	62	92	123	154	185	216	246	277	308
TB	-	4,382	9,033	13,965	19,190	24,722	30,576	36,765	43,304	50,210	57,498
HIV/AIDS	-	5,008	10,323	15,960	21,931	28,254	34,944	42,017	49,491	57,383	65,712
Nutrition	2,007	2,559	3,141	3,755	4,401	5,012	5,570	6,157	6,773	7,419	8,097
Community Mobilization / BCC / Messaging	-	31	62	92	123	154	185	216	246	277	308
Immunization	12,975	23,432	34,517	46,255	58,679	71,822	85,710	100,384	115,872	132,213	149,441
0	-	-	-	-	-	-	-	-	-	-	-
Total	187,150	277,791	373,803	475,433	582,926	696,487	816,372	942,940	1,076,501	1,217,338	1,365,796
Services by Program (%)											
Reproductive Health / Family Planning	44%	42%	41%	41%	40%	40%	40%	40%	40%	40%	39%
Maternal, Newborn and Child Health	2%	3%	4%	4%	4%	4%	4%	4%	5%	5%	5%
iCCM	46%	42%	40%	39%	38%	37%	37%	36%	36%	36%	35%
Malaria (5 years +)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TB	0%	2%	2%	3%	3%	4%	4%	4%	4%	4%	4%
HIV/AIDS	0%	2%	3%	3%	4%	4%	4%	4%	5%	5%	5%
Nutrition	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Community Mobilization / BCC / Messaging	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Immunization	7%	8%	9%	10%	10%	10%	10%	11%	11%	11%	11%
0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	Baseline 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Time on Services by Program (hours)											
Reproductive Health / Family Planning	16,994	23,677	30,754	38,242	46,160	54,527	63,364	72,691	82,531	92,904	103,836
Maternal, Newborn and Child Health	998	2,419	3,927	5,525	7,216	9,007	10,900	12,901	15,014	17,245	19,597
iCCM	21,640	32,999	45,032	57,773	71,251	85,501	100,559	116,458	133,239	150,935	169,596
Malaria (5 years +)	-	15	31	46	62	77	92	108	123	139	154
TB	-	1,614	3,326	5,142	7,066	9,103	11,258	13,537	15,945	18,487	21,171
HIV/AIDS	-	2,425	4,998	7,727	10,619	13,680	16,919	20,344	23,963	27,784	31,817
Nutrition	335	423	516	613	715	810	895	984	1,077	1,173	1,274
Community Mobilization / BCC / Messaging	-	5	10	15	21	26	31	36	41	46	51
Immunization	1,081	2,801	4,625	6,556	8,601	10,764	13,051	15,467	18,018	20,709	23,547
0	-	-	-	-	-	-	-	-	-	-	-
Total	41,048	66,379	93,219	121,640	151,710	183,495	217,070	252,525	289,949	329,423	371,044
HSA's time spent as a % of time available	9%	14%	19%	25%	32%	38%	45%	53%	60%	69%	77%
Number of HSAs	308	308	308	308	308	308	308	308	308	308	308
Number of HSAs direct supervisors	36	36	36	36	36	36	36	36	36	36	36
HSAs per supervisor	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6

Table 8. Ntcheu District – Summary of costs by input and by program 2015-25 (USD)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population served by Community Health pr	184,451	190,102	195,927	201,930	208,118	214,494	221,066	227,840	234,821	242,016	249,431
Cost per CHW (all costs) (USD)	2,323	3,131	3,404	3,654	3,861	4,338	4,480	4,896	5,269	5,625	5,940
Training and Equipment cost per CHW	25	592	611	592	513	690	513	592	611	592	513
Supervision cost per CHW	231	231	231	231	231	231	231	231	231	231	231
Cost by Input (USD)											
CHW Salaries	411,840	411,840	411,840	411,840	411,840	411,840	411,840	411,840	411,840	411,840	411,840
Equipment	7,579	31,895	37,593	31,895	7,579	61,909	7,579	31,895	37,593	31,895	7,579
Medicines, supplies, commodities	139,983	213,961	292,340	375,323	463,110	555,932	654,002	757,566	866,863	982,135	1,103,650
Supervision	71,199	71,199	71,199	71,199	71,199	71,199	71,199	71,199	71,199	71,199	71,199
Training	-	150,480	150,480	150,480	150,480	150,480	150,480	150,480	150,480	150,480	150,480
Management	84,843	84,843	84,843	84,843	84,843	84,843	84,843	84,843	84,843	84,843	84,843
Start-up Costs	-	-	-	-	-	-	-	-	-	-	-
Other Program Costs	-	-	-	-	-	-	-	-	-	-	-
Total	715,443	964,217	1,048,295	1,125,579	1,189,050	1,336,202	1,379,942	1,507,822	1,622,818	1,732,391	1,829,590
Cost by Program (USD)											
All Community Health Programs											
Reproductive Health / Family Planning	325,241	403,448	427,918	457,336	484,710	548,251	570,571	628,390	681,541	732,872	779,259
Maternal, Newborn and Child Health	13,403	24,917	28,877	31,023	32,044	34,877	34,753	36,596	37,967	39,106	39,899
iCCM	355,620	416,193	406,393	398,615	388,943	407,039	394,048	405,790	413,519	419,662	422,863
Malaria (5 years +)	-	147	203	224	227	239	227	227	222	215	206
TB	-	15,495	22,014	25,100	26,337	28,562	28,064	28,957	29,311	29,370	29,088
HIV/AIDS	-	23,181	32,874	37,411	39,175	42,393	41,561	42,781	43,196	43,168	42,635
Nutrition	4,352	4,047	3,397	2,973	2,643	2,516	2,206	2,078	1,951	1,834	1,720
Community Mobilization / BCC / Messagi	-	61	90	107	117	132	135	145	152	157	161
Immunization	16,827	76,728	126,528	172,790	214,853	272,193	308,377	362,859	414,958	466,007	513,758
0	-	-	-	-	-	-	-	-	-	-	-
Total	715,443	964,217	1,048,295	1,125,579	1,189,050	1,336,202	1,379,942	1,507,822	1,622,818	1,732,391	1,829,590

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cost by Input (USD)											
CHW Salaries	57.6%	42.7%	39.3%	36.6%	34.6%	30.8%	29.8%	27.3%	25.4%	23.8%	22.5%
Equipment	1.1%	3.3%	3.6%	2.8%	0.6%	4.6%	0.5%	2.1%	2.3%	1.8%	0.4%
Medicines, supplies, commodities	19.6%	22.2%	27.9%	33.3%	38.9%	41.6%	47.4%	50.2%	53.4%	56.7%	60.3%
Supervision	10.0%	7.4%	6.8%	6.3%	6.0%	5.3%	5.2%	4.7%	4.4%	4.1%	3.9%
Training	0.0%	15.6%	14.4%	13.4%	12.7%	11.3%	10.9%	10.0%	9.3%	8.7%	8.2%
Management	11.9%	8.8%	8.1%	7.5%	7.1%	6.3%	6.1%	5.6%	5.2%	4.9%	4.6%
Other Program Costs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
All Community Health Programs											
Reproductive Health / Family Planning	45.5%	41.8%	40.8%	40.6%	40.8%	41.0%	41.3%	41.7%	42.0%	42.3%	42.6%
Maternal, Newborn and Child Health	1.9%	2.6%	2.8%	2.8%	2.7%	2.6%	2.5%	2.4%	2.3%	2.3%	2.2%
iCCM	49.7%	43.2%	38.8%	35.4%	32.7%	30.5%	28.6%	26.9%	25.5%	24.2%	23.1%
Malaria (5 years +)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TB	0.0%	1.6%	2.1%	2.2%	2.2%	2.1%	2.0%	1.9%	1.8%	1.7%	1.6%
HIV/AIDS	0.0%	2.4%	3.1%	3.3%	3.3%	3.2%	3.0%	2.8%	2.7%	2.5%	2.3%
Nutrition	0.6%	0.4%	0.3%	0.3%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%
Community Mobilization / BCC / Messagi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Immunization	2.4%	8.0%	12.1%	15.4%	18.1%	20.4%	22.3%	24.1%	25.6%	26.9%	28.1%
0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 9. Dedza District population and health service structure 2015-2025

	Baseline 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sub-national population, if applicable	735,411	757,944	781,167	805,102	829,771	855,195	881,398	908,404	936,238	964,924	994,489
Annual population growth rate	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
% population targeted by community services	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Total population covered by community services	242,686	250,122	257,785	265,684	273,824	282,214	290,861	299,773	308,958	318,425	328,181
Average household size (persons per household)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Crude birth rate (per 1,000 population)	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46	39.46
Maternal mortality rate (per 100,000 live births)	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00	634.00
All	242,686	250,122	257,785	265,684	273,824	282,214	290,861	299,773	308,958	318,425	328,181
Village Clinic	439	439	439	439	439	439	439	439	439	439	439
Household	52,758	54,374	56,040	57,757	59,527	61,351	63,231	65,168	67,165	69,223	71,344
All Male	121,138	124,850	128,675	132,617	136,680	140,868	145,185	149,633	154,218	158,943	163,813
All Female	121,548	125,272	129,110	133,067	137,144	141,346	145,676	150,140	154,740	159,482	164,368
Children <1	17,071	17,594	18,133	18,689	19,261	19,851	20,460	21,086	21,733	22,398	23,085
Children >1 to <5	24,566	25,319	26,095	26,894	27,719	28,568	29,443	30,345	31,275	32,233	33,221
Children <5	41,637	42,913	44,228	45,583	46,980	48,419	49,903	51,432	53,008	54,632	56,306
Children <15	84,162	86,740	89,398	92,137	94,960	97,870	100,869	103,959	107,144	110,427	113,811
Adolescents 10-19	58,986	60,793	62,656	64,575	66,554	68,593	70,695	72,861	75,094	77,394	79,766
Youth 15-24	50,019	51,552	53,131	54,759	56,437	58,166	59,948	61,785	63,678	65,629	67,640
Adults >5	201,048	207,208	213,557	220,101	226,845	233,795	240,959	248,342	255,951	263,793	271,876
Adults >15	133,096	137,174	141,377	145,709	150,174	154,775	159,517	164,405	169,442	174,634	179,985
Male Adult	65,970	67,991	70,074	72,221	74,434	76,715	79,065	81,488	83,985	86,558	89,210
Female Adult	67,126	69,183	71,303	73,488	75,739	78,060	80,452	82,917	85,457	88,076	90,774
Female Rep Age	55,834	57,545	59,308	61,125	62,998	64,928	66,918	68,968	71,081	73,259	75,504
Fem + Male Rep Age	121,804	125,536	129,382	133,346	137,432	141,643	145,983	150,456	155,066	159,817	164,714
Pregnant Women	9,637	9,933	10,237	10,551	10,874	11,207	11,550	11,904	12,269	12,645	13,032
Postpartum Women	9,576	9,870	10,172	10,484	10,805	11,136	11,477	11,829	12,191	12,565	12,950
Newborns	9,673	9,969	10,275	10,590	10,914	11,248	11,593	11,948	12,314	12,692	13,081

Table 10. Dedza District – actual and potential numbers of services – 2015-2025

	Baseline 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TOTAL	260,057	377,093	500,018	629,659	765,305	908,657	1,058,596	1,216,316	1,382,714	1,558,140	1,740,379
Male condom distribution	8,950	22,822	37,536	53,131	69,645	87,123	105,605	125,138	145,770	167,548	190,523
Oral Contraceptives	9,827	21,637	34,162	47,433	61,486	76,356	92,079	108,694	126,240	144,760	164,297
Depo Provera Injections	79,133	93,067	107,780	123,307	139,685	156,950	175,144	194,303	214,472	235,695	258,019
Family Planning Counseling	-	6,277	12,938	20,002	27,486	35,411	43,795	52,660	62,026	71,918	82,357
ANC Visit 1	9,155	9,933	10,237	10,551	10,874	11,207	11,550	11,904	12,269	12,645	13,032
ANC Visit 2	9,155	9,933	10,237	10,551	10,874	11,207	11,550	11,904	12,269	12,645	13,032
ANC Visit 3	-	497	1,024	1,583	2,175	2,802	3,465	4,166	4,908	5,690	6,516
Referral of pregnant women with problematic pregnancy	-	50	102	158	217	280	347	417	491	569	652
PNC Visit 1	-	494	1,017	1,573	2,161	2,784	3,443	4,140	4,876	5,654	6,475
PNC Visit 2	-	494	1,017	1,573	2,161	2,784	3,443	4,140	4,876	5,654	6,475
PNC Visit 3	-	494	1,017	1,573	2,161	2,784	3,443	4,140	4,876	5,654	6,475
Referral of unhealthy baby to health center	-	49	102	157	216	278	344	414	488	565	648
Monitoring of breathing	-	50	103	159	218	281	348	418	493	571	654
iCCM assessment	-	12,874	26,537	41,025	56,376	72,629	89,825	108,007	127,219	147,506	168,918
Referral of children requiring health center management	-	1,287	2,654	4,102	5,638	7,263	8,983	10,801	12,722	14,751	16,892
Vitamin A Supplementation	22,775	25,619	28,615	31,771	35,094	38,589	42,267	46,134	50,198	54,468	56,306
Diarrhea Treatment	15,023	25,139	35,860	47,215	59,233	71,941	85,374	99,563	114,540	130,342	147,004
Pneumonia treatment	11,658	12,016	12,384	12,763	13,154	13,557	13,973	14,401	14,842	15,297	15,766
Growth Monitoring	-	8,583	17,691	27,350	37,584	48,419	59,884	72,005	84,813	98,338	112,612
Rotavirus Immunization	-	2,639	5,440	8,410	11,557	14,888	18,414	22,140	26,080	30,237	34,628
Measles Immunization	29,437	32,098	34,895	37,378	38,522	39,702	40,920	42,172	43,466	44,796	46,170
WASH Messaging and Providing HTH	-	44	88	132	176	220	263	307	351	395	439
DPT Immunization	-	4,399	9,067	14,017	19,261	24,814	30,690	36,901	43,466	50,396	57,713
Pneumococcus Immunization	-	880	1,813	2,803	3,852	4,963	6,138	7,380	8,693	10,079	11,543
Polio Immunization	-	3,519	7,253	11,213	15,409	19,851	24,552	29,520	34,773	40,316	46,170
Nutrition Campaigns/Messaging	-	44	88	132	176	220	263	307	351	395	439
Neonatal Conjunctivitis Prevention	-	498	1,028	1,589	2,183	2,812	3,478	4,182	4,926	5,711	6,541
Malaria /fever diagnosis (RDT)	24,556	27,025	29,622	32,353	35,224	38,240	39,922	41,146	42,406	43,706	45,045
Malaria treatment	23,317	24,031	24,768	25,526	26,309	27,115	27,946	28,802	29,684	30,594	31,531
Antenatal Malaria treatment referral	-	50	102	158	217	280	347	417	491	569	652
TB Screening	-	2,146	4,423	6,837	9,396	12,105	14,971	18,001	21,203	24,584	28,153
TB sputum collection	-	107	221	342	470	605	749	900	1,060	1,229	1,408
Referral of positive sputum to health center	-	54	111	171	235	303	374	450	530	615	704
Referral to HIV Counselling Testing (HTC) at Health Center	-	313	644	996	1,369	1,764	2,181	2,623	3,090	3,582	4,102
TB education/sensitization - risk factors, prevention	-	3,459	7,130	11,023	15,148	19,515	24,136	29,021	34,183	39,634	45,387
HIV sensitization - risk factors, education	-	6,277	12,938	20,002	27,486	35,411	43,795	52,660	62,026	71,918	82,357
Growth Monitoring/MUAC	-	-	-	-	-	-	-	-	-	-	-
Malnutrition Screening	-	215	442	684	940	1,210	1,497	1,800	2,120	2,458	2,815
Referral of newborn for LBW	-	88	181	280	385	496	614	738	869	1,008	1,154
Height Monitoring	-	215	442	684	940	1,210	1,497	1,800	2,120	2,458	2,815
National Immunization Campaigns (Monthly, Quarterly)	-	44	88	132	176	220	263	307	351	395	439
Malaria Messaging	-	44	88	132	176	220	263	307	351	395	439
BCG Vaccine	17,071	17,594	18,133	18,689	19,261	19,851	20,460	21,086	21,733	22,398	23,085

Table 11. Dedza District – numbers and percentages of services by program and number of HSA hours required - 2015-2025

	Baseline 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Services by Category											
Promotional	-	132	263	395	527	659	790	922	1,054	1,185	1,317
Preventive	185,503	275,876	370,584	470,381	574,482	684,518	800,765	923,476	1,052,967	1,189,510	1,330,798
Curative	74,554	101,085	129,171	158,883	190,296	223,481	257,041	291,918	328,692	367,444	408,264
Total	260,057	377,093	500,018	629,659	765,305	908,657	1,058,596	1,216,316	1,382,714	1,558,140	1,740,379
Services by Program											
Reproductive Health / Family Planning	97,910	143,803	192,416	243,873	298,303	355,839	416,623	480,795	548,509	619,921	695,196
Maternal, Newborn and Child Health	41,085	48,158	54,601	61,394	68,552	76,089	84,025	92,376	101,160	110,397	117,456
iCCM	74,554	110,955	149,516	190,335	233,518	279,163	325,907	374,724	426,227	480,533	537,768
Malaria (5 years +)	-	44	88	132	176	220	263	307	351	395	439
TB	-	5,766	11,885	18,373	25,249	32,528	40,229	48,372	56,976	66,062	75,651
HIV/AIDS	-	6,589	13,583	20,998	28,856	37,175	45,976	55,283	65,116	75,500	86,459
Nutrition	-	561	1,154	1,780	2,440	3,137	3,871	4,646	5,461	6,320	7,224
Community Mobilization / BCC / Messagin	-	44	88	132	176	220	263	307	351	395	439
Immunization	46,508	61,172	76,689	92,642	108,037	124,288	141,437	159,507	178,562	198,617	219,747
Total	260,057	377,093	500,018	629,659	765,305	908,657	1,058,596	1,216,316	1,382,714	1,558,140	1,740,379
Services by Program (%)											
Reproductive Health / Family Planning	38%	38%	38%	39%	39%	39%	39%	40%	40%	40%	40%
Maternal, Newborn and Child Health	16%	13%	11%	10%	9%	8%	8%	8%	7%	7%	7%
iCCM	29%	29%	30%	30%	31%	31%	31%	31%	31%	31%	31%
Malaria (5 years +)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TB	0%	2%	2%	3%	3%	4%	4%	4%	4%	4%	4%
HIV/AIDS	0%	2%	3%	3%	4%	4%	4%	5%	5%	5%	5%
Nutrition	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Community Mobilization / BCC / Messagin	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Immunization	18%	16%	15%	15%	14%	14%	13%	13%	13%	13%	13%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Total Time on Services by Program (hours)											
Reproductive Health / Family Planning	21,348	30,110	39,389	49,208	59,592	70,566	82,157	94,392	107,299	120,908	135,252
Maternal, Newborn and Child Health	11,053	13,222	15,001	16,877	18,854	20,935	23,127	25,433	27,860	30,411	32,871
iCCM	18,639	32,638	47,478	63,196	79,834	97,430	115,660	134,784	154,971	176,268	198,725
Malaria (5 years +)	-	22	44	66	88	110	132	154	176	198	220
TB	-	2,123	4,376	6,765	9,297	11,977	14,812	17,811	20,979	24,324	27,855
HIV/AIDS	-	3,191	6,577	10,167	13,971	17,999	22,261	26,767	31,528	36,556	41,862
Nutrition	-	90	185	284	387	495	608	727	851	980	1,116
Community Mobilization / BCC / Messagin	-	7	15	22	29	37	44	51	59	66	73
Immunization	6,329	8,744	11,300	13,927	16,460	19,134	21,956	24,930	28,066	31,368	34,847
0	-	-	-	-	-	-	-	-	-	-	-
Total	57,368	90,147	124,363	160,512	198,511	238,682	280,757	325,048	371,787	421,078	472,820
HSA's time spent as a % of time available	8%	13%	18%	23%	29%	35%	41%	47%	54%	61%	69%
Number of HSAs	439	439	439	439	439	439	439	439	439	439	439
Number of HSAs direct supervisors	34	34	34	34	34	34	34	34	34	34	34
HSAs per supervisor	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9

Table 12. Dedza District – summary of costs by input and by program – 2015-25 (USD)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population served by Community Health program	242,686	250,122	257,785	265,684	273,824	282,214	290,861	299,773	308,958	318,425	328,181
Total Program Cost (USD)	962,298	1,303,801	1,411,980	1,509,456	1,585,439	1,779,849	1,824,464	1,987,414	2,130,944	2,265,595	2,380,193
Recurrent Cost	962,298	1,303,801	1,411,980	1,509,456	1,585,439	1,779,849	1,824,464	1,987,414	2,130,944	2,265,595	2,380,193
Start-up Cost	-	-	-	-	-	-	-	-	-	-	-
Cost per Capita	3.97	5.21	5.48	5.68	5.79	6.31	6.27	6.63	6.90	7.12	7.25
Cost per CHW (all costs) (USD)	2,192	2,970	3,216	3,438	3,611	4,054	4,156	4,527	4,854	5,161	5,422
Training and Equipment cost per CHW	24	587	606	587	508	685	508	587	606	587	508
Supervision cost per CHW	175	175	175	175	175	175	175	175	175	175	175
Cost by Input (USD)											
CHW Salaries	587,006	587,006	587,006	587,006	587,006	587,006	587,006	587,006	587,006	587,006	587,006
Equipment	10,666	45,324	53,446	45,324	10,666	88,104	10,666	45,324	53,446	45,324	10,666
Medicines, supplies, commodities	177,389	271,828	371,884	477,483	588,124	705,096	827,149	955,441	1,090,849	1,233,621	1,382,878
Supervision	76,865	76,865	76,865	76,865	76,865	76,865	76,865	76,865	76,865	76,865	76,865
Training	-	212,406	212,406	212,406	212,406	212,406	212,406	212,406	212,406	212,406	212,406
Management	110,373	110,373	110,373	110,373	110,373	110,373	110,373	110,373	110,373	110,373	110,373
Start-up Costs	-	-	-	-	-	-	-	-	-	-	-
Other Program Costs	-	-	-	-	-	-	-	-	-	-	-
Total	962,298	1,303,801	1,411,980	1,509,456	1,585,439	1,779,849	1,824,464	1,987,414	2,130,944	2,265,595	2,380,193
Cost by Program (USD)											
All Community Health Programs											
Reproductive Health / Family Planning	385,276	498,890	539,101	582,194	620,849	707,891	737,597	816,025	887,340	955,508	1,016,216
Maternal, Newborn and Child Health	156,262	149,616	124,818	109,560	98,434	97,044	89,228	88,492	87,349	86,272	83,030
iCCM	308,408	416,360	432,492	438,198	435,407	462,107	446,152	457,920	463,636	466,525	465,326
Malaria (5 years +)	-	217	305	341	350	372	355	358	352	343	329
TB	-	21,077	30,596	35,352	37,441	41,038	40,493	42,089	42,817	43,048	42,732
HIV/AIDS	-	31,539	45,710	52,724	55,740	60,977	60,048	62,284	63,222	63,416	62,798
Nutrition	-	894	1,287	1,475	1,550	1,685	1,650	1,702	1,718	1,715	1,690
Community Mobilization / BCC / Messaging	-	89	134	160	176	199	203	218	228	236	242
Immunization	112,353	185,119	237,537	289,451	335,492	408,536	448,738	518,326	584,282	648,532	707,830
0	-	-	-	-	-	-	-	-	-	-	-
Total	962,298	1,303,801	1,411,980	1,509,456	1,585,439	1,779,849	1,824,464	1,987,414	2,130,944	2,265,595	2,380,193

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population served by Community Health program	242,686	250,122	257,785	265,684	273,824	282,214	290,861	299,773	308,958	318,425	328,181
Cost by Input (USD)											
CHW Salaries	61.0%	45.0%	41.6%	38.9%	37.0%	33.0%	32.2%	29.5%	27.5%	25.9%	24.7%
Equipment	1.1%	3.5%	3.8%	3.0%	0.7%	5.0%	0.6%	2.3%	2.5%	2.0%	0.4%
Medicines, supplies, commodities	18.4%	20.8%	26.3%	31.6%	37.1%	39.6%	45.3%	48.1%	51.2%	54.5%	58.1%
Supervision	8.0%	5.9%	5.4%	5.1%	4.8%	4.3%	4.2%	3.9%	3.6%	3.4%	3.2%
Training	0.0%	16.3%	15.0%	14.1%	13.4%	11.9%	11.6%	10.7%	10.0%	9.4%	8.9%
Management	11.5%	8.5%	7.8%	7.3%	7.0%	6.2%	6.0%	5.6%	5.2%	4.9%	4.6%
Other Program Costs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
All Community Health Programs											
Reproductive Health / Family Planning	40.0%	38.3%	38.2%	38.6%	39.2%	39.8%	40.4%	41.1%	41.6%	42.2%	42.7%
Maternal, Newborn and Child Health	16.2%	11.5%	8.8%	7.3%	6.2%	5.5%	4.9%	4.5%	4.1%	3.8%	3.5%
iCCM	32.0%	31.9%	30.6%	29.0%	27.5%	26.0%	24.5%	23.0%	21.8%	20.6%	19.5%
Malaria (5 years +)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
TB	0.0%	1.6%	2.2%	2.3%	2.4%	2.3%	2.2%	2.1%	2.0%	1.9%	1.8%
HIV/AIDS	0.0%	2.4%	3.2%	3.5%	3.5%	3.4%	3.3%	3.1%	3.0%	2.8%	2.6%
Nutrition	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Community Mobilization / BCC / Messaging	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Immunization	11.7%	14.2%	16.8%	19.2%	21.2%	23.0%	24.6%	26.1%	27.4%	28.6%	29.7%
0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%