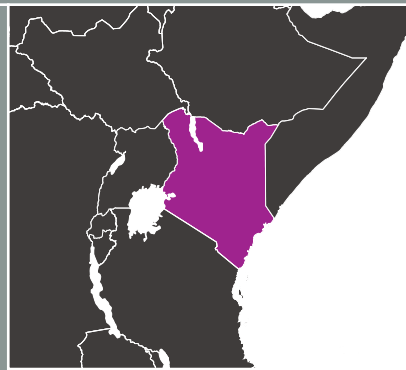


# policy

April 2015

## RESOURCE NEEDS FOR THE KENYA HEALTH SECTOR STRATEGIC AND INVESTMENT PLAN



*Analysis Using the  
OneHealth Tool*

This publication was prepared by Nicole Perales, Arin Dutta,  
and Thomas Maina of the Health Policy Project.

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# Resource Needs for the *Kenya Health Sector Strategic and Investment Plan*: Analysis Using the OneHealth Tool

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**APRIL 2015**

This publication was prepared by Nicole Perales, Arin Dutta, and Thomas Maina of the Health Policy Project.

The information provided in this document is not official U.S. Government information and does not necessarily represent the views or positions of the U.S. Agency for International Development.



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## EXECUTIVE SUMMARY

The *Kenya Health Sector Strategic and Investment Plan, July 2014–June 2018 (KHSSP III)* aims to “deliberately build progressive, responsive, and sustainable technologically driven, evidence-based and client-centered health system for accelerated attainment of highest standard of health to all Kenyans” (MOH, 2013, p. 11). The *KHSSP III* is the third medium-term plan for health covering the public and private health sectors, including all sector-related activities that promote health in Kenya (MOH, 2013a).

A thorough and all-inclusive consultative process informed the development of the *KHSSP III*. Six thematic working groups were established to develop the plan. Working group members represented the government, the private sector, nongovernmental organizations, and development partners. The Ministry of Health (MOH) selected the OneHealth Tool to cost the *KHSSP III* and requested technical assistance in applying the tool from the USAID- and PEPFAR-supported Health Policy Project (HPP). The OneHealth costing process was closely integrated with the writing of the *KHSSP III*, a draft of which was approved for dissemination in 2014 after a review by key stakeholders. The strategic plan will serve to advise county and national governments on operational priorities in health and guide the allocation of resources under the medium-term expenditure framework process (MOH, 2013a).

### OneHealth Methodology

The OneHealth Tool is a model for the medium- to long-term (three to 10 years) strategic planning in the health sector. It is unique in considering the demands of the health sector from both systemwide (i.e., governance, health financing, logistics, human resources, health information, and infrastructure) and program-specific perspectives (i.e., vertical health programs).

The OneHealth Tool groups health services, or interventions, into health programs. The revised Kenya Essential Package for Health outlined in the *KHSSP III* was used to map promotive, preventive, curative, palliative, and rehabilitative interventions to health programs, based on the corresponding department within the ministry responsible for its implementation. The analysis was performed by teams comprised of MOH and HPP staff. For all health programs and health system components, HPP designed customized data collection tools around the OneHealth inputs to synthesize all primary and secondary data. Where formal costed strategic plans were lacking, HPP and MOH Planning and Policy Department staff distributed Excel-based data collection tools. The tools were sent to key respondents from other ministry departments to develop intervention unit costs with an ingredients-based approach. The analysis teams drew on treatment standards and Kenya Medical Supplies Agency or donor commodity procurement prices (i.e., Mission for Essential Drugs and Supplies). The consultation with the Ministry of Health was supplemented by a literature review and recent survey data.

The cost of service delivery was disaggregated into the private for-profit sector market and public and private not-for-profit markets.

## Financial Resource Requirements

Over the period from fiscal year (FY) 2013/14 to FY 2017/18, the health sector is projected to cost US\$13,142 million (KSh 1,103 billion). The management and delivery of Kenya Essential Package for Health interventions will constitute the largest share of the health sector cost at 43 percent. During *KHSSP III* implementation, the annual cost of the health sector will increase by US\$749 million (KSh 62 billion), or 33 percent. This growth is mostly attributed to projected increases in health program and human resource costs.

### Health programs

For the purpose of the analysis, the technical team organized the Kenya Essential Package for Health interventions into 12 health programs:

- Child health and immunization
- Environmental health
- Emergency care and blood safety
- Health promotion
- HIV and sexually transmitted infections (STIs)/reproductive tract infections (RTIs)
- Malaria
- Maternal, newborn, and reproductive health
- Noncommunicable diseases
- Neglected tropical diseases
- Nutrition
- Other specializations
- Tuberculosis

Service delivery and management through the 12 health programs is projected to cost US\$5,631 million (KSh 473 billion) over FYs 2013/14–2017/18. The health sector's response to HIV and STIs/RTIs will require the largest share of resources (21%), followed by child health and immunization (17%).

Drug and commodity procurement will incur US\$4,574 million (KSh 384 billion), or 81 percent of total program costs. Procurement through the private, for-profit sector will account for only 9 percent of program costs. Drugs and commodities to screen and treat noncommunicable diseases are the largest cost drivers in the private, for-profit market, while HIV- and STI/RTI-related drugs constitute the largest cost for the public and private, not-for-profit markets.

### Human resources for health

The *KHSSP III* aims to meet 80 percent of the minimum required staffing for health facilities in 15 counties by FY 2015/16 and 30 counties by FY 2017/18. Over FYs 2012/13–2017/18, the cost to train, retain, and compensate human resources for health is projected to total US\$2,873 million (KSh 241 billion). The estimated annual cost will nearly double in five years due to the rapid scale-up of human resources for health, in accordance with *KHSSP III* targets. The public and private, not-for-profit sectors would finance 74 percent of salaries and benefits for human resources for health, while the private, for-profit sector would finance 26 percent.

### Health infrastructure

The *KHSSP III* defines health infrastructure as any investment in physical infrastructure, medical equipment, information and communication technology, or select transport (MOH, 2013a). During implementation of the *KHSSP III*, efforts will be geared toward assuring 80 percent of the required health infrastructure is available in 30 counties by FY 2017/18. To achieve *KHSSP III* targets, US\$1,966 million (KSh 165 billion) must be invested over FYs 2013/14–2017/18. Capital costs will make up 12 percent of the investment and operating costs will make up 80 percent. Despite ambitious scale-up targets under the *KHSSP III*, the implication for cost growth over time is moderate.

## **Logistics**

The strategic aim of the *KHSSP III* is centered on minimizing stockouts for essential medicines and medical supplies. Direct investments in the health sector supply chain include warehouses, vehicles, human resources not associated with a health facility, and program management. To adopt a comprehensive view of the cost of the supply chain, the technical team also included the cost of wasted drugs and commodities within the logistics health system component. Over FYs 2013/14–2017/18, the supply chain and logistics management will incur US\$2,350 million (KSh 197 billion) in costs.

## **Health information systems**

The *KHSSP III* aims to improve the entire continuum of the information system, from data collection to information use. Health information system investments under the *KHSSP III* are categorized into six functional domains, which encompass the *KHSSP III* priority investments and *Health Information System Policy 2010–2030* priority actions. Over the period from FY 2013/14 to FY 2017/18, health information system investments will total US\$24 million (KSh 2 billion). In total, the functional domains will make up 91 percent of the health information system investments under the *KHSSP III*, while program management activities will make up 9 percent of the system cost.

## **Health financing**

Kenya has piloted many innovative health financing schemes, aiming to minimize cost barriers to accessing the health sector. The cost of many such financing schemes is already reflected in the respective service delivery and health system cost analyses. The only health financing mechanism that represents an incremental cost to the health sector is performance-based financing to incentivize human resources for health, funded by the World Bank. This scheme will require US\$67 million (KSh 5 billion) over the period from FY 2013/14 to FY 2017/18; program management through the ministry's Planning and Policy Department will require US\$1 million (KSh 50 million).

## **Governance**

The *KHSSP III* highlights six priority objectives to be achieved through strengthening health stewardship, improved health governance, and consolidated health partnerships. The estimated cost of governance under the *KHSSP III* focuses on investments in stewardship through the Ministry of Health, including a broad range of existing management entities at the national and county levels (14 in total). By analyzing the historical, committed, and anticipated government budgets, the Health Policy Project projected the cost of continuing to strengthen stewardship of the health sector through the Ministry of Health. Over the period from FY 2013/14 to FY 2017/18 the 14 management entities will cost US\$228 million (KSh 19 billion).

## **Discussion**

The results of the OneHealth analysis represent a robust resource base for answering questions related to epidemiology, programmatic reach, implementation strategy, and cost in the Kenyan health sector. From the results of the current exercise, the technical team estimated the health sector will require investments totaling US\$13.1 billion (KSh 1,103 billion) to successfully implement the *KHSSP III* over FYs 2013/14–2017/18. While many investments will be front-loaded to the initial years of the strategy, a growing population and ambitious service delivery scale-up targets mean the annual cost will grow over the five years of implementation. This increase in resource need does not factor in anticipated epidemiological shifts, such as the rising burden of noncommunicable diseases, potential for new disease outbreaks, or other unexpected disruptions to the health system. Further, rising costs will be accompanied by various financial, managerial, and logistical demands for which the Ministry of Health will need to prepare.

An indicative analysis of the total resources available across the public and private sectors suggests the health sector will face a resource shortfall over FYs 2013/14–2017/18. The detailed analysis of total health sector cost drivers also provides a unique opportunity for program managers to critically review their implementation approach on a more granular level. A synthesis of key implications for

policy, further research, and financial feasibility related to each health program area is presented. Given the anticipated gap in financial resources for health at the aggregate level, ongoing review of the national strategy is essential to focus on prioritized investment areas, rationalize service delivery targets, and eliminate cost inefficiencies.

## ABBREVIATIONS

ACT	artemisinin-based combination therapy
AIDS	acquired immune deficiency syndrome
AMFm	Affordable Medicines Facility-malaria
ANC	antenatal care
ARI	acute respiratory infections
ART	antiretroviral therapy
BCG	Bacille de Calmette et Guérin
BMI	body mass index
CIP	National Family Planning Costed Implementation Plan
CPR	contraceptive prevalence rate
CVD	cardiovascular disease
DALY	disability-adjusted life years
DCAH	Department of Child and Adolescent Health
DHS	Demographic and Health Survey
DLTLD	Department for Leprosy, Tuberculosis, and Lung Disease
DMC	Division of Malaria Control
DOTS	directly observed treatment short-term
DVI	Division of Vaccine and Immunization
ENT	ear, nose, and throat
EPI	Expanded Program for Immunization
F&Q	forecasting and quantification
FBO	faith-based organization
FNSP	National Food and Nutrition Security Policy
GET 2020	Global Elimination of Trachoma by 2020
HAART	highly active antiretroviral therapy
HIV	human immunodeficiency virus
HMIS	health management information system
HMSF	Hospital Management Services Fund
HPP	Health Policy Project
HPV	human papilloma virus
HRH	human resources for health
HSSF	Health Sector Services Fund
ICT	information and communication technology
IMNCI	integrated management of neonatal and childhood illnesses
IRS	indoor residual spraying
ITN	insecticide-treated nets
<i>KAIS</i>	<i>Kenya AIDS Indicator Survey</i>
<i>KASF</i>	<i>Kenya AIDS Strategic Framework</i>
KEMSA	Kenya Medical Supplies Agency
KEPH	Kenya Essential Package for Health
<i>KHP</i>	<i>Kenya Health Policy 2012–2030</i>
<i>KHPF</i>	<i>Kenya Health Policy Framework 1994–2010</i>
<i>KHSSP II</i>	<i>National Health Sector Strategic Plan 2005–2010</i>
<i>KHSSP III</i>	<i>Kenya Health Sector Strategic and Investment Plan, July 2014–June 2018</i>
KMTC	Kenya Medical Training College
<i>KNASP</i>	<i>Kenya National AIDS Strategic Plan</i>
LBW	low birth weight
LF	lymphatic filariasis
LLIN	long-lasting insecticide-treated nets
MAM	moderate acute malnutrition
MDA	mass drug administration
MDG	Millennium Development Goal

MDR	multidrug-resistant
MEDS	Mission for Essential Drugs and Supplies
MMR	maternal mortality ratio
MNRH	maternal, newborn, and reproductive health
MOH	Ministry of Health
MOMS	Ministry of Medical Services
MOPHS	Ministry of Public Health and Sanitation
MTEF	medium-term expenditure framework
MTP	Medium Term Plan
NACC	National AIDS Control Council
NASCOP	National AIDS and STI Control Programme
NBTS	National Blood Transfusion Service
NCD	noncommunicable disease
NGO	nongovernmental organization
<i>NNAP</i>	<i>National Nutrition Action Plan 2012–2017</i>
NSHIF	National Social Health Insurance Fund
NTD	neglected tropical disease
ORS	oral rehydration salts
PEPFAR	U.S. President’s Emergency Plan for AIDS Relief
PETS-Plus	Public Expenditure Tracking Survey
PLHIV	people living with HIV
PMTCT	prevention of mother-to-child transmission
PPD	Planning and Policy Department
RDTs	rapid diagnostic tests
RTI	reproductive tract infections
SAFE	Surgery, Antibiotics, Facial Cleanliness, and Environmental Improvement
SAM	severe acute malnutrition
SARAM	Service Availability and Readiness Assessment Mapping
SBA	skilled birth attendant
<i>SPA</i>	<i>Kenya Service Provision Assessment</i>
STH	soil-transmitted helminthiasis
STI	sexually transmitted infection
TB	tuberculosis
THE	total health expenditure
TT	trachoma trichiasis
U5MR	under-five mortality rate
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
WASH	water, sanitation, and hygiene
WHO	World Health Organization

# INTRODUCTION TO THE THIRD KENYA HEALTH SECTOR STRATEGIC AND INVESTMENT PLAN (KHSSP III)

## Development of the KHSSP III

Kenya's long-term health sector development is guided by the *Kenya Health Policy 2014–2030 (KHP)*, which aims to “attain the highest possible health standards in a manner responsive to the population needs” (MOMS and MOPHS, 2012, p.15). By 2030, the policy aims to achieve a level and equitable distribution of healthcare observed in other middle-income countries using a human rights–based approach. In addition to building on the former *Kenya Health Policy Framework 1994–2010 (KHPPF)*, the *KHP* reflects recent national commitments to health outlined in the *Kenya Vision 2030*, global health forums, and the *2010 Kenya Constitution*. *Kenya Vision 2030* is a broad national development plan to achieve “a globally competitive and prosperous country with high quality of life” (GOK, 2007, p. 2). The health sector will be critical to increasing labor productivity by means of a healthy workforce and is featured in *Vision 2030*'s social pillar. Global health commitments include the Ouagadougou Declaration on Primary Health Care, the Millennium Development Goals (MDGs), and various international human rights agreements, among others. The 2010 constitution implied drastic changes to health service delivery and management by guaranteeing the right to health and devolving health governance to 47 newly formed counties, discussed further in Section 1 (MOH, 2013a). Following the enactment of a new constitution and formation of a new government in 2013, the former Ministry of Public Health and Sanitation (MOPHS) and Ministry of Medical Services (MOMS) were merged into a unified Ministry of Health (MOH). Under this structure, the *KHP* provides a comprehensive framework for improving health and optimizing national development.

Medium-term objectives and priorities for the *KHP* are elaborated in the *Kenya Health Sector Strategic and Investment Plan, July 2014–June 2018 (KHSSP III)*. The *KHSSP III* is Kenya's third medium-term plan for health and is aligned with the Medium Term Plan (MTP) II of the *Kenya Vision 2030*. The vision, mission, and goal of the *KHSSP III* (Box 1) are intended for the public and private health sectors, including all sector-related activities that promote health in Kenya (MOH, 2013a).

A thorough and inclusive consultative process informed the development of the *KHSSP III*. Six thematic working groups were established, representing the government, the private sector, nongovernmental organizations (NGOs), and development partners. Following an external evaluation of the *National Health Sector Strategic Plan 2005–2010 (KHSSP II)*, the *KHSSP III*'s predecessor, representatives from each thematic working group convened for a 14-day workshop. At the workshop, participants critically evaluated the *KHSSP II*, reviewed available literature, defined priorities, and created an implementation framework. The resulting draft was approved for dissemination in 2014 after a review by key stakeholders. The strategic plan will serve to advise county and national governments on operational priorities in health and guide the allocation of resources under the medium-term expenditure framework (MTEF) process (MOH, 2013a).

### Box 1. Overall vision, mission, and goal of the KHSSP III

**VISION:** A globally competitive, healthy, and productive nation.

**MISSION:** To deliberately build a progressive, responsive, and sustainable technologically driven, evidence-based, and client-centered health system for accelerated attainment of the highest standard of health for all Kenyans.

**GOAL:** Accelerating attainment of health goals.

Source: MOH, 2013a

# DEVOLUTION AND THE SERVICE DELIVERY CHALLENGE FOR COUNTY GOVERNMENTS

In Kenya, the public health system consists of six levels of healthcare: community (level I), primary care (levels II–III), and referral (levels IV–VI) (Box 2). As per the new constitution, level I–V facilities are the responsibility of the county governments, while level VI facilities are managed by the national government (MOH, 2013a). The Fourth Schedule of the Constitution explicitly defines county health functions, which include the management of pharmacies, ambulatory services, and health facilities.

The *KHSSP III* stipulates that county-specific health strategies be developed based on local realities, including county-specific targets and investment priorities (MOH, 2013a). Furthermore, the priority areas of investment identified in the *KHSSP III* and listed below highlight aspects of national-level strategic planning and policy which should be county-specific. However, the extent to which counties will be involved in these planning processes is unclear (MOH, 2013a):

- Develop county-specific human resources for health (HRH) staffing targets
- Document and share county experiences with the attraction and retention of HRH
- Define county-specific health infrastructure gaps in requirements of all norms (e.g. service units, quantity of equipment and transportation)
- Develop and implement costed county-specific health infrastructure plans with recurrent cost calculations
- Develop sectorwide annual workplans at the county level, based on available resources and guided by strategic plans

At the time of this analysis, county-specific health strategies had been completed for a limited number of counties and exclusive county functions were not fully transferred from the national level. Due to the uncertainty surrounding county management of service delivery, this report largely assumes national-level management of service delivery and the related cost in the near term. As strategic planning moves toward counties, it will be more appropriate to adopt a bottom-up costing approach.

## Box 2. *KHSSP III* levels of care

Level	Facility
I.	Community units
II.	Dispensary
III.	Health centre
IV.	Primary referral unit
V.	Secondary referral unit
VI.	Tertiary referral unit

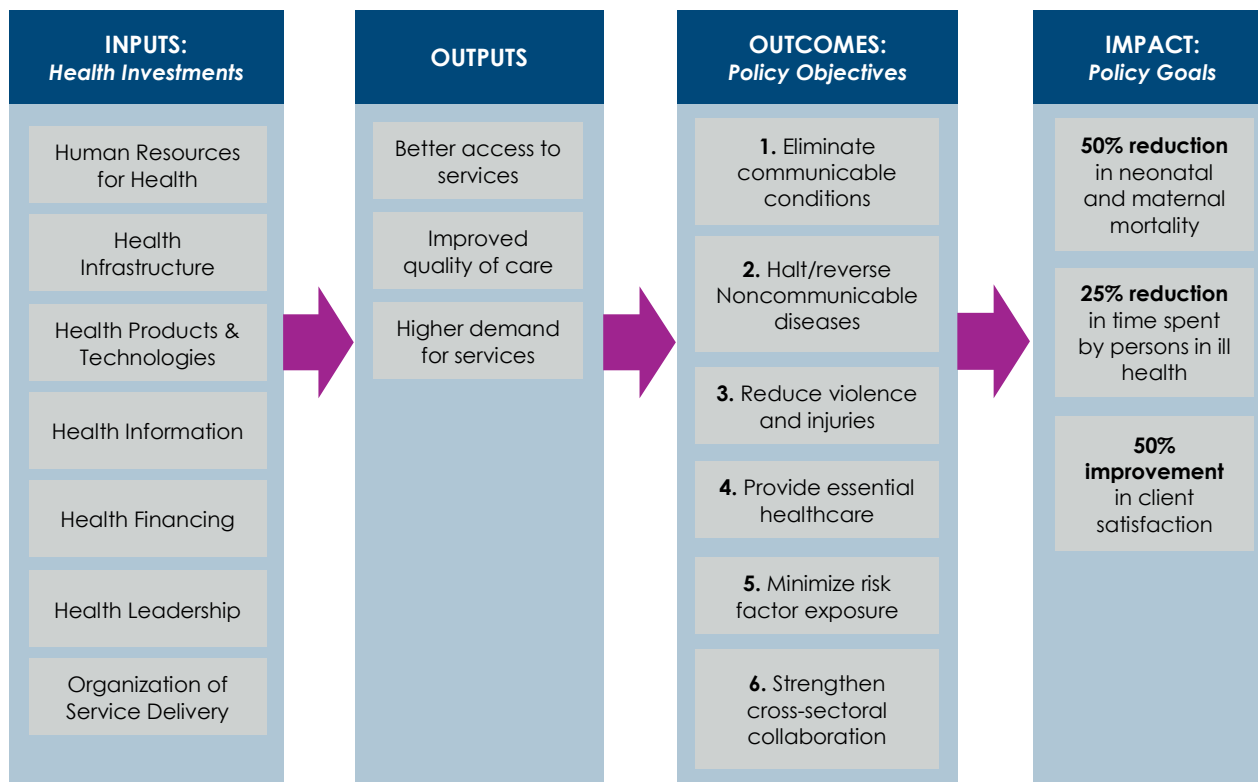
Source: MOH, 2013a



## KHSSP III Implementation Framework

The *KHSSP III* implementation framework is based on the *KHP* conceptual framework. It logically outlines health sector priorities for 2014 to 2018. The implementation framework defines health sector priorities in terms of health inputs, outputs, outcomes, and impact (Figure 1) which interact to create a conceptual framework for implementation.

Figure 1. *KHSSP III* Framework for Implementation



Source: Adapted from MOH, 2013a

### ***KHSSP III* inputs: health investments**

Seven health investment areas constitute the *KHSSP III* inputs (Figure 1). These inputs closely mirror the World Health Organization's (WHO) six health system building blocks, with the exception of the Service Delivery building block. The Service Delivery WHO building block encompasses two *KHSSP III* investment areas: Health Infrastructure and Organization of Service Delivery. Under the *KHSSP III*, health infrastructure investments refer to the construction, procurement, and/or maintenance of facilities, equipment, and transportation, while Organization of Service Delivery focuses on the organization of services within facilities and among facilities (i.e., referral and outreach) (MOH, 2013a).

The prioritization of investments in *KHSSP III* is governed by principles of equity, people-centered participation, multisectoralism, efficiency, and social accountability (MOH, 2013a). The *KHSSP III* does not provide details on how these principles will be operationalized.

### ***KHSSP III* outputs**

Under the *KHSSP III* implementation framework, sufficient investment in health inputs should improve access to services, quality of care, and demand for services in the health sector. Therefore these represent the *KHSSP III* outputs and link health investments to health outcomes.

Improving access to services depends on physical proximity, affordability, and sociocultural acceptability. To improve access to services, functional facilities and personnel must be available at a

low cost and free from gender, religious, and/or cultural barriers. Health outcomes depend on high-quality services marked by positive client experiences, patient safety, and effective care. Demand for services will grow when communities are aware of available services and health-seeking behaviors improve (MOH, 2013a).

***KHSSP III* outcomes: strategic objectives<sup>1</sup>**

The *KHSSP III*'s six strategic objectives articulate the plan's priority health outcomes. It outlines more than 350 comprehensive health services across its six strategic objectives, collectively referred to as the Kenya Essential Package for Health (KEPH). The KEPH, whose development preceded the *KHSSP III*, was updated in parallel with the creation of the strategic plan and mapped to the appropriate strategic objective (Table 1). The *KHSSP III* prioritizes service delivery scale-up in terms of eradication, elimination, control, or containment of various communicable and noncommunicable conditions, with an overall view to moving toward universal health coverage (MOH, 2013a). Universal health coverage implies improving the breadth, depth, and height of coverage.<sup>2</sup> Indicators and the five-year attainment targets for key health services are defined in the *KHSSP III*.

**Table 1. Mapping of *KHSSP III* strategic objectives to KEPH services**

<b><i>KHSSP III</i> STRATEGIC OBJECTIVE</b>	<b>KEPH SERVICES</b>
<b>1. Eliminate communicable conditions</b>	Immunization, child health, screening for communicable conditions, antenatal care, prevention of mother-to-child transmission, integrated vector management, good hygiene practices, HIV and sexually transmitted infection (STI) prevention, Port Health, control and prevention of neglected tropical diseases
<b>2. Halt and reverse the rising burden of noncommunicable conditions</b>	Health promotion and education for noncommunicable diseases (NCDs), institutional screening for NCDs, rehabilitation, workplace health and safety, food quality and safety
<b>3. Reduce the burden of violence and injuries</b>	Health promotion and education on violence and injuries, pre-hospital care, outpatient department/accident and emergency, management for injuries, rehabilitation
<b>4. Provide essential healthcare</b>	Accident and emergency, life support, maternal and newborn services, reproductive health, inpatient care, clinical and specialized laboratory, imaging, pharmaceutical, blood safety, rehabilitation, palliative care, specialized clinics, comprehensive youth-friendly services, operative surgical services, specialized therapies
<b>5. Minimize exposure to health risk factors</b>	Health promotion including education, sexual education, substance abuse, micronutrient deficiency control, physical activity
<b>6. Strengthen collaboration with health-related sectors</b>	Safe water, sanitation and hygiene, nutrition, pollution control, housing, school health, food fortification, population management, road infrastructure and transport

Source: Adapted from MOH, 2013a

<sup>1</sup>Strategic objectives are also referred to as policy objectives in the *KHSSP III*.

<sup>2</sup> Breadth of coverage is defined as the proportion of the population that has access to the health services they need. Depth of coverage is defined as the number of conditions or interventions are included in the package of health services provided. Height of coverage is defined as the proportion of the cost of health services covered (Qingyue and Shenglan, 2010).

### ***KHSSP III impact: policy goals***

The *KHSSP III* ultimately aims to achieve “better health in a responsive manner” that is both equitable and effective, by 2018 (MOH, 2013a). Specifically, the health sector will focus on three impact targets: general morbidity, client satisfaction, and maternal and newborn mortality (Table 1). Maternal and newborn health are high priorities due to the lack of evidence that any progress has been made in these areas since the implementation of the *KHSSP II* (MOH, 2013a). Achieving the *KHSSP III*'s policy goal of a 50 percent decline in newborn and maternal mortality will depend largely on the success of Strategic Objective 4, to provide essential healthcare. Further analysis of the health status in Kenya and related impact goals are provided below, in the “Health Programs: Service Delivery and Program Management” section.

## **Request for Technical Assistance from the Health Policy Project and MOH Engagement**

To provide sustainable healthcare services for Kenyans, an adequate and sustained flow of resources is required. Modes of financing health services should reflect both the cost of service provision and the population's ability to pay. Consequently, information on the cost of providing healthcare services is becoming increasingly important, especially in the context of the new constitution, which provides healthcare as a right to all Kenyans. This report presents cost estimates of providing healthcare services under the *KHSSP III*.

The MOH selected the OneHealth Tool to cost the *KHSSP III* and requested technical assistance in applying the tool from the USAID-supported Health Policy Project (HPP). The OneHealth costing process was closely integrated with the writing of the *KHSSP III*, and the thematic working groups were briefed early in the process. Two junior economists and a senior clinician from the MOH supported the HPP team in the data collection process. From 2012 to 2013, HPP and the MOH technical team engaged the respective MOH departments and divisions to determine the *KHSSP III* scale-up plans, commodities required for scale-up, unit costs, and other aspects of service delivery and management. Originally intended to guide 2012–2016 strategic planning, the *KHSSP III* underwent multiple, significant revisions between 2012 and 2014 to adapt to the changing structure of the public health sector and based on the availability of unprecedented health system databases (i.e., the Service Availability and Readiness Assessment [SARAM]). In parallel, HPP generated several drafts of the costing results and performed ongoing validation of the inputs, targets, and results with the MOH over 2012–2013. This culminated in an off-site OneHealth workshop for ministry staff, detailed in the following section.

## **Capacity Building with the Kenya MOH**

OneHealth capacity building in the MOH focused on the Planning and Policy Department (PPD). Prior to the tool being applied to the *KHSSP III*, PPD staff attended OneHealth trainings led by the WHO and other development partners. HPP recruited two junior economists from the PPD, both of whom played key roles in facilitating data collection within the MOH.

In October 2013, HPP led an off-site OneHealth training and validation workshop for key informants from the MOH. Thirteen program managers representing eight MOH departments and four PPD economists, each of whom played a key role in supporting the capacity development of other MOH staff, attended the week-long workshop. The workshop focused on the OneHealth cost structure for the health sector, data inputs, adapting the costing tool to the devolved governance system, and validating previously collected data and results.

In a survey, workshop participants were asked to rate their confidence in applying certain skills. Program managers reported their confidence in applying the OneHealth costing methodology prior to the workshop to be “low” or “moderate.” After the workshop the same managers reported their confidence to be “good” or “excellent.” Furthermore, all program managers who responded to the survey rated their confidence in validating the Excel-based data collection tools to be “excellent.”

Program managers also noted the knowledge and skills gained at the OneHealth workshop would be applied to annual workplan development and financial gap analyses, and used to advocate for costing tools to guide planning and resource allocation within programs. Program managers also noted the uniform costing tool would improve collaboration across organizations and multisectoral planning. All PPD economists expressed the need to expand capacity building to a broader base of MOH staff and establish a team of experts.

# ONEHEALTH METHODOLOGY

## OneHealth Overview

In 2012, the ministries of health chose the OneHealth Tool (Box 3) to project the health sector cost under *KHSSP III*. Created by international agencies, the OneHealth Tool’s primary purpose is “to assess public health investment needs in low- and middle-income countries” (UN, 2012). It is unique in considering the demands of the health sector from both systemwide and program-specific perspectives. OneHealth incorporates existing costing tools and is linked to the other models included in the Spectrum Policy Modeling System. By using specific impact assessment models from the Spectrum suite, OneHealth also estimates the overall health outcomes and impact achieved. Hence, it is a unified tool in two ways: it unifies planning, costing, budgeting, impact, and financial space analysis; it also unifies analysis of vertical disease programs with demands on the health system. A full list of modules that can be linked with OneHealth as a part of the Spectrum suite is provided in Annex A.

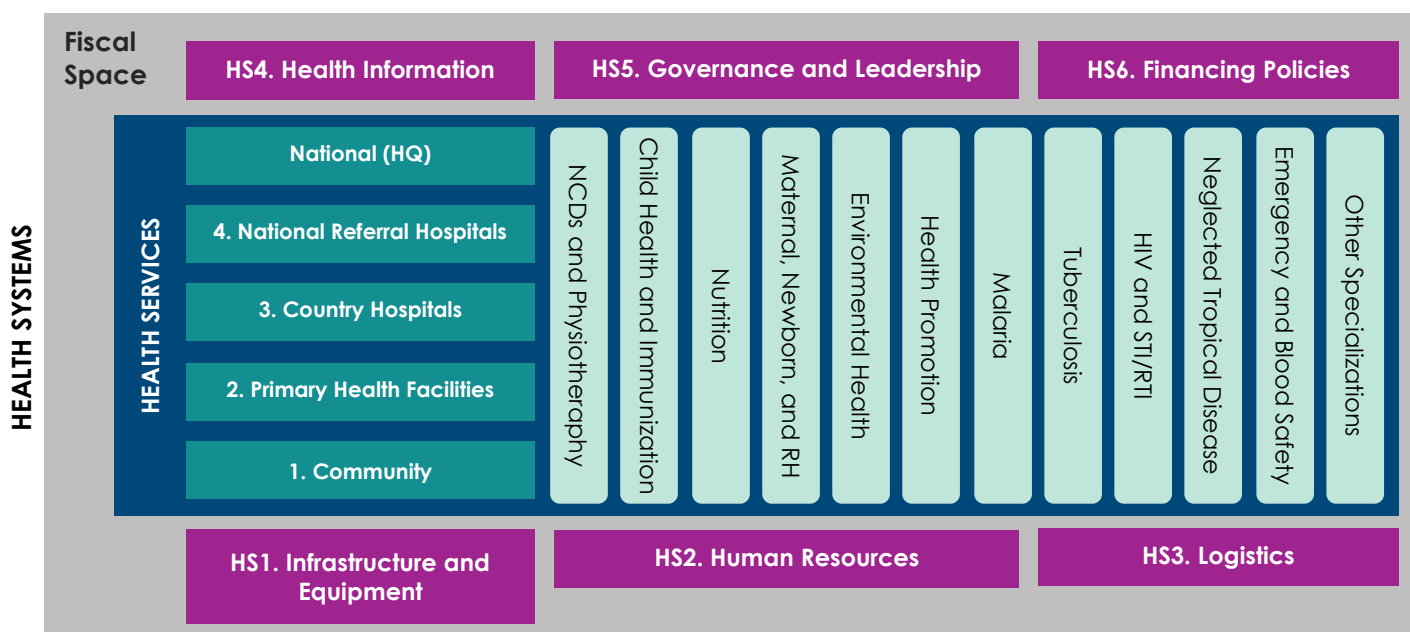
### Box 3. What is OneHealth?

The OneHealth Tool is a model for medium- to long-term (3 to 10 years) strategic planning in the health sector. Produced by an international consortium in collaboration with the WHO, other UN agencies, and Avenir Health (formerly Futures Institute), the OneHealth model estimates the cost of health service delivery by disease program and incorporates implications for health system components. OneHealth is integrated within the Spectrum suite of models, which includes demographic projections derived from UN Population Division estimates.

Source: Authors

OneHealth follows the WHO’s six building blocks health system formulation: health workforce, health financing, medicine and health products, health information, governance, and service delivery (Figure 2). Of these, the medicine and health products block is fully costed in the analysis of health programs, which also incorporates national-level program management costs (National HQ in Figure 2). The remaining building blocks are captured in the OneHealth health systems components that are similar to the *KHSSP III* health system investment areas (HS1–HS6 in Figure 2).

Figure 2. OneHealth diagram



Source: Adapted from Stenberg, 2011

Service delivery through health programs traverses all levels of care. The predefined OneHealth levels of care were adapted to the *KHSSP III* facility level classification:

1. Community: Level I
2. Primary health facilities: Levels II and III
3. County hospitals: Levels IV and V
4. National referral hospitals: Level VI

## Methodology for Health Programs

The OneHealth Tool groups health services (henceforth referred to as “interventions” in accord with OneHealth terminology) into health programs. HPP mapped the promotive, preventive, curative, palliative, and rehabilitative interventions within the revised KEPH to health programs using the corresponding MOH departments responsible for their implementation as a guide. Smaller-scale primary and secondary health programs, and closely related health programs are consolidated in this report for simplified presentation. Figure 2 shows 12 consolidated health programs under the *KHSSP III*.

### Cost analysis of health interventions

All health programs under the *KHSSP III* include service delivery interventions, except for Health Promotion. For the remaining 11 health programs, the OneHealth Tool estimates the direct cost of drugs and commodities required for each intervention. In costing approaches that apply an economic principle, all direct and indirect costs of health interventions, such as the health system inputs and foregone labor productivity (opportunity cost), would be included. However, allocation of health system inputs to specific interventions is complicated by a lack of data. Instead, the OneHealth approach adopts a provider-focused costing perspective in which opportunity cost is excluded and health system inputs, such as infrastructure, are captured comprehensively at the sector level. Similarly, the direct cost of HRH is separate from the health intervention analysis. Health system components are discussed in detail in the “Methodology for Health Systems Components” section. For each intervention the technical team estimated the direct cost of drugs and commodities as follows:

**Total direct costs, by intervention** = Cost per case per year (drugs & commodities) x Number of cases

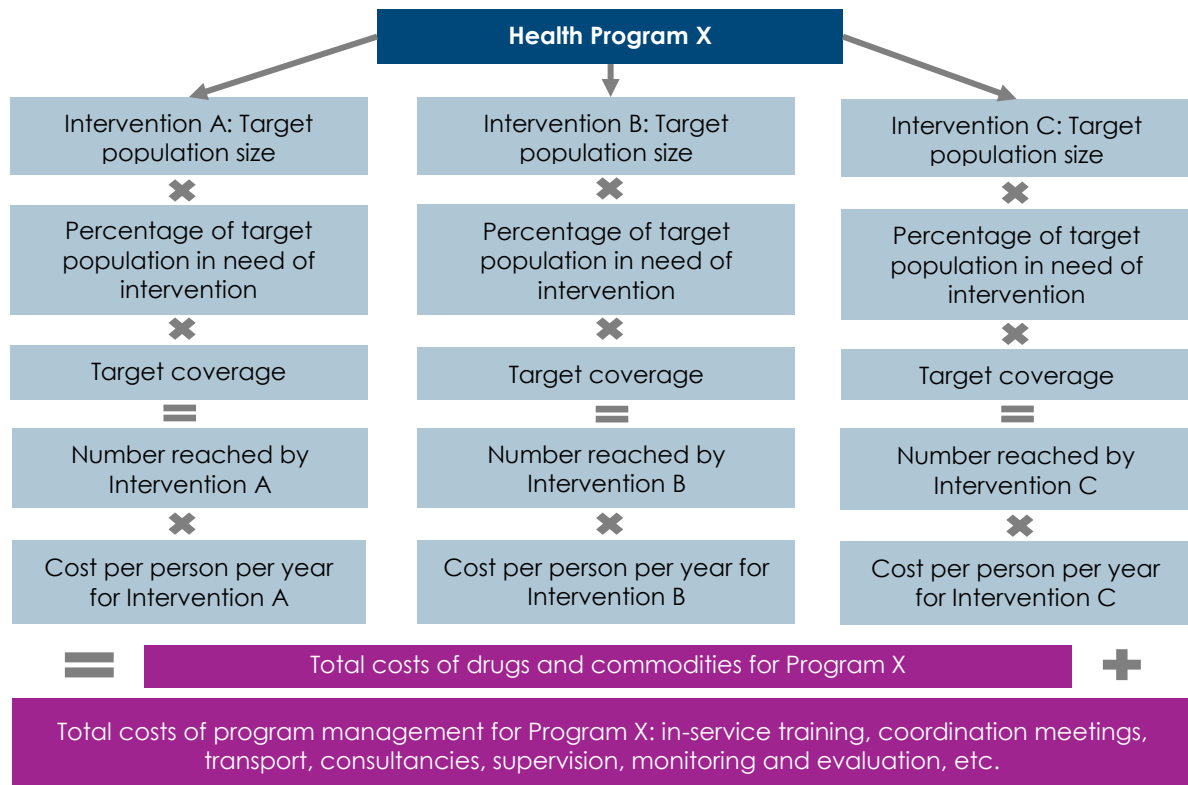
**Where, Number of cases** = Size of target population x Population in need (%) x Coverage (%)

The base or target population is generated from internationally approved demographic and impact modules linked to the OneHealth Tool. The central model, DemProj, projects the population for an entire country disaggregated by age and sex, based on assumptions about fertility, mortality, and migration. The population in need (%) across interventions reflects the epidemiological profile of Kenya. This input can be interpreted as the prevalence of a condition to be targeted for curative, palliative, or rehabilitative interventions, or an at-risk population to be targeted for promotive or preventive interventions. Coverage (%) is the major policy variable and indicates baseline programmatic coverage of the population in need and targeted scale-up, based on *KHSSP III* objectives. In certain cases, the health program provided multi-year estimates of the number of persons it would reach with a specific intervention instead of percentage coverage. In these cases, the number of cases per year, per intervention was entered directly. Other adaptations to specialized interventions are addressed as relevant under “Financial Resource Requirements, Health programs: Service Delivery and Program Management.”

### Cost analysis of program management

Program management costs incurred by a health program may include training, supervision, monitoring and evaluation, transportation, advocacy and communication, and media and outreach. These costs derived from health program managers' inputs, and were incorporated into the annual costs at the program level. Figure 3 illustrates how the cost of program management, together with the direct interventions' cost, represents the total cost of a given health program.

**Figure 3. Diagram of health program cost analysis**



Source: Authors

## Methodology for Health Systems Components

Apart from health programs, the OneHealth Tool includes six health system components which cover the remaining critical inputs for service delivery, as defined by the WHO health system building blocks. The cost of each health system component is driven by the availability of functional inputs (i.e., trained human resources for health, equipped facilities, etc.), as well as program management provided through the MOH at the national level. Specific inputs by health system component are outlined in Table 2.

**Table 2. OneHealth health systems components**

ONEHEALTH COMPONENT	INPUTS INCLUDED IN COSTING OF KHSSP III
<b>1. Health infrastructure</b>	Construction of new facilities; rehabilitation and operation of existing facilities; procurement and maintenance of general equipment, furniture, and vehicles at the facility level
<b>2. Human resources for health</b>	Total remuneration for staff (salaries, benefits, allowances, and any other retention incentives) and the cost of pre-service training in the health sector
<b>3. Logistics</b>	Cost of the supply chain, <sup>i</sup> including storage, transportation, and the cost of drugs and commodities which are procured but never consumed (i.e., wastage <sup>ii</sup> )
<b>4. Health information systems</b>	Cost of the Health Management Information System (HMIS) and its national-level administration cost
<b>5. Health governance</b>	Funding for national-level departments and coordination units (e.g., department of Planning and Feasibility Studies) under MOMS and MOPHS FY 2012/13 budgets; Headquarters budgets of other departments that play a cross-cutting role in service delivery (e.g., National Public Health Laboratory Services)
<b>6. Health financing</b>	Cost of health financing initiatives, such as performance-based financing for healthcare workers funded through the World Bank <sup>iii</sup>

Source: Authors

i. Commodity procurement for interventions is excluded.

ii. This is calculated by assuming a wastage rate (%) for each commodity.

iii. All voucher schemes and user fee waivers were excluded as their purpose is to cover a cost that is already reflected in the intervention cost analysis.

## Overall Data Collection and Sources

For all health programs, HPP designed customized data collection tools around the OneHealth inputs to synthesize all primary and secondary data. Primary sources include recently costed disease strategies and their associated costing files, and recent budget proposals for the Global Fund. For the HIV and STI program, the 2013 forecasting and quantification (F&Q) report was also a major source for targets and unit costs. Where formal costed strategic plans were lacking, HPP and ministry staff fielded Excel-based data collection tools to key respondents from the ministry to develop intervention unit costs with an ingredients-based approach drawing on treatment standards and Kenya Medical Supplies Authority (KEMSA) or donor commodity procurement prices (i.e., Mission for Essential Drugs and Supplies [MEDS]). The data collection tools were also populated with epidemiological data, programmatic coverage targets, and program management costs, and supplemented as necessary with literature review.

Consultation with the ministry on health systems components also centered on Excel-based data collection tools. The SARAM informed infrastructure, equipment, and staffing availability at baseline, while the *KHSSP III* provided specific scale-up targets for the corresponding health system investment areas.



## Adopting a Whole Sector Approach

In Kenya, the contribution of the private health sector is growing, but the full extent remains unknown. At present the public sector oversees 48 percent of facilities; the private, not-for-profit sectors (i.e., faith-based organizations [FBOs] and NGOs) manage 16 percent of facilities; and the private, for-profit sector operates 33 percent of facilities (GOK, 2014). While the public sector's physical presence is especially strong in primary healthcare (i.e., level II and II facilities), the private, for-profit sector is moving toward “nursing homes and maternity facilities catering to higher income clients,” and secondary care (Gayle et al., 2010, p. 2). Still, the private, for-profit sector extends across socioeconomic groups, with 47 percent of Kenya's poorest quintile using a private facility when a child is sick (Barnes, 2010).

This report aims to capture the range of these costs across the whole health sector, both public and private. The utilization of certain health services broken down by provider type is reported in the Health Management Information System (HMIS) and Demographic Health Survey (DHS), in addition to select strategic plans. HPP also conducted a literature review of the private, for-profit sector in Kenya and other developing countries, and collaborated with program managers to estimate the relative distribution of select services across managing authorities. The SARAM, which encompasses all forms of facility ownership, also provided key information on the private sector for the health system component analyses.

### **Public and private not-for-profit sectors**

Public sector costs are estimated for every health system component and health program. However, the costs for the private, not-for-profit sector are limited to service delivery for certain health programs. Service delivery coverage in the public and private not-for-profit sectors was determined through secondary data analysis and via consultation with key respondents in the ministry, as discussed in the previous section. The coverage across the two sectors was combined for cost analysis.

### **Private for-profit sector**

Based on available data, the cost of service delivery through the private, for-profit sector is reflected only in certain health programs. This cost analysis assumes that the cost of drugs and commodities required for service delivery in the private, for-profit sector is equal to that in the public and private not-for-profit sectors. Key inputs, such as infrastructure and human resources in the private, for-profit sector are also reflected in the cost of health system components.

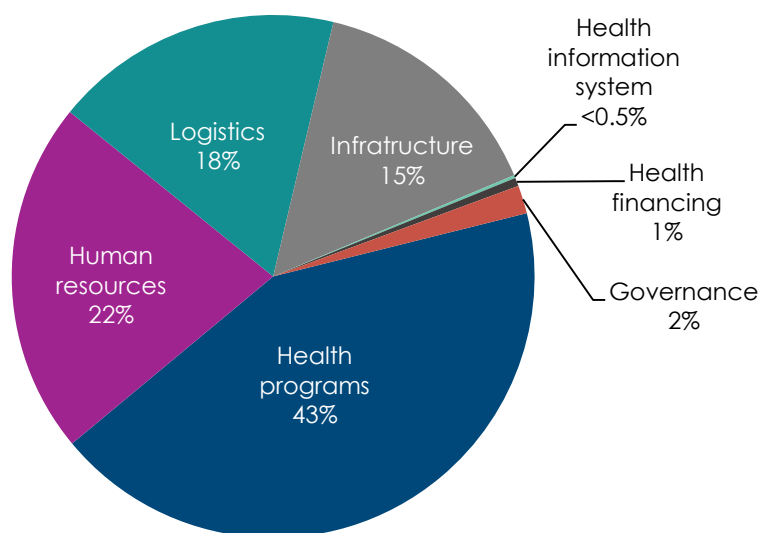
A complete analysis of the private, for-profit sector is limited by incomplete or absent data and monitoring systems. The lack of information on the private, for-profit sector also has broad implications for the quality of health services. In the private sector, a lack of regulation, unqualified health professionals, inefficient monitoring and licensing, and the absence of accreditation for facilities and laboratories contribute to the large disparities in health service quality compared to the public sector (Barnes, 2010).

# FINANCIAL RESOURCE REQUIREMENTS

## Summary of Costs

Over the period from FY 2013/14 to FY 2017/18, the health sector is projected to cost US\$13,142 million (KSh 1,103 billion). Management and delivery of KEPH interventions through the 12 health programs will require the largest share of the health sector cost, 43 percent (Figure 4). Together, HRH, logistics, and health infrastructure will make up 55 percent of the total health sector cost, while health information systems, health financing, and governance will make up less than 3 percent.

**Figure 4. Summary of health sector cost, FYs 2013/14–2017/18**



Source: Author's calculations

During *KHSSP III* implementation, the annual cost of the health sector will increase by US\$749 million (KSh 62 billion) or 33 percent (Table 3). This growth will mostly be attributed to health programs and human resources. Over the five-year implementation period, the cost of these two health system components will increase by 37 and 39 percent, respectively. In contrast, the cost of logistics will increase by only 5 percent, and the cost of health information systems will decrease by nearly half (49%). Consequently, health programs and HRH will make up a relatively larger share of the total health sector cost over time. All other components of the health system will make up a relatively smaller share.

**Table 3. Summary of health sector cost, FYs 2013/14–2017/18**

	US\$					Percentage of Total Cost FYs 2013/14–2017/18
	FY 2013/14	FY 2014/15	FY 2015/16	FY 2016/17	FY 2017/18	
Health programs	935,220,074	1,071,854,442	1,126,923,884	1,219,394,116	1,278,241,021	43%
Human resources	425,742,243	485,601,084	550,934,931	647,727,512	763,070,508	22%
Logistics	375,747,371	379,071,526	382,395,680	409,581,291	420,086,564	18%
Infrastructure	457,152,784	466,776,532	469,914,494	475,941,831	479,918,652	15%

Governance	42,813,156	44,141,541	45,768,456	47,027,240	48,654,213	2%
Health financing	13,531,979	13,553,518	13,671,494	13,671,683	13,671,894	1%
Health information system	7,050,903	6,257,035	3,576,102	3,579,875	3,603,178	<0.5%
<b>Total</b>	<b>2,257,258,509</b>	<b>2,467,255,677</b>	<b>2,593,185,040</b>	<b>2,816,923,548</b>	<b>3,007,246,029</b>	<b>100%</b>

Source: Author's calculations

Note: In this and subsequent tables, the totals for columns showing percentages may not equal the sum of components due to rounding.

## Health Programs: Service Delivery and Program Management

Service delivery and program management through the 12 health programs are projected to cost US\$5,631 million (KSh 473 billion) over FYs 2013/14–2017/18. The health sector's response to HIV,<sup>3</sup> STIs, and reproductive tract infections (RTIs) will require the largest share of resources (21%), followed by child health and immunization (17%) (Table 4). Over time, the relative distribution of cost by program area will fluctuate across certain programs. The cost attributed to the malaria program will vary substantially over FYs 2013/14–2017/18 (7–17%), while the maternal, newborn, and reproductive health (MNRH) program will consistently incur 9 percent of the total program cost. Less than 1 percent of the projected health program cost under the *KHSSP III* will be attributed to health promotion and neglected tropical diseases (NTDs). This is due to the inherent structure of these health programs; health promotion does not involve commodity procurement, while the NTD program targets a finite number of effective interventions targeting geographically concentrated diseases.

**Table 4. Summary of health program cost, FYs 2013/14–2017/18**

	US\$					Percentage of total cost FYs 2013/14–17/18
	FY 2013/14	FY 2014/15	FY 2015/16	FY 2016/17	FY 2017/18	
HIV and STI/RTI	198,267,883	215,912,062	242,989,877	268,714,930	283,570,475	21%
Child health and immunization	145,912,035	162,352,730	202,706,955	222,465,182	233,920,345	17%
NCD	68,803,397	96,758,006	128,080,547	159,746,841	201,405,140	12%
Malaria	110,596,427	177,573,010	112,575,784	112,977,528	90,434,989	11%
MNRH	93,343,427	97,632,254	105,055,229	109,322,803	113,558,557	9%
Other specializations*	78,317,824	81,727,063	84,922,999	88,177,079	91,485,839	8%

<sup>3</sup> This analysis was conducted prior to subsequent multisectoral cost analyses of the HIV response, such as the *Kenya AIDS Strategic Framework (KASF) 2014/15–2018/19*. Therefore the resource requirement for the *KASF* will not align with the *KHSSP III* during common years. This difference is explained by the respective costing methodologies. The *KHSSP III* views the cost of the HIV and STI/RTI program as the incremental cost of the program, including HIV-related commodities and health sector activities. The *KASF* also accounts for non-health sector activities and shared health sector expenses defined by the six health system components under the *KHSSP III*.

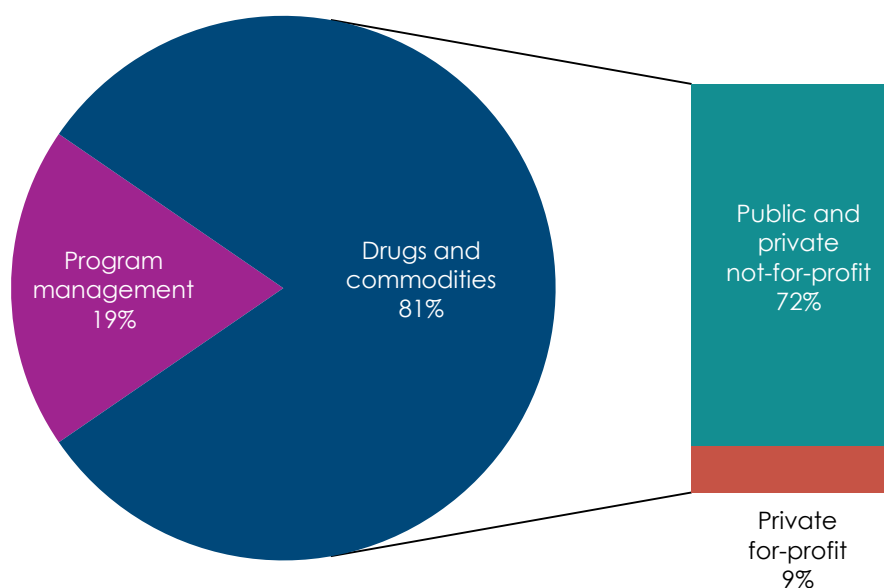
Nutrition	51,105,873	58,765,888	65,521,821	72,187,894	78,013,540	6%
Environmental health	70,805,994	61,327,143	59,148,516	54,264,613	48,678,057	5%
Emergency care and blood safety	49,713,016	54,782,904	60,078,820	65,546,045	71,258,760	5%
Tuberculosis	51,382,036	49,917,084	50,766,749	50,786,970	50,635,135	5%
Health promotion	10,277,283	8,576,815	8,467,559	8,602,980	8,602,980	<1%
NTD	6,694,878	6,529,482	6,609,027	6,601,251	6,677,203	<1%
<b>Total program cost</b>	<b>935,220,074</b>	<b>1,071,854,442</b>	<b>1,126,923,884</b>	<b>1,219,394,116</b>	<b>1,278,241,021</b>	<b>100%</b>

Source: Author's calculations

\*Includes ophthalmology, mental health, oral health, internal medicine, and other communicable diseases.

Drug and commodity procurement will incur US\$4,574 million (KSh 384 billion), or 81 percent of the total program cost (Figure 5). Procurement through the private, for-profit sector will account for only 9 percent of the program cost. Drugs and commodities to screen and treat NCDs are the largest drivers of cost in the private, for-profit market, while HIV- and STI/RTI-related drugs constitute the largest cost for the public and private not-for-profit markets.

**Figure 5. Total health programs macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

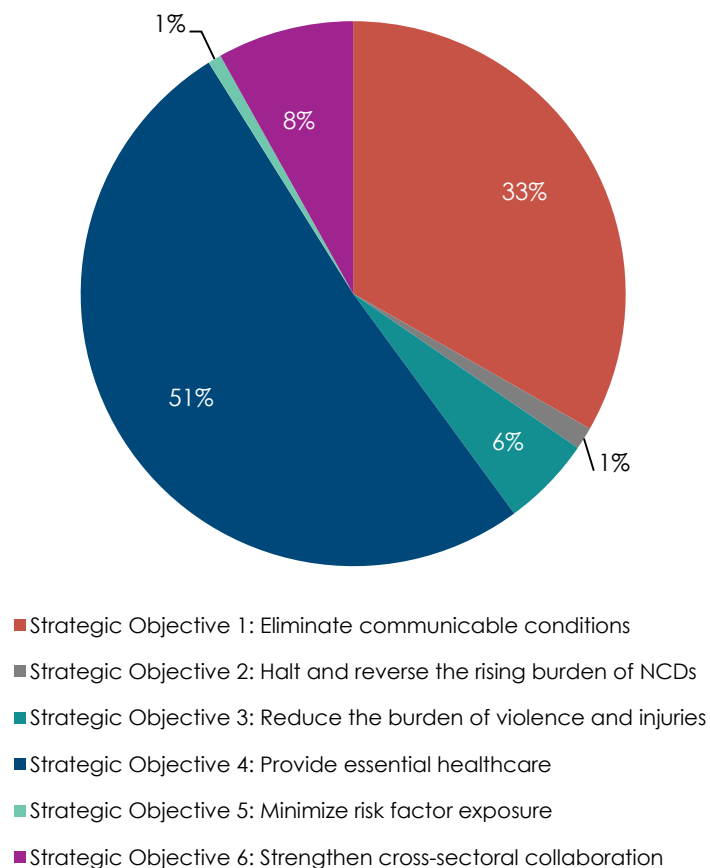
### Health strategic objectives

As stated, the KEPH serves as the basis for the OneHealth service delivery and program management structure, as well as the *KHSSP III* strategic objectives. By mapping the OneHealth interventions and program management activities to the corresponding strategic objective, Figure 6 illustrates the distribution of total program cost by strategic objective.

Strategic Objective 4, to provide essential healthcare, will require the most resources (51%) under the *KHSSP III*. The objective encompasses all specializations, as well as care and treatment for the HIV,

nutrition, NCD, and MNRH programs. Strategic Objective 1, to eliminate communicable conditions, will require the second most resources. All screening and preventive interventions for communicable conditions are included in Strategic Objective 1, as well as care and treatment for certain highly infectious diseases (i.e., NTDs, leprosy, tuberculosis [TB], STIs, malaria, and childhood illnesses).

**Figure 6. Distribution of program cost, by KHSSP III strategic objective, FYs 2013/14–2017/18**



Source: Author's calculations

The smallest proportion of resources will be required to achieve Strategic Objective 2, to halt and reverse the rising burden of NCDs, and Strategic Objective 5, to minimize risk factor exposure. This finding may not be indicative of a lesser need for resources, but rather a smaller number of responsible divisions within the MOH and a narrower scope for the interventions. Strategic Objective 5 is supported exclusively by the health promotion program, which focuses on integrated activities to target all health behaviors and risk factors. In practice, behavior change is also supported through the communication programs of vertical disease programs. Furthermore, the total cost to minimize exposure will likely require non-health sector investment.

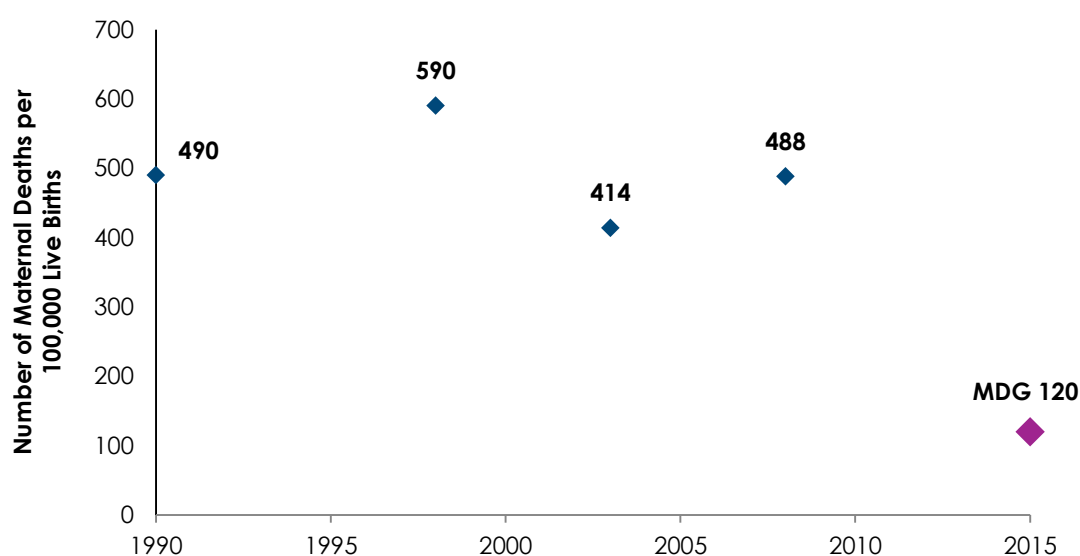
Strategic Objective 2 focuses on NCD prevention and is limited to four screening interventions between the NCD and MNRH programs. The limited scope of Strategic Objective 2 is compounded by low baseline coverage relative to the recommended population. Although the programs outline ambitious targets for the scale-up of screening, it is unlikely that the total volume of services in FY 2017/18 will “halt and reverse the rising burden of NCD” (MOH, 2013a). Only cervical cancer screening will achieve 50 percent coverage of the recommended population under the *KHSSP III*. Strategic objectives 4 and 5 also indirectly support Strategic Objective 2 through curative (Strategic Objective 4) and promotive (Strategic Objective 5) NCD interventions.

## Program areas

### Maternal, newborn, and reproductive health

**Situational analysis:** Under the *KHSSP II*, progress in newborn and maternal survival stagnated; antenatal care (ANC) coverage fell from 95 to 92 percent, and births attended by a skilled birth attendant (SBA) dropped from 45 to 42 percent (MOH, 2013a). As a result, Kenya is not on track to meet Millennium Development Goal (MDG) 5, to improve maternal health by reducing the maternal mortality ratio (MMR) by three-quarters between 1990 and 2015 (Figure 7). In Kenya, neonatal deaths are most often caused by severe infections or birth asphyxia, and maternal deaths are most commonly the result of hemorrhage and hypertension (UNICEF, 2012). Shortfalls in SBA and ANC are likely due to insufficient access to maternity services, which are not provided in 65 percent of facilities. Furthermore, lifesaving drugs such as misoprostol for mothers and antenatal corticosteroids for newborns are only available at 10 percent and 16 percent of all health facilities, respectively (GOK, 2014).

Figure 7. Maternal mortality ratio in Kenya, 1990–2015



Source: KNBS, 2010; World Bank, 2014b; Countdown, 2014; UNDP, n.d.

Use of modern contraceptive methods among women of reproductive age expanded under the *KHSSP II*. By 2008, 28 percent of women of reproductive age were using modern forms of contraception. Increased funding for family planning, integrated reproductive health and HIV services, and changing from a donor-led procurement distribution system to one led by KEMSA contributed to this achievement (KNBS, 2010; MOH, 2012b).

**Strategic objectives:** Reducing maternal and newborn morbidity and mortality by 50 percent is the priority impact target under the *KHSSP III*. Performance monitoring indicators specifically aim to decrease the prevalence of facility-based maternal deaths, low birth weight (LBW) infants, and stillbirths. Additionally, the strategic plan calls for the elimination of maternal and neonatal tetanus.

**Scale-up:** In line with the *KHSSP III* impact targets, performance monitoring indicators are also outlined for programmatic coverage of essential maternal and newborn services. The plan ambitiously targets 65 percent of deliveries to be attended by an SBA, 75 percent of women of reproductive age to be screened for cervical cancers, and 80 percent of pregnant women to receive four ANC visits by FY 2017/18. This would require ANC coverage (four visits) to nearly double from FY 2012/13, but would still fall short of the Division of Reproductive Health's long-term goal of bringing the level of women attending four ANC visits to the current level of those attending at least one (92%). The *Kenya Service Provision Assessment (SPA) 2010* indicated that 51 percent of facilities offering delivery services could

manage common complications. This helped inform coverage of maternal complications. Through consultation with the Division of Reproductive Health, coverage of postpartum complications is planned to scale-up from 80 to 90 percent over the course of the *KHSSP III*.

A large discrepancy exists between the *KHSSP III* contraceptive prevalence rate (CPR) target, which plans for a 35 percentage point increase in CPR over four years, and the *National Family Planning Costed Implementation Plan (CIP)*, which proposes a 2 percentage point annual CPR scale-up (MOH, 2012b). Given the *KHSSP III*'s commitment to a rights-based approach, which would imply a gradual CPR scale-up based on voluntary uptake, and the ministry's commitment to the CIP, the OneHealth analysis adopted the CIP targets through 2015 and established moderate post-FY 2016/17 targets. These targets were determined through consultation with the Division of Reproductive Health.

**Cost results:** Over FYs 2013/14–2017/18, MNRH will cost US\$518 million (KSh 43.6 billion) (Box 4). By FY 2017/18, the annual cost of MNRH will total US\$122 million (KSh 10.3 billion), a 24 percent increase from FY 2013/14's US\$99 million (KSh 8.33 billion). This projected rapid growth results from an ambitious service delivery scale-up which will rely on the expanded availability of drugs and commodities. Compared to the cost of drugs and commodities, program management costs will remain flat over FYs 2013/14–2017/18. As a result, the relative contribution of program management costs will fall from 31 to 23 percent of the total MNRH cost over FYs 2013/14–2017/18. The largest portion of this program management cost will derive from 30 in-service trainings and sensitizations for healthcare providers, managers, and other support staff.

#### Box 4. MNRH micro cost drivers, FYs 2013/14–2017/18

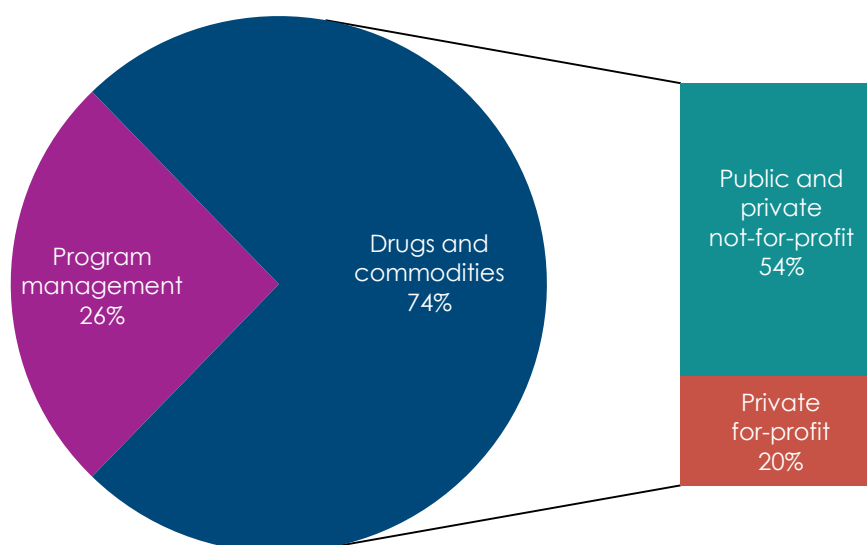
Total Cost: **US\$518,912,270**

Cost Drivers:

- In-service training
- Feeding for LBW infants, unit cost
- Contraceptive implant, unit cost
- Basic ANC, reach
- Injectable contraception, reach

The total cost of drugs and commodities reflects 38 MNRH interventions, excluding STIs, RTIs, screening for reproductive cancers in males, and treatment of reproductive cancers for males and females. Specifically, 70 percent of the total cost of drugs and commodities was derived from four interventions: injectable contraception, contraceptive implant, basic ANC, and feeding counseling and support for LBW infants (Box 4). The contraceptive implant contributes a relatively small portion of the modern contraceptive method mix (9.5%), but is the most costly method at US\$27 (KSh 2,251) per woman per year. Similarly, while the estimated prevalence (10%) and the targeted coverage (33% in 2017) of LBW infants is low, the high cost of infant formula makes feeding counseling and support the most costly MNRH intervention per beneficiary at US\$446 (KSh 37,500). Basic ANC, on the other hand, is a relatively low-cost intervention, US\$7 (575 KSh) per woman over four visits, but the related *KHSSP III* targets are ambitious: aiming to reach more than 2.1 million pregnant women by 2017/18. Likewise, the cost of injectable contraception is one-sixth the cost of contraceptive implant per woman and is used by nearly six times as many women of reproductive age.

Based on the reported source of MNRH services in the *Kenya DHS 2008/09*, procurement of drugs in the private, for-profit sector is projected to make up 20 percent of the total MNRH cost under the *KHSSP III* (Figure 8). The Division of Reproductive Health indicated the private sector may play an exclusive role in the provision of services for the management of infertility, but this intervention was excluded from the analysis due to a lack of data.

**Figure 8. MNRH macro cost drivers, FYs 2013/14–2017/18**

Source: Author's calculations

### *Child health and immunization*

**Situational analysis:** Under-five survival in Kenya has improved consistently since 1997. However, the country is not on track to achieve the MDG 4, which targets 33 under-five deaths per 1,000 population in Kenya in 2015 (Countdown to 2015 Maternal Newborn and Child Survival, 2014). By 2010, the leading causes of post-neonatal deaths for under-fives were diarrhea and pneumonia (IUI, PMNCH, and GOK, 2012). Although health-seeking behaviors (i.e., seeking advice or treatment from a health facility or provider) for children with acute respiratory infection (ARI) symptoms worsened between 2003 and 2008, the prevalence of symptoms in children reduced drastically. In contrast, diarrheal prevalence among children was unchanged between 2003 and 2008, but health-seeking behaviors improved by nearly twofold (Central Bureau of Statistics, 2004; KNBS, 2010). Despite the improvements in health-seeking behaviors, evidence suggests only 55 percent of children with diarrhea are correctly assessed and classified (MOPHS, 2010d). In response, Kenya has committed to the integrated management of neonatal and childhood illnesses (IMNCI) at the community and health facility levels through the training of health workers (MOPHS, n.d.).

The government and stakeholders also attribute the decline in under-five mortality since 1997 to achievements in childhood immunization (IUI, PMNCH, and GOK, 2012) In 2012, 79 percent of children were fully immunized, with especially high coverage for the Bacillus Calmette–Guérin (BCG) vaccine due to support from the country's TB program (MOH, 2013a). Technological advances have reduced immunization prices and immunization wastage—which was estimated to be as high as 70 percent for the measles vaccine in 2012 (Multi Media University, 2013). Vaccines and anti-sera for therapeutic use that fall outside the scope of the Expanded Program for Immunization (EPI) include typhoid, yellow fever, anti-rabies, anti-snake venom, and hepatitis B. These are delivered through the Department of Vaccines and Immunizations as needed.

**Strategic objectives:** The *KHSSP III* aims to reduce the under-five mortality rate (U5MR) from 74 per 1,000 live births in 2012 to 50 per 1,000 live births in 2015. This would require the average annual reduction in the U5MR seen over 2008–2012 to accelerate by threefold over 2013–2015. To support the U5MR target, the *KHSSP III* aims to achieve polio eradication, measles elimination, and a 75 percent reduction in diarrhea prevalence; efforts which will be compounded by the scale-up of water, sanitation, and hygiene (WASH) interventions.

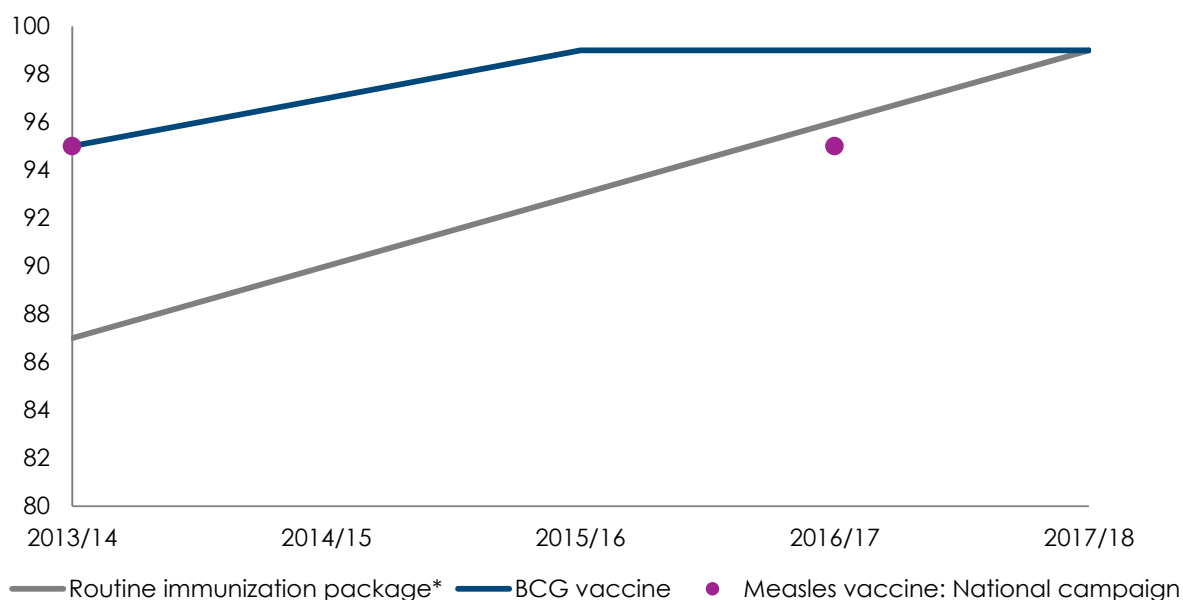


**Scale-up:** In Kenya, diarrheal episodes are classified by no, some, or severe dehydration with corresponding clinical treatment guidelines. Diarrheal episodes with no or some dehydration are treated with oral rehydration salts (ORS) and zinc, which was introduced in 2012. The Department of Child and Adolescent Health (DCAH) plans to scale up ORS treatment coverage for diarrheal episodes with no or some dehydration from 50 percent in 2013/14 to 75 percent in 2017/18, based on reported health-seeking behaviors. Although every child receiving ORS should also receive zinc, the coverage for this intervention lags considerably due to the lack of zinc formulations and trained personnel in facilities. In the absence of programmatic data, the DCAH assumed the coverage for diarrheal episodes with severe dehydration (80%) would be higher than that for some or no dehydration (50%). High coverage may be due to the severity of symptoms, which would make patients more likely seek treatment.

With no specific pneumonia or measles treatment targets included in the *KHSSP III*, the DCAH aims for modest scale-up in the private, for-profit sector. Meanwhile, the DCAH ambitiously intends to double coverage of community-based growth monitoring and promotion from 30 to 60 percent over FYs 2013/14–2017/18.

The *KHSSP III* aims to fully immunize 90 percent of children by 2015/16, while the Division of Vaccines and Immunizations (DVI) aims to achieve the *KHSSP III* target for routine childhood immunization by 2014 and targets 99 percent coverage by 2017/18. The OneHealth technical team adopted the division's targets for the purposes of this analysis (Figure 9). National campaigns are also planned for polio every year and measles every three years. National roll-out of the rotavirus vaccine is planned for 2015 and will be included in the routine immunization package. National rollout of the human papillomavirus (HPV) vaccine is not expected until 2016. The HPV vaccination will target 85 percent coverage of 10-year-old females in 2017/18. Demand for most non-EPI vaccines is expected to increase by 7 percent over *KHSSP III* implementation.

**Figure 9. Scale-up of expanded program for immunization, FYs 2013/14–2017/18**



\*Routine immunization package includes measles, pneumococcal, polio, and pentavalent vaccines. Rotavirus vaccine also included beginning in FY 2015/16.

Source: Author's calculations

**Cost results:** Under the *KHSSP III*, child health and immunization costs will expand by 63 percent and incur a total of US\$967 million (KSh 81.2 billion) (Box 5). The highest annual cost growth will occur between FY 2014/15 and 2015/16, due to the introduction of the rotavirus vaccine into the routine immunization package.

Program management by DCAH, DVI, and respective partners will constitute over one-third of the total cost of the program (Figure 10). The majority of program management costs will go toward in-service training on integrated care in schools, communities, and health facilities under DCAH; and mother and child cards (printing) and mass media campaigns for measles under DVI. The contribution of program management cost to the total program cost will fall overtime in comparison to drugs and commodities, as interventions scale-up.

Drugs and commodities for child health and immunization interventions will contribute over half of the implementation cost, 98 percent of which will be incurred through the public and private not-for-profit sectors (Figure 10). While a small portion of drugs and commodities for child health interventions will be procured through the private, for-profit sector, all immunizations and vaccines will be procured by the public sector and supplied to the private sector free of charge.

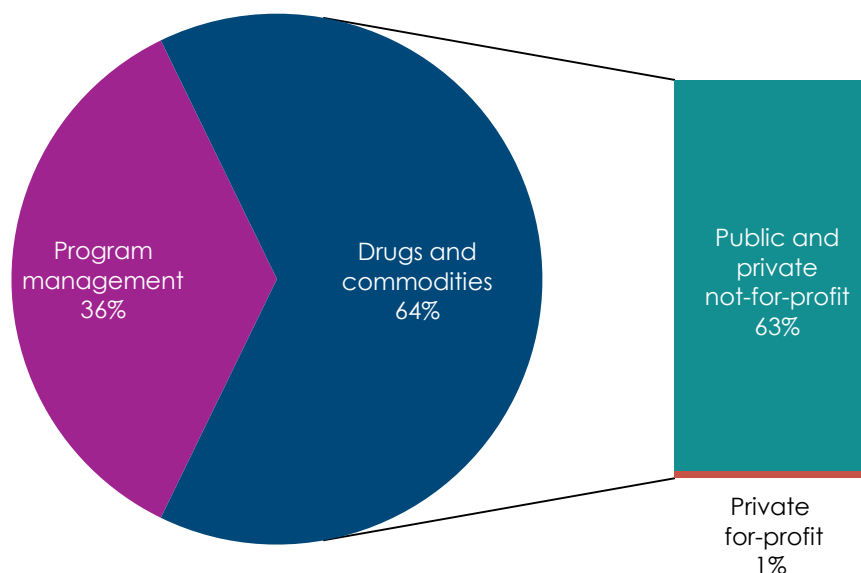
**Box 5. Child health and immunization micro cost drivers, FYs 2013/14–2017/18**

Total Cost: **US\$967,357,247**

Cost Drivers:

- In-service training
- Printing and mass media
- Pentavalent vaccine, unit cost
- Community-based growth monitoring and promotion, unit cost

**Figure 10. Child health and immunization macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

Individually, each child health and immunization intervention will contribute less than 8 percent of the total cost of drugs and commodities, with the exception of the pneumococcal vaccine and community-based growth monitoring and promotion interventions. The pneumococcal vaccine is targeted to reach the same number of children under age one as other routine immunizations, but at US\$11 (KSh 895) per three doses, it is the most costly routine immunization. Similarly, community-based growth monitoring and promotion cost more than any childhood curative intervention at US\$14 (KSh 1,200). Vaccine interventions will make up 16 percent of the total cost of drugs and commodities for the child health and immunization area over FYs 2013/14–2017/18. Growth monitoring and promotion interventions will make up 48 percent.

### Malaria

**Situational analysis:** In 2010, 70 percent of the population lived in a geographical area defined as malaria endemic, epidemic prone, or subject to seasonal transmission (MOPHS, 2010c). Although sentinel and demographic surveillance in various parts of the country indicate a decrease in prevalence of the malaria parasite over the past decade, the disease's contribution to outpatient

consultations is largely unchanged (MOPHS, 2010c). Furthermore, over the implementation period of the *KHSSP II*, malaria consistently accounted for the highest proportion of inpatient mortality (12%). At present, the disease is the sixth highest cause of death and third highest cause of disability-adjusted life years (DALY) (MOH, 2013a).

Uptake of effective preventive interventions such as insecticide-treated nets (ITNs), intermittent preventive treatment in pregnant women, and indoor residual spraying (IRS), has improved in target areas and likely contributed to slowing the spread of the disease (MOH, 2013a). For example, according to Demographic Health Surveys, the percentage of households who reported owning at least one ITN increased from 6 percent in 2003 to 56 percent in 2008 (Central Bureau of Statistics, 2004; KNBS, 2010). However, the diagnostic capacity of health facilities still lags—rapid diagnostic tests are only available in 42 percent of facilities, compared to 72 percent of facilities with treatment available (GOK, 2014).

**Strategic objectives:** Elimination of malaria is targeted under the *KHSSP III*. Specifically, providing ITNs to 85 percent of children under age one and 85 percent of pregnant women are included as performance monitoring indicators for the *KHSSP III*'s Strategic Objective 1. Malaria elimination is also supported by the *National Malaria Strategy 2009–2017*, which aims to reduce malaria morbidity and mortality in the various epidemiological zones by two-thirds from 2007/08 levels (MOPHS, 2009).

**Scale-up:** National policy stipulates that every detected malaria case be treated. To develop exact testing and treatment targets, the Division of Malaria Control (DOMC) extrapolated the total projected number of malaria cases from artemisinin-based combination therapy (ACT) consumption data. By 2015, the DOMC aims to achieve 72 percent diagnostic coverage and 75 percent treatment coverage. Case detection will favor rapid diagnostic testing (90% of tests) over microscopy (10% of tests).

In addition to malaria testing and treatment, three malaria preventive interventions are provided under the *KHSSP III*: long-lasting insecticide-treated nets (LLINs), IRS, and intermittent preventive therapy for pregnant women living in malaria endemic areas. DOMC aims to achieve 100 percent coverage of individuals in malaria risk areas with LLINs (defined as one LLIN per 1.8 persons, as per WHO guidelines). Given the three-year lifespan of LLINs, routine distribution in EPI clinics and ANC settings are required every year, in addition to mass net-distribution campaigns. Under the phase-out coverage strategy for 2012–2017, the IRS intervention is based on a target of 100 percent coverage of structures in 38 endemic districts, with two spraying cycles. The DOMC estimates the average household has three structures and that each structure requires two cycles of spraying. The DOMC also targets 80 percent coverage of pregnant women with intermittent preventive therapy in malaria endemic areas for the duration of the *KHSSP III*.

**Cost results:** The implementation and management of the malaria program under the *KHSSP III* will cost US\$604 million (KSh 50.7 billion) (Box 6). Over 90 percent of the cost will derive from drugs, insecticides, and commodities to implement curative and preventive interventions (Figure 11).

Distribution of drug and commodity cost by intervention fluctuates significantly around mass net-distribution campaigns, the next of which is scheduled for FY 2014/15. In non-campaign years, LLINs contribute 12–17 percent of the total cost of drugs and commodities. In FY 2014/15 LLINs are estimated to make up 42 percent of the total drug and commodity cost. Overall, however, it is projected that IRS will incur the largest portion of intervention costs, totaling US\$252 million (KSh 21.2 billion), or 46 percent of total intervention costs over FYs 2013/14–2017/18. This is largely attributed to the high cost of spraying: US\$25.4 (KSh 1,067) per two rounds, per structure.

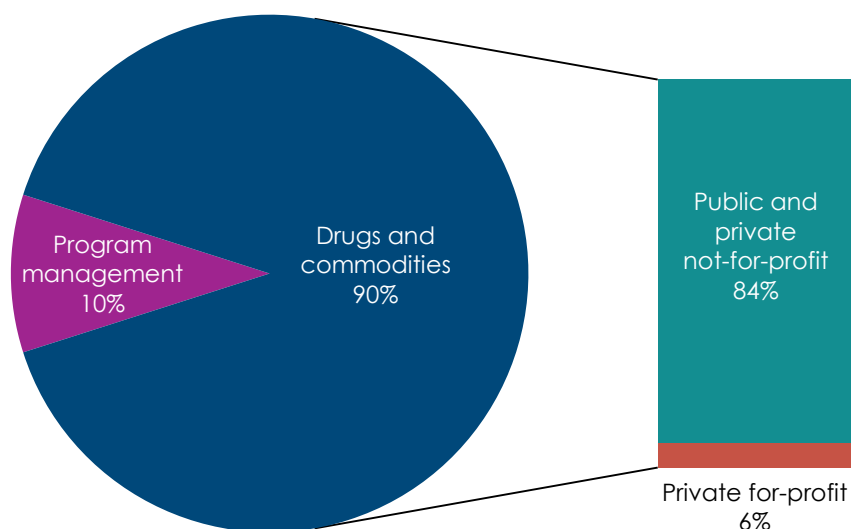
#### Box 6. Malaria micro cost drivers, FYs 2013/14–2017/18

Total Cost: US\$604,157,739

Cost Drivers:

- Indoor residual spraying, unit cost
- ITN national campaigns

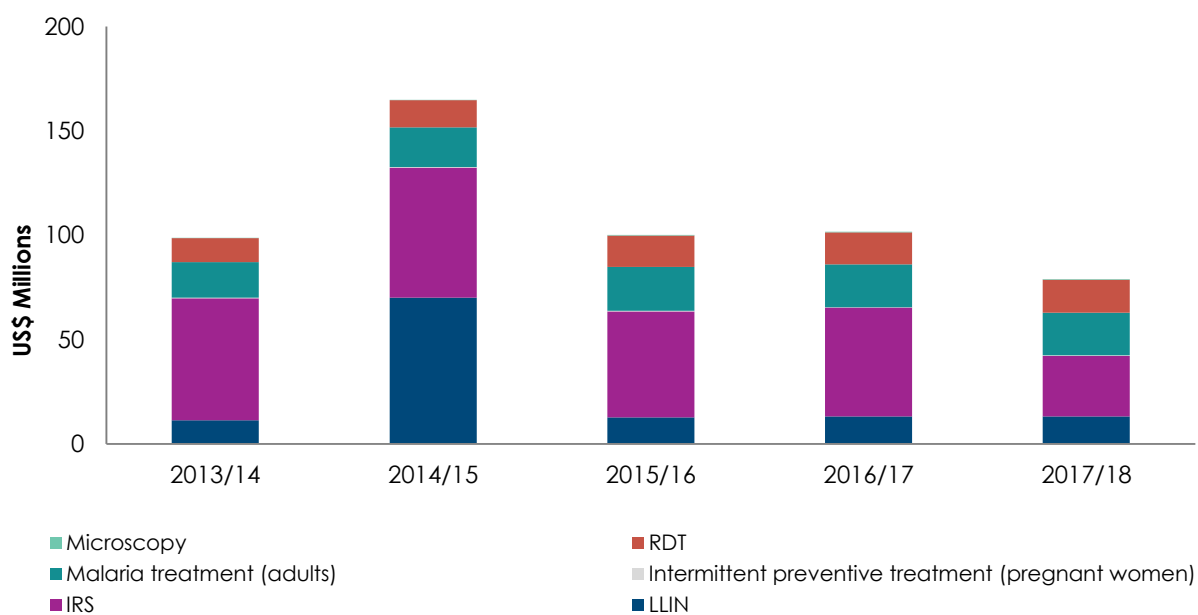
**Figure 11. Malaria macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

Delivery of interventions through the private sector will focus on curative interventions. Specifically, 27 percent of malaria treatment, 11 percent of malaria testing, and 16 percent of intermittent preventive treatment for pregnant women will be provided through the private, for-profit sector, based on DOMC programmatic data and reported source of ANC (KNBS, 2010). Malaria treatment is available in the private sector due to past subsidies provided by the Affordable Medicines Facility-malaria (AMFm) mechanism (extended from 2012 to 2014). All other preventive interventions will be exclusively delivered through the public and private not-for-profit sectors. In total, procurement of drugs and commodities through the private, for-profit sector will account for 6 percent of the total malaria cost under the *KHSSP III*.

**Figure 12. Cost of the malaria commodities, by intervention, FYs 2013/14–2017/18**



Source: Author's calculations

Malaria program management constitutes a small, but growing, factor of the total program cost. Over FYs 2014/15–2017/18 the relative contribution of program management to the malaria program will increase from 7 to 13 percent. Mass media campaigns; production of information, education, and communication (IEC) materials; and social outreach activities comprise one-third of program management costs, while in-service training contributes one-fifth.

### *Tuberculosis and leprosy*

**Situational analysis:** Although Kenya remains one of 22 high-burden TB countries identified by the WHO, TB incidence declined from 359 per 100,000 in 2005 to 272 per 100,000 in 2012 (WHO, 2013). This is indicative of broad programmatic success in the face of chronic underfunding. Kenya's TB case detection rate<sup>4</sup> has stabilized around 80 percent since 2005, and the treatment success rate among all new cases was 87 percent in 2011, up from 77 percent in 2004 (WHO, 2013). The country is also adopting advanced diagnostic technologies and successfully tested 94 percent of notified TB patients for HIV in 2012 (WHO, 2013). Further, Kenya is a global leader in the field of case-based electronic recording and reporting systems for TB (WHO, 2013).

Nevertheless, 61 percent of the national TB program budget was unfunded<sup>5</sup> in 2012. Every TB tracer commodity reported in the SARAM was available in less than half of all public and private facilities (GOK, 2014; WHO, 2012b). Tuberculosis still causes 6.3 percent of deaths and 4.8 percent of DALYs in Kenya (MOH, 2013a).

Leprosy is in its post-elimination phase in Kenya. In 2010, leprosy was endemic in less than 15 districts and national prevalence was below 1 case per 10,000 population (MOPHS, 2010a). Identified cases of leprosy continue to decline, with only 88 cases reported in 2011 (MOPHS, 2012c).

**Strategic objectives:** Given the high burden of TB, the KHSSP III places a strong focus on TB control. Under Strategic Objective 1, the *KHSSP III* lists 90 percent treatment success as one of its performance monitoring indicators. Having already achieved elimination, leprosy is one of three conditions for which the KHSSP III targets eradication (i.e., the complete absence of transmission and new case detection).

*The Department for Leprosy, Tuberculosis, and Lung Disease (DLTLD) Strategic Plan 2011–2015* is guided by the Stop TB Strategy and aims to introduce community-based, directly observed therapy short-term (DOTS); more intensive and focused active case finding; increased contact tracing; and enhanced systems to support patient adherence to treatment (MOPHS, 2010a).

**Scale-up:** Coverage of leprosy case detection and treatment will stabilize over the course of the *KHSSP III* as prevalence continues to decline. DLTLD targets high and expanding coverage over FYs 2013/14–2017/18 for case detection. It aims to screen 100 percent of people living with HIV (PLHIV) in care for TB, in addition to scaling up active case finding from 51 percent coverage of persons at high risk of TB infection in 2013 to 63 percent in 2017. Even with intensified case detection, the total number of new and re-treatment TB patients in care is projected to decline over FYs 2013/14–2017/18 based on DLTLD's projected decline in TB incidence. By 2017, 71,826 new TB patients and 6,385 re-treatment TB patients are projected to be on treatment, down from 83,794 (new) and 8,474 (re-treatment) in 2013.

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<sup>4</sup> The case detection rate is the number of cases detected and reported to national TB programs, divided by the estimated TB incidence.

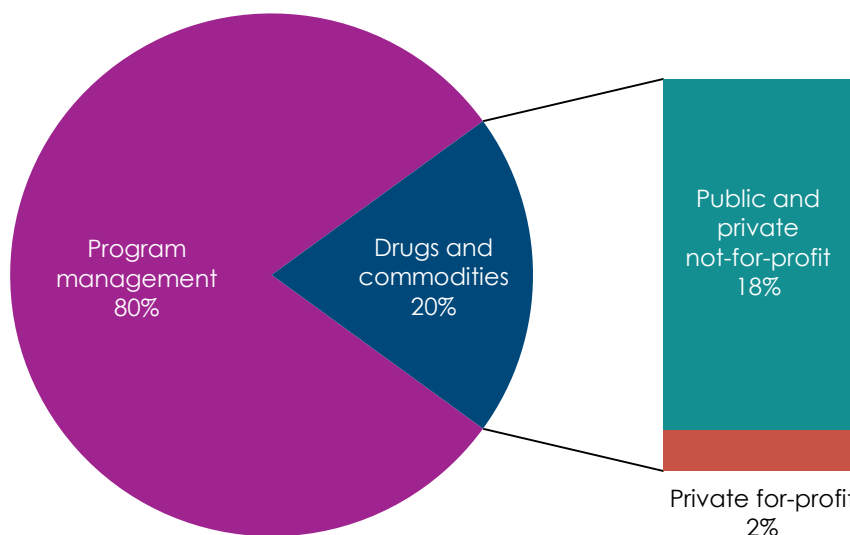
<sup>5</sup> The WHO defines the funding gap to be the difference between funding needs for TB prevention, diagnosis, and treatment and the actual amount of funds mobilized from domestic and international donor sources, as assessed and reported by national TB programs to the WHO (WHO, 2013).

Notification and case management of multidrug-resistant (MDR) TB is expected to scale up rapidly. Case management of MDR-TB is targeted to increase more than twofold from 7.5 percent in 2013 to 18 percent in 2017.

DLTLD is also responsible for providing isoniazid preventive therapy to all HIV-positive individuals who qualify (about 50%). Since isoniazid preventive therapy is protective for two years, 25 percent of HIV-positive adults and children in care will be targeted annually over FYs 2013/14–2017/18.

**Cost results:** Under the *KHSSP III*, the TB program will cost US\$253 million (KSh 21.2 billion). Since TB-specific health system investments are required for the successful prevention, detection, and treatment of the disease, drugs and commodities make up only 20 percent of the TB program cost over FYs 2013/14–2017/18 (Figure 13). While annual program management costs will decrease by 16 percent between 2013/14 and 2017/18, the annual cost of drugs and commodities will increase by 25 percent. This is largely due to the scale-up of interventions like MDR-TB case management, which will account for 17 percent of the cost of drugs and commodities in 2017/18, compared to 9 percent in 2013/14. The most significant factor in intervention costs will be TB screening for HIV-positive cases; while TB screening costs US\$3 (KSh 274) per HIV-positive case, it will constitute 42 percent of the total TB drug and commodity cost under the *KHSSP III* due to its ambitious target (100% coverage).

**Figure 13. Tuberculosis macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

TB interventions delivered through the private, for-profit sector only account for 2 percent of the total TB program cost. The majority of this cost stems from diagnostic testing. In fact, 18 percent of diagnostic services were provided through the private, for-profit sector in 2010 (MOPHS, 2011). To a lesser extent, TB care and treatment were also provided through the private, for-profit sector—about 2 percent of treated cases (MOPHS, 2010a).

Comprehensive TB, leprosy, and TB/HIV program management activities and costs derive from the costed *DLTLD 2011–2015 Strategic Plan*. Excluding procurement for drugs and commodities, the strategic plan will cost US\$41–39 million (KSh 3.2–3.4 billion) annually during the first three years of the *KHSSP III*. To estimate 2016/17 and 2017/18 program management cost, the technical team extrapolated ongoing and

**Box 7. Tuberculosis micro cost drivers, FYs 2013/14–2017/18**

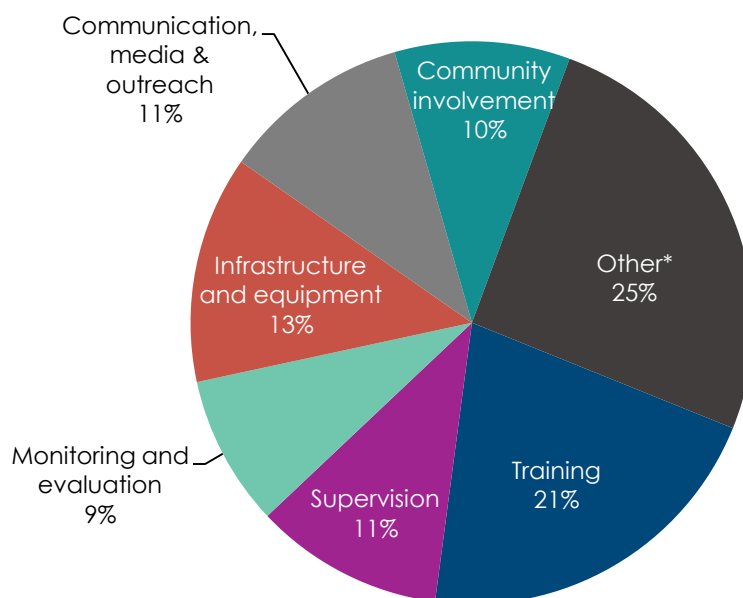
Total Cost: **US\$253,487,974**

Cost Drivers:

- Screen HIV+ individuals for TB targets
- In-service training
- Laboratory infrastructure and equipment

periodic activities under the costed plan. Besides office equipment, in-service training, infrastructure, and equipment are the largest drivers of this cost (Box 7). In total, 44 types of trainings, mentorships, and sensitization workshops are planned for health personnel. Equipment and infrastructure investments focus on strengthening Kenya's laboratory network, including 120 new laboratories, each equipped with acid-fast bacilli microscopy.

**Figure 14. Cost of the TB program management, by category, FYs 2013/14–2017/18**



Source: Author's calculations

\*Combines all other categories, for which the cost makes up less than 5% individually of the total TB program management cost.

#### *HIV and AIDS, STIs, and RTIs*

**Situational analysis:** In Kenya, the HIV epidemic is unparalleled in its effect on morbidity and mortality. HIV causes double the number of DALYs and triple the number of deaths than any other single disease or injury (MOH, 2013a). The *Kenya AIDS Indicator Survey (KAIS) 2007* shows that the prevalence among adults ages 15 to 64 decreased from 7.2 percent in 2007 to 5.6 percent in 2012 (MOH and NASCOP, 2013; NASCOP, 2009). However, the reduction of prevalence is slowing (MOH, 2013a).

The decline in prevalence follows a decade of rapid expansion in the coverage and scope of HIV services. According to the national HIV forecasting and quantification report, by December 2012, 61 percent of HIV-positive pregnant women who needed prevention of mother-to-child transmission (PMTCT) services received them. Likewise, by June 2013, 84 percent of adults in need of highly active antiretroviral therapy (HAART) received it. The program introduced third-line antiretroviral therapy (ART) and anticipates expanding its eligibility criteria for HIV-positive pregnant women<sup>6</sup> (MOH and NASCOP, 2013). Still, evidence suggests that the quality of HIV services is low. For instance, at the time of the 2012 SARAM survey, first-line HIV drugs were available in only 5 percent of private, for-profit facilities and 28 percent of public facilities (GOK, 2014).

<sup>6</sup> The 2013 *HIV Commodities Quantification Report* states, "anticipated increase in patient numbers with the implementation of the 2013 revised guidelines," are reflected in the rapid PMTCT scale-up targets (Ministry of Health, 2013b).

The burden of disease from individual STIs other than HIV is largely unknown. From reported syndromic management of STIs and RTIs in outpatient departments, the technical team estimates 5 percent of adults ages 15 to 49 are affected (Liambila, 2009). This aligns with the 5.2 percent of adults in this age group who reported having an STI, genital discharge, sore, or ulcer in the 12 months preceding the *DHS 2008/09* (KNBS, 2010).

**Strategic objectives:** The *KHSSP III* aims to control the HIV epidemic and eliminate mother-to-child transmission of HIV by 2017/18. Detailed strategic objectives are typically identified in the *Kenya National AIDS Strategic Plan (KNASP)*. During this analysis, *KNASP III* (2009/10–2012/13) had lapsed and planning for the *Kenya AIDS Strategic Framework (KASF) 2014/15–2018/19* was underway. Since the *KHSSP III* cost analysis was completed, the *KASF* was launched. The *KASF* echoes the *KNASP III*'s focus on reducing new infections, AIDS-related mortality, and HIV-related stigma and discrimination, and increasing domestic financing of the HIV response (NACC, 2014).

**Scale-up:** In an effort to improve commodity security for HIV and AIDS in Kenya, the MOH—through the National AIDS and STI Control Programme (NAS COP)—undertakes a comprehensive F&Q exercise for health commodities every year. The F&Q establishes two-year programmatic targets to inform the implementation of the *KNASP* at national and county levels, from which the study team extrapolated five-year targets.

*KHSSP III* Strategic Objective 1 includes adult ART coverage for eligible persons as a performance monitoring indicator, targeting 90 percent coverage by 2015/16. However, *KHSSP III* target setting preceded the 2013 WHO eligibility guidelines which qualify all HIV-positive individuals with CD4 counts less than 500 to receive ART. These guidelines were adopted by Kenya in 2014. Based on the expanded eligible pool and absolute targets set forth in the 2013 national HIV commodities quantification, adult ART coverage will target 63 percent in 2017/18, while pediatric ART coverage will target 68 percent coverage. According to the F&Q, all HIV-positive individuals in care will receive laboratory and diagnostic services over the 2013/14–2017/18 period. Further, with the exception of TB, all individuals who develop an opportunistic infection (over 10% of adults) will receive treatment. NAS COP also plans to scale-up management of moderate and acutely malnourished HIV-positive children, adults, and pregnant and lactating women. By 2017/18, management of moderately malnourished HIV-positive adults is projected to achieve 81 percent coverage.

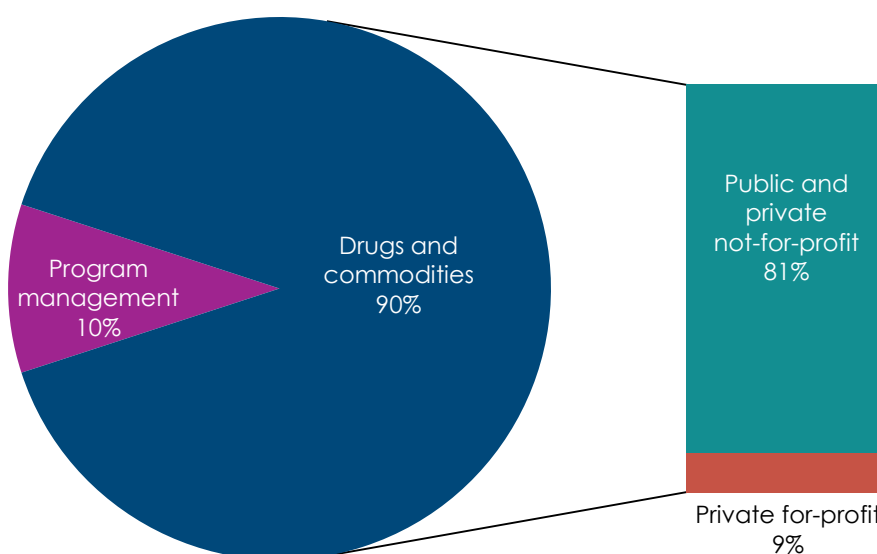
Prevention interventions for key populations and HIV-positive pregnant women will also scale-up rapidly. NAS COP will exceed *KHSSP III* performance monitoring targets for PMTCT (90%) by reaching 95 percent of HIV-positive pregnant women in need in 2017/18. Condom and HIV testing coverage for the general population, however, will stay constant over the course of *KHSSP III*.

**Cost results:** Over FYs 2013/14 to 2017/18, the HIV and STI/RTI program will require US\$1,209 million (KSh 101 billion). An overwhelming proportion of this cost (96%) will derive from drugs and commodities required to deliver over 30 interventions according to the latest treatment guidelines (Figure 15).

At the time of this analysis, neither the Global Fund HIV Round 10 Phase 2 proposal, nor the *KNASP IV* implementation plan had been completed. Consequently, projected program management costs are largely limited to NAS COP and National AIDS Control Council (NACC) activities and may underestimate the total cost of the health sector response to HIV. At present, national and targeted mass media campaigns, community mobilization, and NACP information and advertising materials make up the majority of HIV and STI program management costs at US\$98 million (KSh 8.3 billion).



Figure 15. HIV macro cost drivers, FYs 2013/14–2017/18



Source: Author's calculations

Two interventions constitute two-thirds of the estimated cost of HIV and STI/RTI related drugs and commodities under the *KHSSP III*: adult ART and PMTCT (Box 8). Although the cost per adult receiving second-line drugs per year is expected to approach US\$450 (KSh 37,800) under the *KHSSP III*, the average cost per adult receiving ART will be US\$149 (KSh 12,555) over FYs 2013/14 to 2017/18. When coupled with already high and rapidly scaling up programmatic targets, delivery of adult ART services is projected to make up 43 percent of the cost of all HIV and STI interventions.

Similarly, the cost of PMTCT services will be dramatically affected by scale up of Option B+ for pregnant women, compared to Option A. In the first three years of *KHSSP III* implementation, the average cost per pregnant woman receiving prophylaxis or ART will increase from US\$276 (KSh 23,151) to US\$505 (KSh 42,387).<sup>7</sup> Additionally, early infant diagnosis will cost US\$25 (KSh 2,135), while infant prophylaxis will cost US\$18 (KSh 1,470).

#### Box 8. HIV micro cost drivers, FYs 2013/14–2017/18

Total Cost: US\$1,209,455,227

Cost Drivers:

- Adult ART, targets
- Option B+, targets
- Communication activities

The F&Q focuses on commodity requirements for the public and private not-for-profit sectors. Therefore, the technical team assumes all program targets will be achieved through these sectors unless otherwise specified. Service delivery through the private, for-profit sector is explicitly defined for condoms. Similarly, STI/RTI coverage in the private, for-profit sector is reported in outpatient loads. Together, private, for-profit procurement of condoms and STI/RTI-related drugs and commodities only account for 9 percent of the total projected HIV and STI/RTI program cost.

#### Nutrition

**Situational analysis:** Stunting, underweight, and wasting in children under age five prevents full mental and physical development. In the *DHS 2008/09*, the proportions of children under five who were stunted and wasted were 35 percent and 7 percent, respectively. These statistics show little to no improvement in child nutrition since 1998 (MOPHS, 2013). In pregnant women, low body mass index

<sup>7</sup> The PMTCT unit cost is based on women receiving Option B+ treatment for 742 days. Clinical guidelines indicate HAART be provided from 14 weeks gestation through breastfeeding, after which women will stay on treatment, but will be considered part of the general population and will be reflected in adult ART targets and cost.

(BMI) and micronutrient deficiencies are equally important to childhood development and maternal health broadly. The *National Micronutrient Survey* suggests more than half of pregnant women may be anemic, but less than half of facilities offer micronutrient deficiency services (GOK, 2014; MOPHS, 2013).

**Strategic objectives:** The goal of the *National Food and Nutrition Security Policy (FNSP)* is to enable a situation where “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (GOK, 2011). The *National Nutrition Action Plan 2012–2017 (NNAP)* details 14 priority nutrition implementation areas focusing on women of reproductive age, children under five, and vulnerable groups to support the FNSP (MOPHS, 2013). Similarly, the *KHSSP III* aims to contain the prevalence of underweight status in mothers and children and other micronutrient deficiencies.

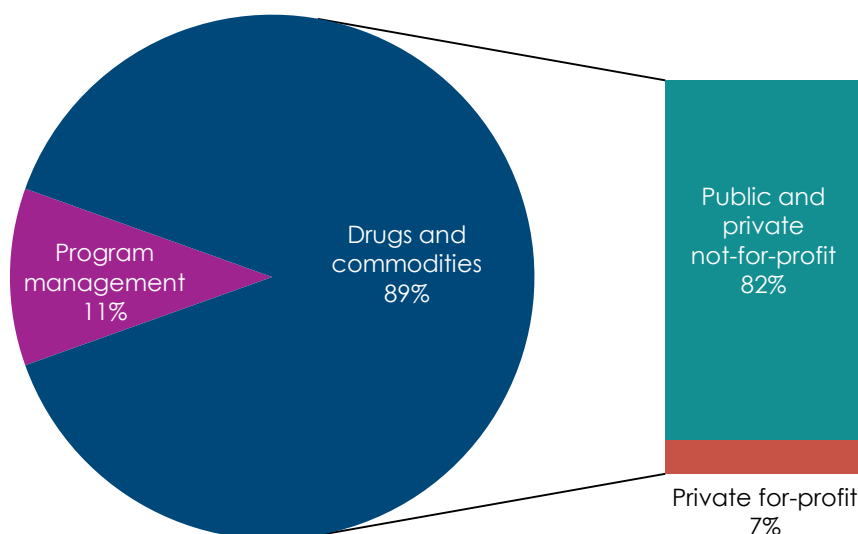
**Scale-up:** The Division of Nutrition aims to scale up coverage of curative and preventive interventions related to nutritional status. Baseline coverage of treatment for severe acute malnutrition (SAM) in children under five (52%) is lower than that of moderate acute malnutrition (MAM) (60%), because not all facilities provide the inpatient care required to treat SAM. By 2017/18, the division aims to achieve 75 percent coverage of SAM-related and 85 percent coverage of MAM-related interventions. Care for women with low BMI will also scale up from 52 percent of affected women in 2013/14 to 80 percent by 2017/18. Curative nutrition interventions for HIV-positive individuals are addressed in the HIV and STI/RTI program.

Preventive interventions mostly consist of nutritional supplementation for children and pregnant women. In Kenya, all children between ages six months and five years should receive vitamin A supplementation, although only 30 percent reported receiving it at the time of the last DHS. By 2017/18, the Division of Nutrition aims to reach half of the targeted children with vitamin A supplementation, and to introduce micronutrient supplementation for 60 percent of children ages 6 to 23 months. The division will also oversee the scale-up of screening for malnutrition, skin diseases, and anemia for children. For basic ANC, pregnant women require folic acid, ferrous sulphate, and multivitamin supplementation. In collaboration with the Division of Reproductive Health, the Division of Nutrition will scale up nutritional supplementation for pregnant women (i.e., every woman who attends at least one ANC visit) from 69 percent in 2013/14 to 92 percent in 2017/18.

**Cost results:** The projected cost to deliver and manage nutrition interventions under the *KHSSP III* is US\$325 million (KSh 27 billion). Long-term investments in nutrition training, advocacy, and monitoring and evaluation occur mostly in the initial years; therefore, the share of the total cost borne by program management will fall from 18 to 11 percent in the first two years.

Overall, drug and commodities account for 89 percent of the total nutrition program cost (Figure 16). The private, for-profit sector is involved in a limited number of nutrition interventions, such as care for women with low BMI and supplementation for pregnant women. Based on consultation with the MOH, the One Health technical team assumed management of childhood MAM and SAM cases in the private, for-profit sector to be minimal or nonexistent and therefore excluded it from the analysis. As a result, procurement of drugs and commodities through the private, for-profit sector will require only US\$24 million (KSh 2 billion).

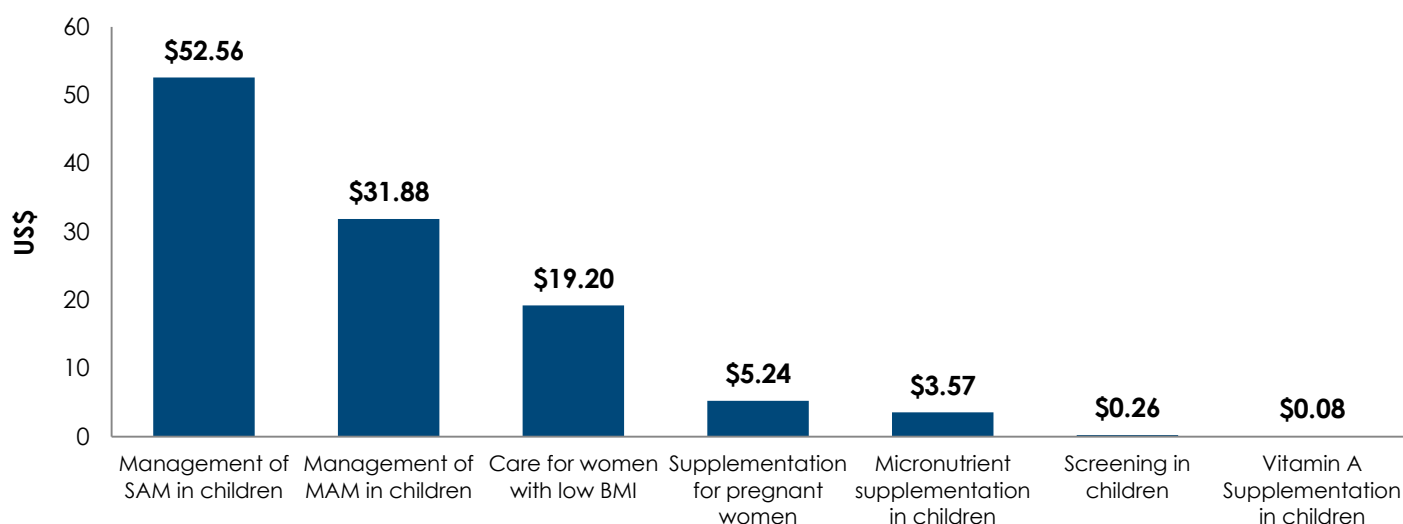
**Figure 16. Nutrition macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

Providing care for women with low BMI will require the most financial resources, 35 percent of the total drug and commodity costs. In 2017/18, it is estimated to cost US\$19 (KSh 1,613) per woman to treat each of the 1.2 million women with low BMI targeted for treatment with blended fortified flour for one month. Management of MAM in children will require 25 percent of the total nutrition intervention costs. Although the number of children reached by the intervention will be half the number of women reached with BMI management, the cost per child with MAM is nearly double that of the cost per woman with low BMI (Figure 17).

**Figure 17. Nutrition intervention unit costs per patient per year**



Source: Author's calculations

### Environmental Health

**Situational analysis:** Poor hygiene behaviors, low sanitation coverage, and use of unprotected water sources lead to the outbreak of water and sanitation-related diseases. The environmental health program, in collaboration with non-health sectors, aims to address these causal factors to reduce the risk of disease outbreaks. At present, 14 percent of primary caregivers wash their hands at critical times, 32 percent of rural Kenyans use improved sanitation facilities, and 20 percent of rural communities have access to an

improved water source (MOPHS, 2012a). Such gaps in access to environmental health are at odds with the 2010 constitution's commitment to sanitation as a universal right.

**Strategic objectives:** The *National Environmental Sanitation and Hygiene Strategy 2010–2015* identified the following key objectives in the pursuit of sanitation for all Kenyans (MOPHS, 2012a):

1. Eradicate open defecation by 2015.
2. Improve hand washing practice to over 90% by 2015.
3. Improve safe water at point-of-use for all households by 2015.
4. Ensure that all solid and liquid waste is properly managed by 2020.
5. Establish an effective emergency preparedness and response mechanism for sanitation by 2015.
6. Strengthen the coordination of sanitation hygiene systems and enabling framework on an ongoing basis.

The *KHSSP III* elaborates on these objectives with performance monitoring indicators, which include ensuring the availability of latrines in 80 percent of households and access to safe water for 85 percent of the population by 2017/18. The environmental health program also addresses exposure to health risk factors such as tobacco smoke and alcohol consumption, which are targeted for containment under the *KHSSP III*.

**Scale-up:** Seven WASH interventions are targeted for scale up under the environmental health program. These include three interventions that require no drug or commodity procurement in the health sector: sensitization of communities on safe water; hand washing with soap; and improved excreta removal. While safe water and hand washing interventions are delivered through interpersonal communication and community education, improved excreta removal interventions utilize the community-led total sanitation approach where communities finance latrines.

The remaining four interventions will be delivered through the public and private not-for-profit sectors. Coverage of water source protection and water quality testing for previously unreached populations will scale up from 5 percent in 2013/14 to 25 percent in 2017/18. In 2013/14, it was estimated that 36 percent of the population needed vector/vermin control and water treatment at point-of-use, but only 40 percent of those in need were reached with these services. As the population in need decreases over time, water treatment coverage will scale up to 54 percent and vector/vermin control to 50 percent by 2017/18.

**Cost results:** From 2013/14 to 2017/18, the annual cost of the environmental health program will fall from US\$70 million (KSh 5.9 billion) to US\$48 million (KSh 4.0 million). This is attributed to the declining proportion of households in need of WASH interventions and an associated 38 percent decline in the estimated cost of commodities. As a result, the relative contribution of program management to the total cost of the environmental health program will increase from 16 to 24 percent under the *KHSSP III*.

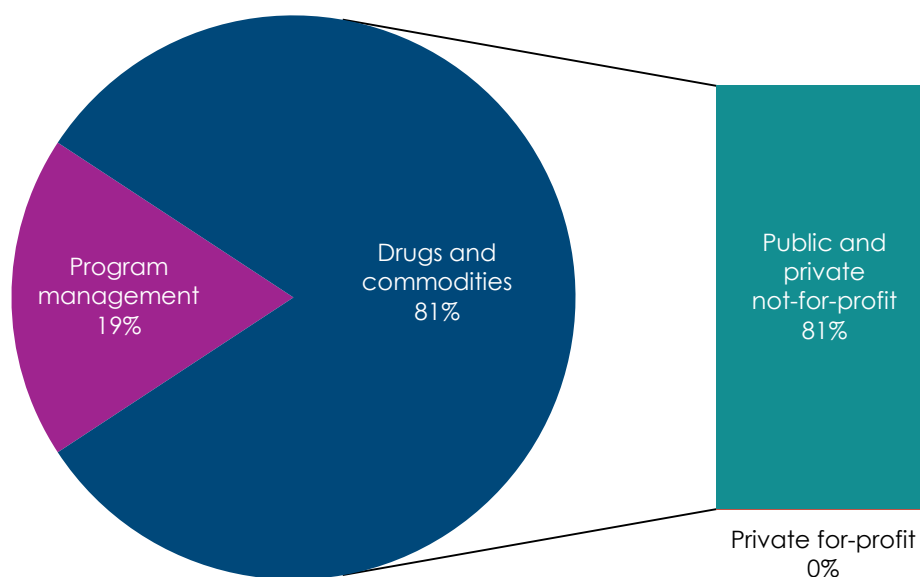
Still, the majority (81%) of financial resources under environmental health go toward commodities (Figure 18). Due to large ranges in unit cost and programmatic targets, over 99 percent of the cost of drugs and commodities will derive from two interventions: vector control and water treatment at point-of-use. Vector/vermin control requires 12 days of jigger control per household, and in some cases additional control for cockroaches, bedbugs, and lice. In total, the average household costs US\$21 (KSh 1,833). Water treatment takes various forms, the most costly of which are filters, followed by Pur tablets, Aqua tablets, and Waterguard.

**Box 10. Environmental health micro cost drivers, 2013/14–2017/18**

Total Cost: **US\$294,224,323**

Cost Drivers:

- Vector/vermin control, unit cost and targets
- Water treatment at point-of-use, unit cost and targets

**Figure 18. Environmental health macro cost drivers, FYs 2013/14–2017/18**

Source: Author's calculations

### *Neglected tropical diseases*

**Situation analysis:** In Kenya, major NTDs include lymphatic filariasis (LF), schistosomiasis, soil-transmitted helminthiasis (STH), trachoma, and leishmaniasis. These diseases are not fatal, but have profound and prolonged impacts on morbidity, have secondary consequences for childhood development, and mostly affect poor rural communities. Safe and effective interventions for the prevention, control, and management of NTDs have been identified, primarily centered on preventive chemotherapy and mass drug administration (MDA) (MOPHS, 2012b).

In recent years Kenya has observed declining prevalence in most NTDs (MOH, 2013a). However, the endemicity of each disease varies widely across geographic regions in Kenya, largely due to climate (MOPHS, 2012b). Therefore, disease surveillance and mapping are especially critical to the success of targeted MDA strategies, but have not been fully realized. In the *National Multi-year Strategic Plan of Action for Control of NTDs 2011–2015*, 17 districts suspected to be STH endemic had not been mapped; gaps in mapping persisted through 2013 (MOPHS, 2012b).

**Strategic objectives:** The *KHSSP III* ambitiously targets the elimination of all NTDs. The 2011–2015 strategic plan for NTDs identifies specific strategic objectives for NTD prevention and treatment, and collaboration with other health programs and non-health sectors. The strategic objectives outlined by the plan are as follows:

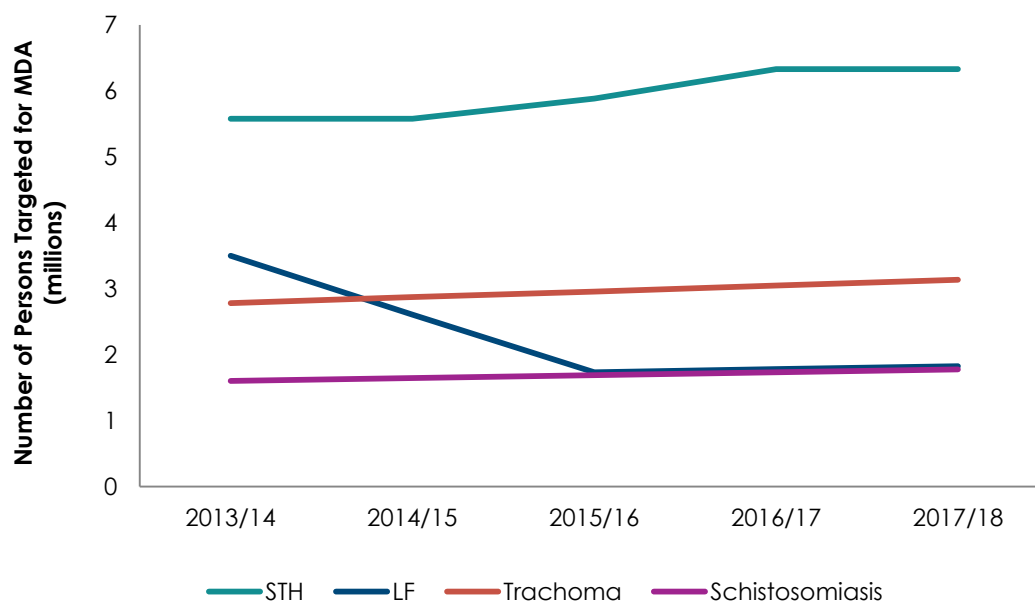
1. Mass drug administration for LF, schistosomiasis, and STH
2. Case detection and management for leishmaniasis, trachoma trichiasis (TT), and LF disabilities
3. Transmission control through effective and comprehensive vector control
4. Safe water supply and sanitation
5. Health promotion

Additionally, the Division of Ophthalmic Services produced the *Kenya Trachoma Action Plan 2011–2020*, which aligns with the WHO's Alliance for Global Elimination of Trachoma by 2020 (GET 2020) and Surgery, Antibiotics, Facial Cleanliness, and Environmental improvement strategy (MOH,

2012a). Under the *KHSSP III*, Kenya is working toward the elimination of trachoma two years ahead of the WHO GET 2020 target.

**Scale up:** The population to be targeted for MDA was determined by the NTD and ophthalmology programs to be those at risk for LF, schistosomiasis, STH, and trachoma. At the national level, aggressive scale up of MDA is planned to meet elimination targets. At the programmatic level, this requires both scaling up in underachieving or previously unreached districts and scaling down in districts with well-established MDA campaigns (Figure 19). Post-2015 targets may be adjusted downward based on the success of MDA programs over 2013–2014.

**Figure 19. Number of persons targeted for MDA, by NTD, FYs 2013/14–2017/18**



Source: Author's calculations

Little is known about how the future demand for LF hydrocele surgery, LF lymphoderma management, and TT surgery will change. The NTD program aimed to meet the total estimated need for LF hydrocele surgery in 2012 (200,000 cases). This did not take into account new cases needing surgery and no updated estimate was available at the time of this analysis. Similarly, the annual volume of LF lymphoderma cases (57,604) and cases needing TT surgery (10,000) is assumed to stay constant over FYs 2013/14–2017/18. However, while coverage of LF lymphoderma management will remain constant at 20 percent, the trachoma program plans to scale up coverage from 30 percent in 2013/14 to 70 percent in 2017/18.

**Cost results:** Under the *KHSSP III*, the NTD program is estimated to cost US\$33 million (KSh 2.7 billion). Delivery and management of the program's interventions are provided through the public and private not-for-profit sectors (Figure 20), with donors playing an especially important role in financing interventions (MOPHS, 2012b).

Over 90 percent of the NTD program's cost will be driven by the drugs and commodities required to deliver seven interventions (Box 11). Among MDA interventions, trachoma control and treatment will incur the highest cost—22.5 percent of the total resources required for drugs and commodities. Although trachoma MDA will reach less than half the number of people reached with STH MDA,

**Box 11. NTD micro cost drivers, FYs 2013/14–2017/18**

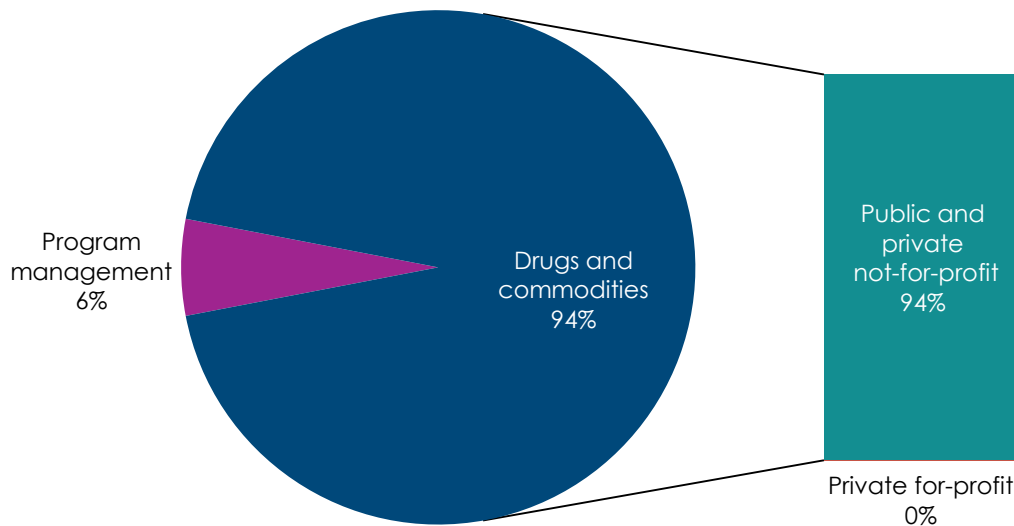
Total Cost: **US\$33,111,841**

Cost Drivers:

- Trachoma MDA, unit cost
- LF hydrocele surgery, unit cost and targets

the cost per person reached with trachoma MDA, US\$0.47 (KSh 39), is 13 times that of STH MDA. Lymphatic filariasis hydrocele surgery will require double the amount of financial resources estimated for trachoma MDA and is the single largest driver of cost in the NTD program. The intervention will target 40,000 surgeries per year at US\$68 (KSh 5,786) each. Due to lack of data, the estimated cost of LF hydrocele surgery does not include anesthesia.

**Figure 20. NTD macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

### Noncommunicable diseases

**Situational analysis:** In Kenya, two chronic NCDs rank in the top ten causes of morbidity and mortality: cerebral-vascular disease and ischemic heart disease. Recent trends confirm that the burden of NCDs, inclusive of cardiovascular disease (CVD), cancers, chronic respiratory disease, diabetes, and neurological conditions, is rising. MOH projections estimate the burden of NCDs may increase by 50 percent over 2010–2030 (MOH, 2013a).

For this analysis, a literature review was conducted in collaboration with the Division of NCDs to estimate the burden of disease. Based on regional studies, the technical team estimated the prevalence of asthma to be 15 percent and chronic obstructive pulmonary disease to be 5 percent (Mayige et al., 2012; Wjst and Boakye, 2007). This implies chronic respiratory conditions affect 20 percent of the population. The MOH reports 80,000 annual cases of cancer, which the technical team conservatively assume will increase according to the population growth (Mulemi, n.d.). In the absence of country-specific data, regional estimates of CVD burden were established through the OneHealth model in consultation with the WHO.

In a 2009 study in Kenya, the prevalence of type 2 diabetes across rural and urban areas was 4.2 percent (Hall, 2011). However, the MOH suspects the prevalence of diabetes may be as high as 10 percent. In this analysis, the technical team assumed the prevalence of diabetes will increase from 4.2 to 10 percent over FYs 2013/14–2017/18. This echoes the trend in diabetes prevalence observed in other developed countries in Africa (Kengne, 2005). Similarly, prevalence estimates of epilepsy in Kenya range from 2 to 3 percent, so the team assumed an increase over time.

**Strategic objectives:** The *KHSSP III* aims to control CVD and contain high blood pressure conditions. Although a comprehensive strategic plan for NCDs does not exist, a Kenya *National Diabetes Strategy* was developed for 2010–2015 and highlights preventing diabetes and reducing complications and premature mortality in people with diabetes as the country's overall goals (MOPHS, 2010b).

**Scale-up:** The only preventive intervention included in the NCD program area is an annual prostate exam for males over age 50, which international standards of care require. However, prostate exams are not currently promoted as routine screening in Kenya. Therefore, the 2013 estimate of prostate exam coverage (3%) only reflects screening upon detection of symptoms. This coverage rate is projected to double under the *KHSSP III*, a feasible goal due to the simplicity of the procedure.

Coverage of chronic respiratory conditions is also expected to scale up, from 25 percent coverage in 2013/14 to 50 percent in 2017/18. Increases in cancer management are planned under the *KHSSP III* (from 35% in 2013/14 to 50% in 2017/18), but will depend on investments in infrastructure and equipment. Baseline diabetes coverage (15%) is derived from HMIS data and projected to stay flat due to the rapidly increasing burden. The HMIS also informs the baseline coverage of neurological conditions (5%) which is expected to increase to 25 percent by 2017/18. Management of CVD spans nine interventions, including screening, follow-up care, and treatment. The NCD Division estimates coverage of each WHO-defined CVD intervention to increase from 10 to 30 percent under the *KHSSP III*, with the exception of rheumatic heart disease treatment, which will experience a slight elevation in coverage.

Palliative care and physiotherapy for NCD patients is excluded from this analysis due to a lack of data. Health education related to NCDs is reflected in the health promotion program area.

**Cost results:** The NCD program is projected to cost US\$654 million (KSh 55 billion) over FYs 2013/14–2017/18 (Box 12). Program management costs constitute 8 percent of the total program cost and are driven by critical investments in equipment and infrastructure related to cancer screening and treatment in level III–VI facilities. Under the NCD program, the largest portion of total program costs will be attributed to commodity procurement through the private, for-profit sector (26%) (Figure 21). For cancer management, the NCD department estimates 60 percent of services are delivered through the private, for-profit sector, and 40 percent through the public, not-for-profit sector.

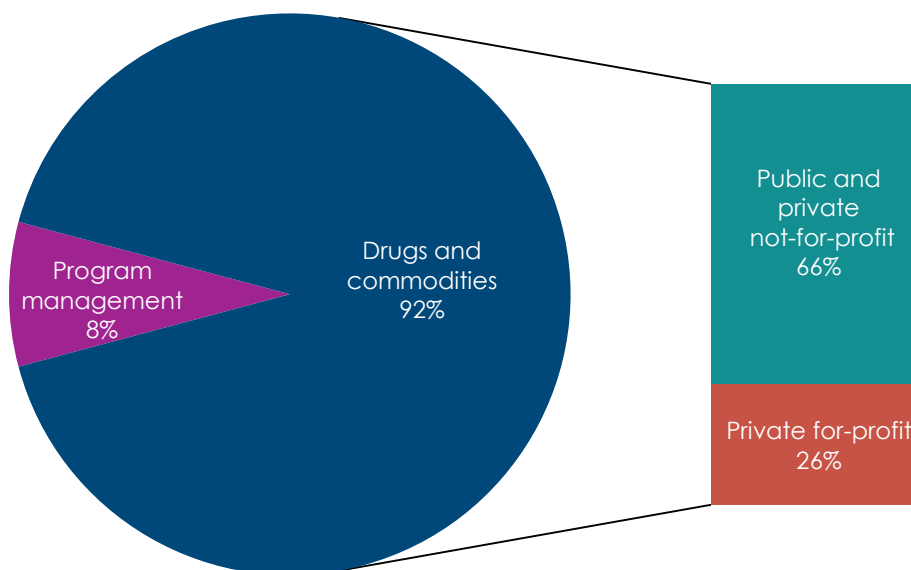
**Box 12. NCD micro cost drivers, FYs 2013/14–2017/18**

Total Cost: **US\$654,793,932**

Cost Drivers:

- Diabetes, unit cost and target
- CVD, unit cost and targets
- Oncology equipment

**Figure 21. NCD macro cost drivers, FYs 2013/14–2017/18**



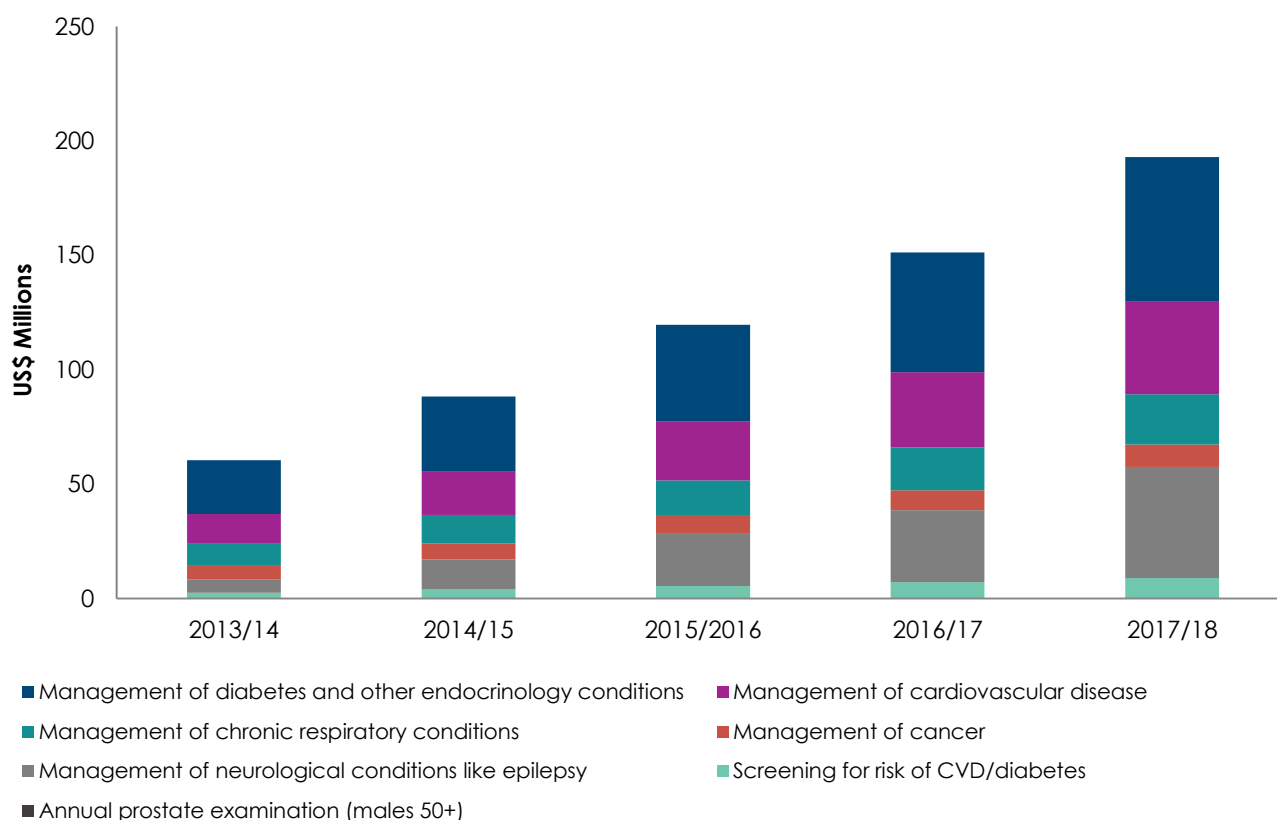
Source: Author's calculations



The cost of NCD-related drugs and commodities will increase from US\$60 million (KSh 5 billion) to US\$192 million (KSh 16 billion) between 2013/14 and 2017/18 (Figure 22). This increase will be necessary to meet programmatic scale-up targets and respond to the rising burden of diabetes, epilepsy, and other NCDs in Kenya. Anti-diabetic medication, insulin supplies, and diabetes-related tests used to manage chronic cases make up 55 percent of the total cost of NCD drugs and commodities. The average diabetic patient costs US\$141 (KSh 11,925) per year.

Annual treatment cost per CVD patient ranges from US\$8 (KSh 728) for rheumatic heart disease to US\$40 (KSh 3,754) for acute myocardial infarction. Taken together, follow-up and treatment for all CVD constitute 26 percent of the estimated resources needed for NCD drugs and commodities.

**Figure 22. Cost of the NCD commodities, by intervention, FYs 2013/14–2017/18**



Source: Author's calculations

### Health promotion

**Situational analysis:** Kenya adopted the 1986 Ottawa Charter for Health Promotion's definition of health promotion as, "the process of enabling people to increase control over, and to improve, their health" including health determinants (WHO, 1986). While interventions have been developed over time to address specific diseases, the underlying factors that worsen the burden of disease persist in Kenya. According to the *Health Promotion Strategy for Kenya, 2013–2018*, these factors (i.e., determinants of health) are widely known and are in most cases modifiable. Examples include poverty and inadequate knowledge and skills (MOH, 2013b). The *KHSSP III* identifies unsafe sex, suboptimal breastfeeding, alcohol and drug use, obesity, and physical inactivity as the major risk factors affecting health in Kenya (MOH, 2013a).

**Strategic objectives:** Health promotion is integrated into every strategic objective. The *Health Promotion Strategy for Kenya* adopts a unified perspective of promotion practice and delineates its various roles and responsibilities. The strategy prioritizes "health promotion approaches that address the risk factors and determinants associated with communicable diseases and noncommunicable

diseases, violence and injuries, maternal and child conditions and new and re-emerging threats to health” (MOH, 2013b). It also aims to strengthen national and county stewardship, build and sustain capacity, mainstream health promotion in health and other sectors, and enhance coordination and collaboration among partners.

**Scale-up:** The health promotion program does not include any direct service delivery interventions. The analysis team worked with the program to identify program management activities and costs, which are discussed in detail below.

**Cost results:** The health promotion program will cost US\$44 million (KSh 3 billion) under the *KHSSP III* (Box 13). The first year of the *KHSSP III* aligns with the first year of the *Health Promotion Strategy*, which invests in the training of trainers and development of training curricula. As a result, the annual program cost will fall by 17 percent over FY 2013/14 to 2014/15, and then stabilize around US\$8.5 million (KSh 720 million) for each following year (Figure 23).

**Box 13. Health promotion micro cost drivers, FYs 2013/14–2017/18**

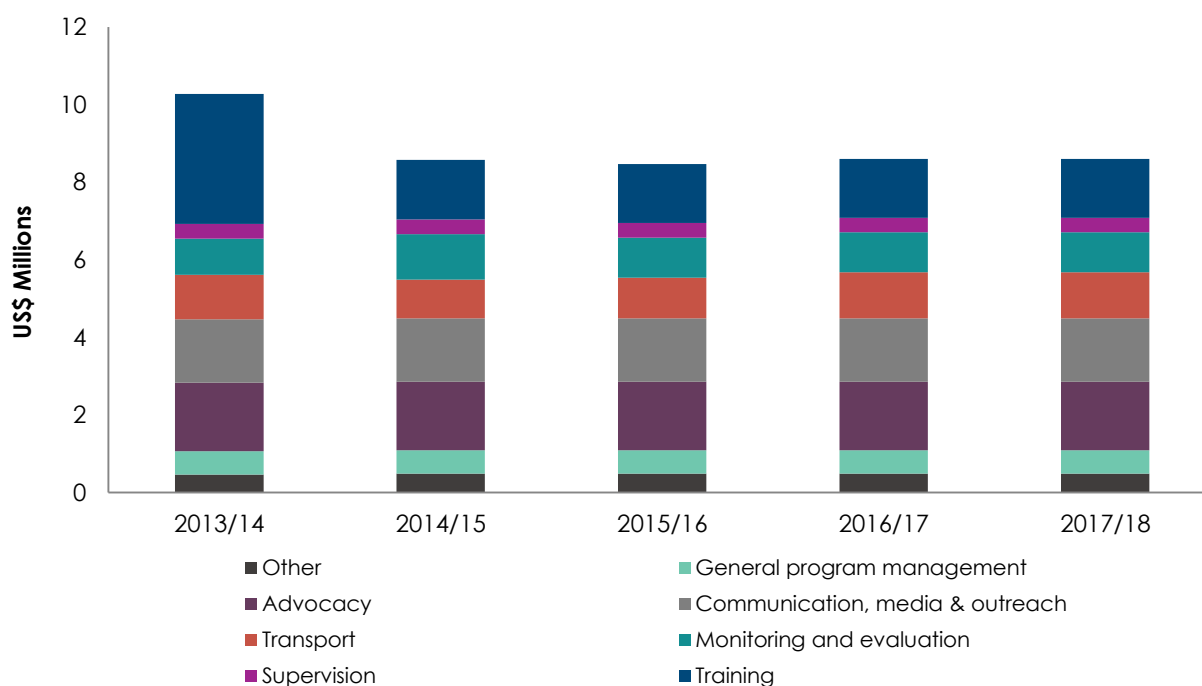
Total Cost: US\$44,527,617

Cost Drivers:

- In-service training
- County printed materials
- Advocacy strategies and materials

The total cost of implementation will derive predominantly from in-service training (21%), followed by advocacy (20%), and communication (18%). Ongoing in-service training will target health promotion officers, community health workers, and community health extension workers. Advocacy for health promotion will require quarterly meetings to support the development of multiple national advocacy strategies, dissemination of policies and regulations, and the production of printed advocacy materials. Communication activities will utilize mass media at the national level, printed information, education, and communication materials at the county level, and social outreach at the community level. Development of a consolidated national communication strategy will also require quarterly meetings and the contracting of consultants.

**Figure 23. Health promotion macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

### *Emergency care and blood safety*

**Situational analysis:** Injuries and violence rank within the top ten causes of morbidity and mortality in Kenya, with young and unemployed people especially affected (MOH, 2013a). The situation not only strains the availability of high-quality emergency care, but also increases demand for physical and psychosocial rehabilitative services to address long-term effects of violence and injuries. The SARAM determined that only 27 percent of facilities provide essential accident and emergency services and only 10 percent offer essential rehabilitation services (GOK, 2014).

Blood safety lacks a consistent definition. Generally, blood safety standards are considered to be in place when a patient in need can receive the necessary quantity of acceptable-quality blood (Sondag-Thull, 2013). The quality of blood for transfusion is especially important to prevent transfusion-transmissible infections such as HIV, syphilis, hepatitis B, and hepatitis C (Dutta et al., 2012). Under the KEPH, blood safety interventions range from blood donation, storage, screening, and preparation, to blood transfusion. According to the SARAM, however, blood safety services are only available at 6 percent of facilities (GOK, 2014).<sup>8</sup>

**Strategic objectives:** The *KHSSP III* Strategic Objective 3 aims to reduce the burden of violence and injuries by increasing access to curative and rehabilitative emergency care and corrective and inter-sectoral preventive interventions. Performance monitoring indicators target a reduction in the percentage of deaths due to injury and the percentage of new outpatient cases attributed to road traffic, gender-based violence, and other injuries.

**Scale-up:** The baseline caseload of emergency care patients was extrapolated from Kenya's health information system, the District Health Information System. It is estimated that 156,893 burns and 906,821 accidents were treated in public and private facilities in 2012 (GOK, 2012). In the absence of implementation targets, baseline coverage was scaled up proportionally to population growth. Rehabilitation and therapy for injury/violence patients was not included for analysis due to incomplete information. Post-rape care is reflected in the HIV and STI/RTI program costs.

The minimum blood requirement need is estimated to be donation by 1 percent of the population (Kenya Red Cross, 2011). Donation of screened and prepared blood units through the National Blood Transfusion Service (NBTS) is projected to increase from 27 percent in 2013/14 to 90 percent in 2017/18. Practices in private hospitals are not tracked and were excluded from this analysis.

**Cost results:** Over FYs 2013/14–2017/18 emergency care and blood safety will require US\$301 million (KSh 25 billion) (Box 14). Less than 1 percent of this cost will reflect investments in program management (Figure 24). Nearly 70 percent of the remaining cost will go toward treatment for accidents, 27 percent for blood donation and screening, and 3 percent for treating burn patients.

Emergency care varies widely among patients, and it was not possible to establish unit costs from standards of care. Instead, the average cost to treat each victim of an accident, US\$42 (KSh 3,593), was extrapolated from a study on the cumulative<sup>9</sup> cost of hospitalization for road

#### **Box 14. Emergency care and blood safety, micro cost drivers, FYs 2013/14–2017/18**

Total Cost: **US\$301,379,546**

Cost Drivers:

- Accident care, targets
- Screening of donor blood, unit costs

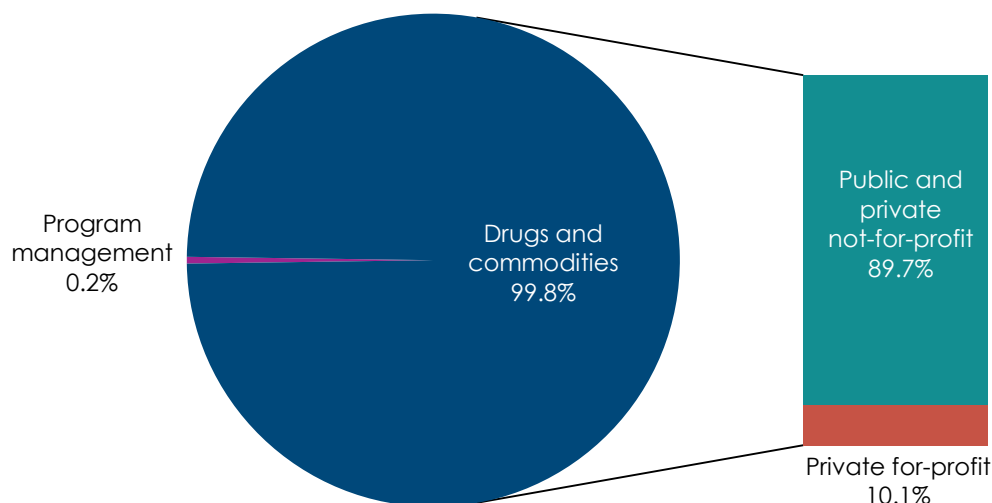
<sup>8</sup> The SARAM does not account for voluntary blood donation through donation camps or National Blood Transfusion Service centers. However, health facilities are the primary screening sites for replacement blood donation.

<sup>9</sup> In the Macharia study, the cumulative cost refers to the hospitalization cost accumulated by road traffic injury patients at the time of interview. The study reported the number of patients within each of four cumulative cost ranges: KSh 0–2,000; KSh 2,001–5,000; KSh 5,001–1,000; and KSh 10,000 and over. The authors of this OneHealth analysis report calculated a weighted average cumulative cost from this information. The unit cost will overestimate the cost of drugs and commodities alone.

traffic injury casualties (Macharia, 2009). From the same study, the technical team conservatively estimated the cost of treating burn patients to be US\$11 (KSh 1,000). Given the high burden of accidents, it is projected that treatment for accidents will require 20 times as many financial resources as treatment for burns.

In 2017/18, it is estimated that 479,414 units of blood will be collected and screened to meet 90 percent of the country’s minimum need. The cost to collect and screen each unit of blood, US\$51 (KSh 4,318), is higher than the average cumulative cost of all other emergency care treatment.

**Figure 24. Emergency care and blood safety macro cost drivers, FYs 2013/14–2017/18**



Source: Author’s calculations

Emergency care varies widely among patients, and it was not possible to establish unit costs from standards of care. Instead, the average cost to treat each victim of an accident, US\$42 (KSh 3,593), was extrapolated from a study on the cumulative<sup>10</sup> cost of hospitalization for road traffic injury casualties (Macharia, 2009). From the same study, the technical team conservatively estimated the cost of treating burn patients to be US\$11 (KSh 1,000). Given the high burden of accidents, it is projected that treatment for accidents will require 20 times as many financial resources as treatment for burns.

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*Other specializations: ophthalmology, oral health, mental health, internal medicine, and other communicable diseases*

**Situational analysis:** Areas of medical specialization in the KEPH span primary and secondary health services related to ophthalmology, oral health, mental health, internal medicine, and communicable diseases. Individually, these programs areas require relatively few resources, but cumulatively they address a large portion of the disease burden in Kenya. However, the quality and availability of data for such specializations is limited.

<sup>10</sup> In the Macharia study, the cumulative cost refers to the hospitalization cost accumulated by road traffic injury patients at the time of interview. The study reported the number of patients within each of four cumulative cost ranges: KSh 0–2,000; KSh 2,001–5,000; KSh 5,001–1,000; and KSh 10,000 and over. The authors of this OneHealth analysis report calculated a weighted average cumulative cost from this information. The unit cost will overestimate the cost of drugs and commodities alone.

Blindness affects 0.7 percent of the population in Kenya. In 2012, this translated to 16,800 children. The most common causes of blindness are cataract, trachoma,<sup>11</sup> glaucoma, and diabetic retinopathy (Karimurio, 2000). Many of these cases can be reversed with treatment. Studies suggest up to 2.6 percent of adults and children in rural Kenya may be partially sighted due to refractive errors, low vision, or both (Oduntan, 2005). Nevertheless, ophthalmological units are only available in 3 percent of hospitals (GOK, 2014).

Oral health is defined as the “optimal functioning of the mouth and its tissues,” and is essential to an individual’s ability to eat, speak, and socialize (Kaimenyi, 2004; MOH, 2002). The status of oral health in Kenya has been described as “dire”, with the Kenya Medical Practitioners and Dentists Board estimating that 90 percent of adults have at least one form of gum disease (Karambu, 2010). As a result of preventable disease, more than 100,000 extractions were performed in public and private health facilities in 2012. This figure likely underestimates the total number of extractions performed because it does not include those performed through outreach or as part of traditional practice.

The MOH estimates 25 percent of general outpatients suffer from at least one psychiatric condition (WHO, 2012a). Unipolar depressive disorders alone account for the tenth highest number of DALYs in Kenya (1.5%) (MOH, 2013a). Psychiatric services are available at the national referral mental hospital, Mathari National Teaching and Referral Hospital, and at 19 general hospital psychiatry units. Where psychiatry units are absent or patients present with multiple symptoms, hospitals will admit psychiatry patients to general wards. Consequently, the MOH suspects that psychiatric outpatients are commonly underreported. In comparison, the WHO estimates mental and substance use disorders are responsible for up to 23 percent of all DALYs worldwide (WHO, n.d.a).

Communicable diseases that are not captured in other health programs include skin conditions;<sup>12</sup> cholera outbreaks; and ear, nose, and throat (ENT) conditions. The average annual number of cholera cases from 2007–2008 was 934. This is used as a conservative projection of the annual caseload. In comparison, the number of cholera cases exceeded 11,000 during the 2009 outbreak (WHO, 2010a). National or regional estimates of the prevalence of skin and ENT conditions do not exist. However, based on 2012 DHIS data, approximately 558,142 outpatients were treated for ear infections and 3,107,415 outpatients were treated for diseases of the skin. These treatments occurred in both public and private facilities. Although skin disease cases may overlap with leprosy, research suggests the actual burden of non-leprosy skin disease is drastically underestimated (Hay, 2006).

The costing analysis of internal medicine is limited by a dearth of information. As a result, hematological conditions, gastrointestinal conditions, and identification and management of disabilities were excluded from this analysis. In 2012, public and private facilities attended more than 800,000 outpatients for rheumatism or joint pains. This was used as a proxy for the musculoskeletal conditions and was the only intervention related to internal medicine included for analysis.

**Strategic objectives:** Mental health and communicable diseases are prioritized under the *KHSSP III*; unipolar depressive disorders are targeted for control and re-emerging infections (e.g., cholera) are targeted for eradication. Ophthalmology, oral health, and internal medicine are omitted from the *KHSSP III* performance monitoring indicators.

**Scale-up:** Strategic planning and target setting within these specializations has not been undertaken. For most interventions, baseline coverage was established through the DHIS database or program-specific reporting mechanisms. The number of persons reached through oral health, ophthalmology, communicable disease, and internal medicine interventions is projected to scale up from baseline coverage relative to population growth. In the absence of outbreak projections, constant coverage of 934 annual cholera cases is targeted over FYs 2013/14–2017/18.

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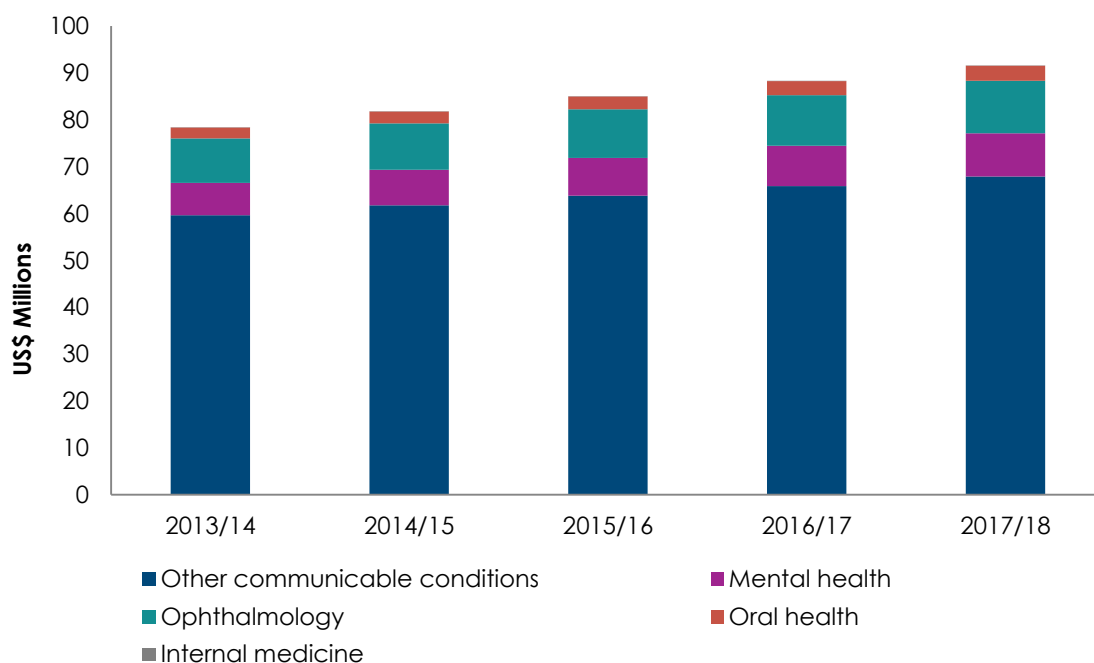
<sup>11</sup> Trachoma is included in the costing analysis for NTDs.

<sup>12</sup> Skin conditions exclude leprosy.

Due to the complexity of treatment for mental health patients, interventions were grouped by psychiatry inpatients and outpatients. The extent of inpatient record keeping through DHIS lags considerably behind that for outpatients. Given this, 7,086 psychiatry inpatients were estimated in 2012 from bed availability and occupancy rates across psychiatry wards. Coverage of psychiatry inpatients will scale up based on the expansion of psychiatry wards, assuming constant bed occupancy rates. Psychiatric outpatients at baseline (449,963) were extrapolated from the 2012 dataset from the DHIS. The Division of Mental Health estimates baseline coverage of mental health interventions meets 20 percent of the need. By 2017/18, the division aims to meet 40 percent of the need for psychiatry services.

**Cost results:** Over FYs 2013/14–2017/18, these five areas grouped under “other specializations” are projected to cost US\$424 million (KSh 35 billion). The cost of the mental health program will scale up rapidly under the *KHSSP III*, from US\$13 million (KSh 1.0 billion) to US\$20 million (KSh 1.7 billion) (Figure 25). Drugs and commodities account for 98 percent of the total cost of specializations, while program management for oral health and mental health programs make up the remaining cost.

**Figure 25. Other specializations macro cost drivers, FYs 2013/14–2017/18**



Source: Author's calculations

Every intervention within the five specializations is primarily delivered through the public and private not-for-profit sectors. The cost of drugs and commodities also reflects a low level of service delivery through the private, for-profit sector for all interventions except ophthalmology. Routine oral check-ups and orthodontics are provided exclusively through the private sector, but were not included in this analysis due to a lack of data on programmatic reach. In total, procurement of drugs and commodities through the private, for-profit sector constitutes 11 percent of the total cost of specializations.

Management of skin conditions incurs the highest portion of total drug and commodity cost (66%), followed by management of ENT conditions (11%) (Box 15). Skin conditions are primarily treated with antifungals, while ENT conditions are mainly treated with antibiotics. The average cost per skin condition treated is estimated at US\$15.80 (KSh

**Box 15. Other specializations, micro cost drivers, FYs 2013/14–2017/18**

Total Cost: **US\$424,630,804**

Cost Drivers:

- Skin conditions, target
- ENT conditions, target

1,327) and the average cost per ENT condition treated at US\$15.16 (KSh 1,273). Although these costs appear very similar, five times as many people will be treated for skin conditions as ENT conditions under the *KHSSP III*.

## Other Health Investment Areas

### **Human resources for health**

#### *Situation analysis*

In 2006, the *World Health Report* identified Kenya as one of 57 countries facing a critical shortage of HRH (Global Health Workforce Alliance, 2014). Since then, despite supportive policy frameworks and related implementation strategies, Kenya's HRH situation has progressed slowly. The number of physicians per 1,000 population increased from 0.14 to 0.18 from 2002 to 2011, yet the number of nurses and midwives per 1,000 people decreased from 1.18 to 0.79 (The World Bank Group, 2014b). Progress has been inhibited by the rapidly changing policy environment, the post-election disruption in 2008, and other realities (Campbell, 2008). In 2013, the *MTP II* highlighted understaffed public health facilities, the inequitable distribution of available HRH, and shortages of an adequate skills mix as important and enduring issues facing the health sector. A comprehensive evaluation of the *KHSSP II* also identified lack of staff at health facilities and poor remuneration of community health workers as failures in the effort to provide equitable access to health services (MOH, 2013a).

Until recently, little was known about the strength of HRH in the private sector. Without a database for private sector HRH, the evidence pointed to generally high levels of unemployment among registered and enrolled nurses across the public and private sectors (Campbell, 2008). In 2013, the results of the SARAM survey provided the first comprehensive view of the magnitude and distribution of HRH in Kenya. Described as the "national census" of HRH, the survey covered all 8,401 health and management facilities, 88 percent of which completely filled questionnaires (7,994 facilities). The results indicated that there is less than one staff member per 10,000 population for all HRH cadres, except nurses and clinical officers (GOK, 2014).

The 2013 SARAM survey also provided evidence for long-suspected issues of absenteeism among health workers. At the time of the survey, 15.45 percent of HRH were absent from work. The *Public Expenditure Tracking Survey in Kenya, 2012 (PETS-Plus)* reported that 27 percent of health workers were absent from work at the time of the survey. Both reports cited large variations in the absentee rate by geographic area and cadre. Within the SARAM sample, HRH were absent due to sanctioned leave such as training (68%), followed by maternity or sick leave (4%). In the two years preceding the survey, 11.46 percent of HRH participated in long-term training, most often diploma programs. The 2013 SARAM also found that 54,193 staff reported participating in short-term trainings in the 12 months preceding the survey (GOK, 2014).

#### *Health sector staff availability analysis*

To estimate the existing HRH in the health sector at the end of FY 2012/13, the technical team drew data from two sources:

1. The SARAM survey, which provides health sector staff strength by cadre, but does not disaggregate these by facility managing authority (GOK, 2014).
2. The October 2013 MOH Permanent Employee (PE) database, which provides the public sector staff strength by cadre.

The analysis team first merged the staff cadres from both sources to a common list of 34 service providers and 19 health management and support personnel.<sup>13</sup> The technical team assumed the private

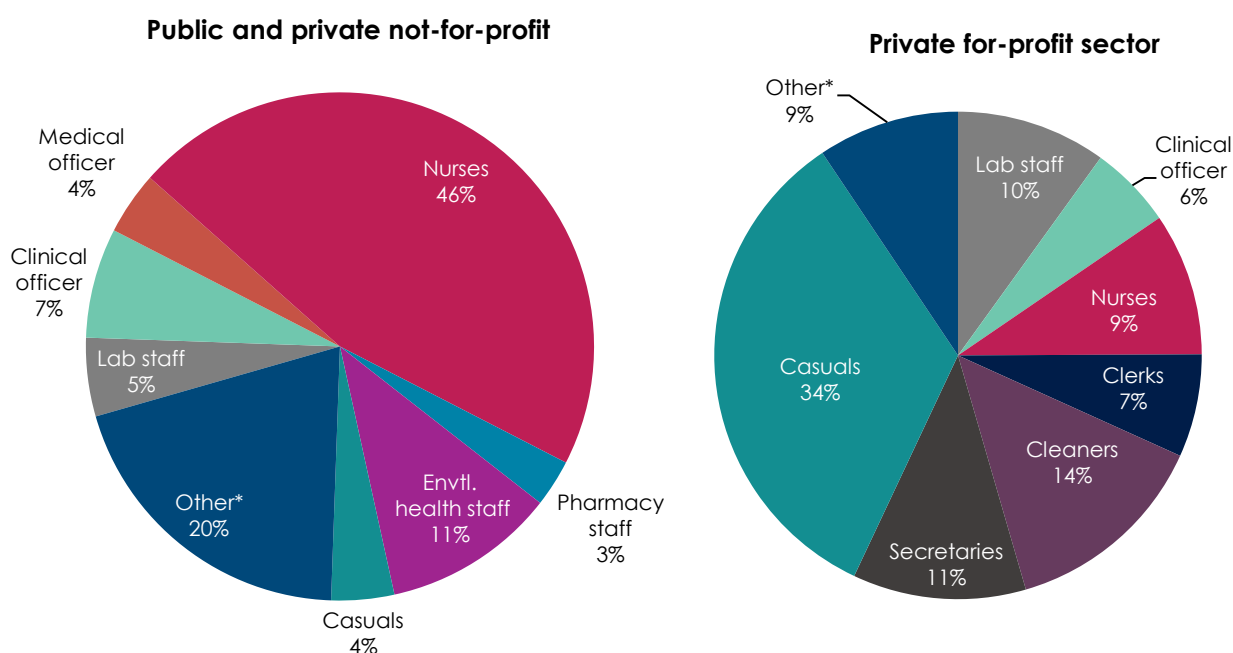
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<sup>13</sup> Midwives were excluded from the common list of service providers due to a lack of data from SARAM and the MOH PE database.

sector staff strength for each cadre was equal to the difference between the total sector (SARAM) and public sector (PE database) staff strength. When staff strength reported by the PE database was larger than that of the SARAM, zero staff strength was assumed in the private sector.<sup>14</sup> This approach, however, does not allow for distinction between private for-profit and private not-for-profit. For the purposes of this analysis, all private sector staff are reflected in the for-profit market.

HPP estimated 70,947 health workers were available sectorwide at the end of FY2012/13. In comparison, the SARAM survey reached 88 percent of all public and private facilities in 2012 and reported 67,075 HRH were available in the sampled facilities (MOH, 2013d). In the OneHealth analysis, two-thirds of the HRH available in FY 2012/13 were employed by the public and private not-for-profit sectors. The distribution of staff by cadre varied significantly between the private, for-profit sector and the public and private not-for-profit sectors (Figure 26). While the majority of public and private not-for-profit sector staff were nurses and environmental staff (i.e., public health officers and technicians), the majority of private, for-profit sector staff were support personnel. The proportion of total HRH attributed to clinical officers, however, was similar across sectors (6% in the private, for-profit sector and 7% in the public and private not-for-profit sectors).

**Figure 26. Comparison of Kenyan HRH across sectors, by cadre, FY 2012/13**



Source: SARAM Report 2013, MOH PE Database 2013, and author's calculations

\*Combines all other cadres, for which the staff strength of each makes up less than 2 percent of the total HRH.

### Strategic objectives

The *KHSSP III* aims to ensure the availability of appropriate and equitably distributed health workers, attract and retain the required health workers, improve institutional and health worker performance, and build the capacity of the health workforce. Priority areas for investment include development of county-specific HRH staffing targets, output-based aid as an HRH motivation strategy, updating pre-

<sup>14</sup> The number of HRH reported in the PE database (public sector) was larger than in the SARAM (total health sector) for the following cadres: biochemists, dentists, dental technologists, drivers, economists, medical officers, physiotherapists, plaster technicians, procurement officers, public health officers, and public health technicians. For these cadres the technical team assumed zero staff employed in the private sector.



service curricula and harmonizing comprehensive schemes of service for all cadres. Policy monitoring indicators for the health workforce investment area will gauge progress based on the number of health workers per 10,000 population, the proportion of staff who have undergone continuing professional development, staff attrition rate, and the percentage of public health expenditures spent on human resources (MOH, 2013a).

*Scale-up*

The *KHSSP III* uses population staffing norms to determine the minimum number of health workers needed to ensure the provision of the KEPH and the equitable distribution of HRH. The HRH and infrastructure norms and standards outlined in the *KHSSP III* define minimum staffing norms per 10,000 persons by staff category as shown in Box 16. Overall, the KEPH (also outlined in the *KHSSP III*) requires 74 HRH per 10,000 people. Based on population norms and population estimates, the *KHSSP III* also defines absolute staff requirements by cadre.

The *KHSSP III* aims to meet 80 percent of the absolute staffing requirement in 15 counties by 2015/16 and 30 counties by 2017/18. However, current staff availability varies considerably by county; total HRH per 10,000 ranges from 53 in Uasin Gishu county to 4.95 in Turkana (GOK, 2014). Furthermore, population size varies significantly by county. Without priority districts identified for scale-up at the time of this analysis, national-level HRH scale-up targets could not be determined. Instead, the average HRH gap per county was quantified by comparing the average HRH availability to the average HRH need in order to meet 80 percent of the minimum requirement for each cadre (Box 17). Analysis by this method determined that the HRH shortage is greatest for trained community health workers and medical officers.

**Box 16. Minimum staffing norms by population**

Staff cadre	Per 10,000 population
Dental	1.1
Laboratory	4.1
Medical practitioners	7.2
Midwives	3.0
Non-surgical specialists	0.6
Surgical specialists	1.1
Nurses	8.7
Pharmacy	0.9
Radiology	0.6
Environmental health	1.6
Community	28.3
Rehabilitation specialists	0.6
Management staff	1.2
Administrative staff	12.6
General support staff	2.5

(Ministry of Health, 2013a)

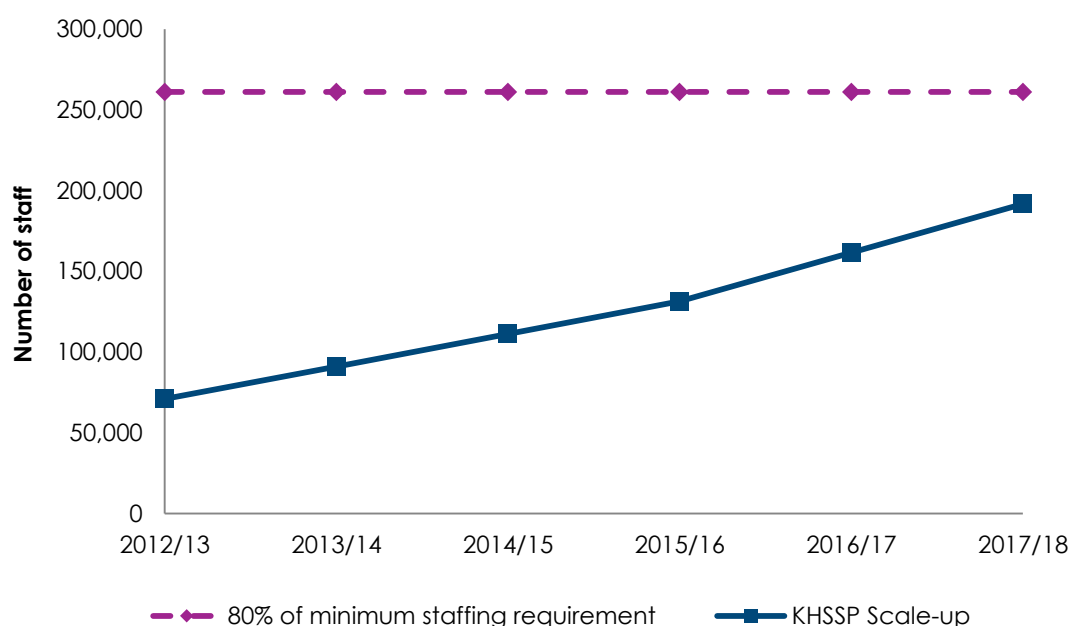
**Box 17. 2015/16 HRH absolute target calculations, by cadre**

1. Subtract number of staff available from the number of staff needed
2. Multiply the result from Step 1 by 80%
3. Divide the result from Step 2 by 47
4. Multiply the result of Step 3 by 15
5. Add the result from Step 4 to the number of staff available

HRH scale-up was distributed across the public and private sectors based on the FY 2012/13 allocation of staff within each cadre. For certain cadres, such as secretaries and casuals, the available HRH in all sectors in FY 2012/13 already met the 80 percent minimum requirement, so they were not targeted for scale-up. Zero scale-up was also planned for cadres that are not included in the minimum staffing norms (Box 16), such as economists and supply chain officers.

National scale-up targets are aggregated across cadres in Figure 27. To meet the ambitious *KHSSP III* targets, 120,832 additional HRH are needed over FYs 2013/4–2017/18. This is a conservative estimate. If the country were to prioritize those counties with the lowest HRH to

population ratio or those with the largest populations, the gap between current levels and *KHSSP III* targets would be even greater.

**Figure 27. Scale-up of HRH, FYs 2012/13–2017/18**

Source: Author's calculations

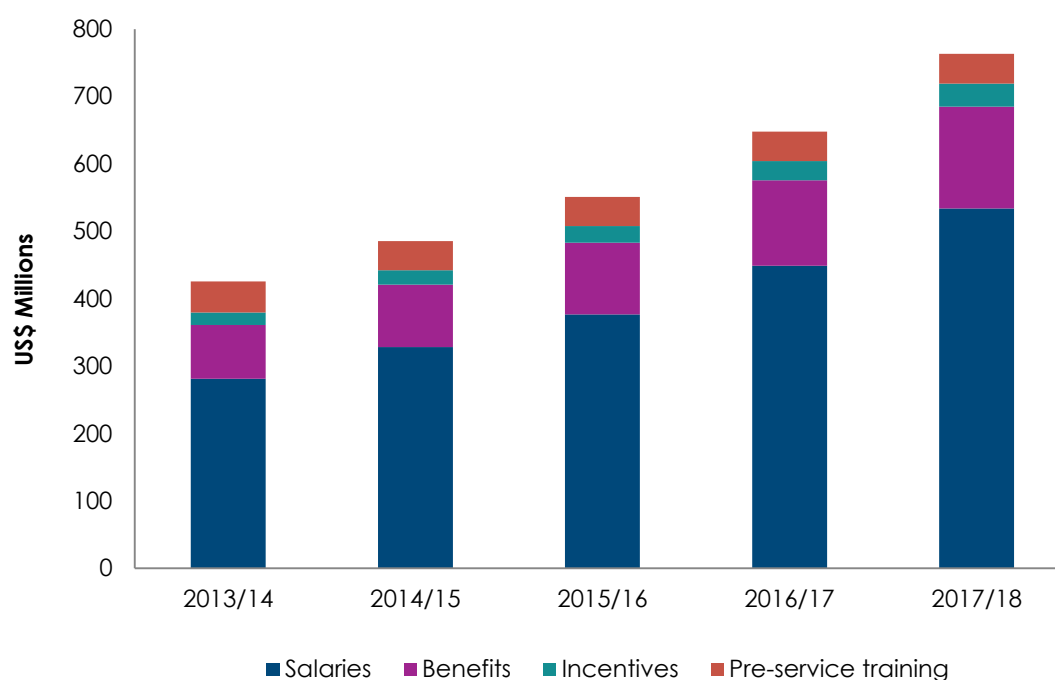
While the *KHSSP III* is geared toward closing the gap between available staff and minimum requirements, future facility staffing norms should define optimum staffing norms based on actual workload (MOH, 2013a).

### Cost analysis

Investments in HRH are comprised of salaries, benefits, incentives, and pre-service training. Salaries are based on 2012 MOH pay grades and housing allowances, which increase by 2 percent annually over FYs 2012/13–2017/18 (MOPHS, unpublished). Where multiple staff cadres were consolidated, the weighted average salary was calculated using the distribution of staff at baseline. Although anecdotal evidence suggests higher-paying positions exist in Kenya's private sector and are linked to attrition from the public sector, a comprehensive database for salaries and allowances is only available for public sector HRH (Bliss, 2014). Consequently, private sector HRH were conservatively assumed to have public sector pay grades and allowances for this analysis. Other incentives are also offered to a subset of public sector HRH to increase retention. These range from US\$9–357 (KSh 729–30,000) per staff member annually and are related to hardship, risk, non-practice, commute, on call, and extraneous duties.

Over FYs 2012/13–2017/18, the cost to train, retain, and compensate HRH is projected to total US\$2,873 million (KSh 241 billion). The estimated annual cost will nearly double in five years due to the rapid scale-up of HRH, in accordance with *KHSSP III* targets. HRH compensation through salaries, benefits, and incentives will account for the overwhelming majority of HRH costs (96%) (Figure 28). Nearly three-fourths of salaries and benefits (74%) will compensate service providers while the rest (26%) will compensate health management and support personnel. Under the *KHSSP III*, the public and private not-for-profit sectors will finance 74 percent of salaries and benefits for HRH, while the private, for-profit sector will finance 26 percent.

The cost of pre-service training includes Rural Health Training and Demonstration Centres and the Kenya Medical Training College (KMTTC), including the expansion of existing medical training colleges. Since no data were available on the cost of pre-service training institutions in the private sector, those institutions were omitted from this analysis.

**Figure 28. Cost of health sector HRH, FYs 2013/14–2017/18**

Source: Author's calculations

## Health infrastructure

### Situation analysis

The *KHSSP III* defines health infrastructure as any investment in physical infrastructure,<sup>15</sup> medical equipment, information and communication technology (ICT), or select transport.<sup>16</sup> Many milestones in health infrastructure were achieved under the *KHSSP II*, including the expansion of primary care facilities. Additionally, the MOH incorporated rehabilitation of health facilities and maintenance of medical equipment into the government budget and established an ICT network at the national and district levels. Despite such investments, the *KHSSP II* failed to ensure the functionality of existing health infrastructure (MOH, 2013a). In FY 2012/13 the SARAM survey determined that the basic equipment needed to provide general health services was only available in 67 percent of health facilities (GOK, 2014). The *MTP II* highlights the general lack of requisite infrastructure and inadequate emergency transportation and facilities able to handle obstetric complications as important issues to be addressed by 2017/18 (MOH, 2013a).

### Health sector infrastructure availability analysis

The SARAM reports the distribution of health facilities by type of facility and managing authority, presented here in Figure 29 (GOK, 2014). Out of the 8,401 health and management facilities visited as part of the 2013 survey, 88 percent (7,994) completed the SARAM questionnaire. This included level I–VI facilities, maternity and nursing homes, medical clinics, and stand-alone voluntary counseling and testing sites. Although the SARAM does not classify community units as health facilities, they require certain ICT equipment and are reflected in the analyses (MOH, 2013a). Overall, the results of the SARAM showed that 65 percent of health facilities were managed by the public and private not-for-profit sectors, and 34 percent of facilities were managed by the private, for-profit sector. Level VI facilities were concentrated in the public and private not-for-profit sectors, while maternity and nursing homes and medical clinics were concentrated in the private, for-profit sector.

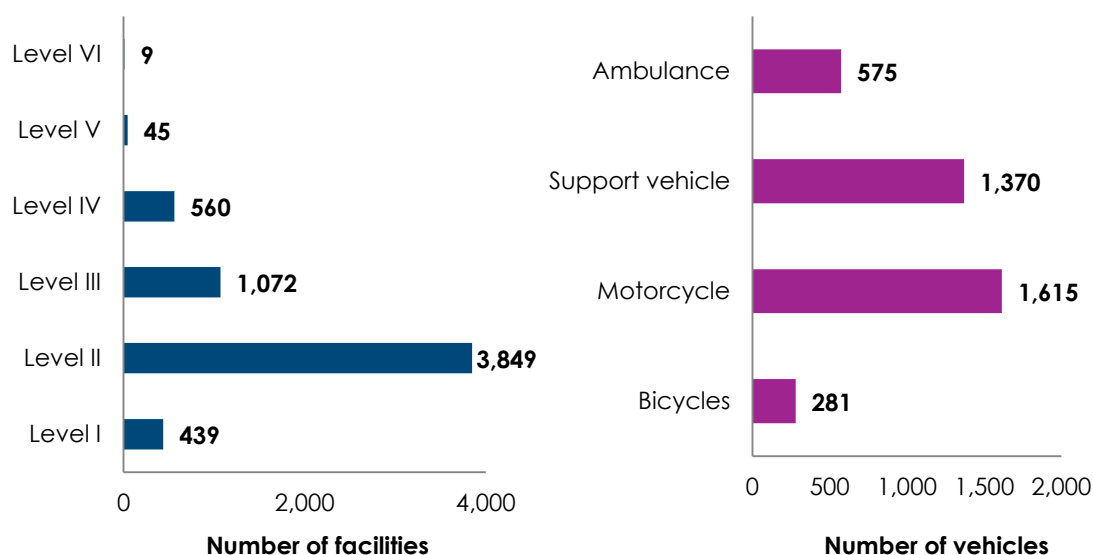
<sup>15</sup> Investments in physical infrastructure include construction of new facilities and rehabilitation of existing facilities.

<sup>16</sup> Investments in transport include support/utility vehicles, ambulances, bicycles, and motorcycles.

The SARAM also measured the number of ambulances, support vehicles, motorcycles, and bicycles available at facilities (Figure 29). However, it is important to note that availability does not necessarily imply functionality. Out of the 575 reportedly available ambulances in FY 2012/13, only 87 percent were functional. Since available transportation equipment is not disaggregated by managing authority, the analysis team applied the distribution of health facilities by managing authority to all transportation equipment. The same assumption was applied to the location of facility rehabilitation, medical equipment, and ICT.

For the purpose of this analysis, HPP defined the number of existing facilities in need of rehabilitation as those that lack basic amenities to create an enabling environment for service delivery. The SARAM assesses the availability of six tracer items which proxy the availability of basic amenities: room with privacy, power supply, communication equipment, improved water source, adequate sanitation facilities, computer with internet access, and emergency transportation. Basic amenities were most available in level IV–VI facilities (68%) and least available in level II facilities (41%) (GOK, 2014). Similarly, the SARAM definition of basic equipment in facilities was applied to determine which facilities were in need of a large-scale re-equipment.<sup>17</sup> Basic equipment includes an adult weighing scale, child/infant weighing scale, thermometer, stethoscope, and blood pressure machines, and was available in 67 percent of facilities. Unlike basic amenities, basic equipment was most available in level III facilities.

**Figure 29. Health facility and transportation availability, FY 2012/13**



Source: Author's calculations

The HRH and infrastructure norms and standards outlined in the *KHSSP III* stipulate all level II–VI facilities have a mobile phone, fixed phone, two-way radio, and internet access for information communication (MOH, 2013a). In FY 2012/13, 5,044 fixed phones; 3,716 mobile phones; 1,849 internet access points; and 537 two-way radios were available across public and private facilities. Most ICT was available in level II–III facilities, except for fixed phones, which were most common in hospitals. Information communication technology encompasses a broad range of other equipment that may also be available in facilities, such as printers and cameras (GOK, 2014).

<sup>17</sup> The OneHealth Tool defines rehabilitation costs as the cost incurred in a single year to rehabilitate a facility. There are three levels of rehabilitation: small, medium, and large scale. The *KHSSP III* aims to increase the number of facilities having equipment as per norms. The technical team renamed large-scale facility rehabilitation as large-scale facility re-equipment to quantify and cost this target.

### Strategic objectives

The *KHSSP III* aims to guarantee the availability and readiness of the minimum health infrastructure. Priority areas for investment in physical infrastructure, medical equipment, transport, and ICT will focus on defining country-specific needs, purchasing new capital, and maintaining existing capital. Policy monitoring indicators will gauge the effectiveness of these investments by measuring the number of facilities per 10,000 population, the percentage of facilities that meet the norms and standards for equipment, the number of hospital beds per 10,000 population, and the percentage of public health expenditures spent on infrastructure (MOH, 2013a).

### Scale-up

Once the availability and readiness of the minimum health infrastructure are assured, additional funds will be used to provide further gains in health infrastructure. These additional funds will be used to go above minimum standards to attain optimum norms, defined by facilities and counties.

In general, the scale-up of health sector infrastructure is centered on five *KHSSP III* targets:

1. Fifteen counties with at least 80 percent of required facilities in 2015; 30 in 2017
2. Fifteen counties with at least 80 percent of facilities having their required physical infrastructure in 2015; 30 counties in 2017
3. Fifteen counties with at least 80 percent of facilities having equipment as per norms in 2015; 30 counties in 2017
4. Fifteen counties with at least 80 percent of the required transport according to norms in 2015; 30 counties in 2017
5. Fifteen counties with at least 80 percent of the facilities having the required ICT equipment in 2015; 47 counties in 2017

The required number of facility rehabilitations and large-scale medical re-equipments is approximated by the SARAM indexes previously discussed and total facility requirements as established by the HRH and infrastructure norms and standards outlined in the *KHSSP III* (Table 5). The guidelines also define transportation and ICT equipment norms by facility level. All level II–VI facilities require mobile phones, fixed phones, two-way radios, internet access, bicycles, and motorcycles. Additionally, utility vehicles are needed for level III–VI facilities and ambulances should be available at level IV–VI facilities (MOH, 2013a). The total need for each equipment type was extrapolated assuming one unit requirement per facility and is summarized in Table 5.

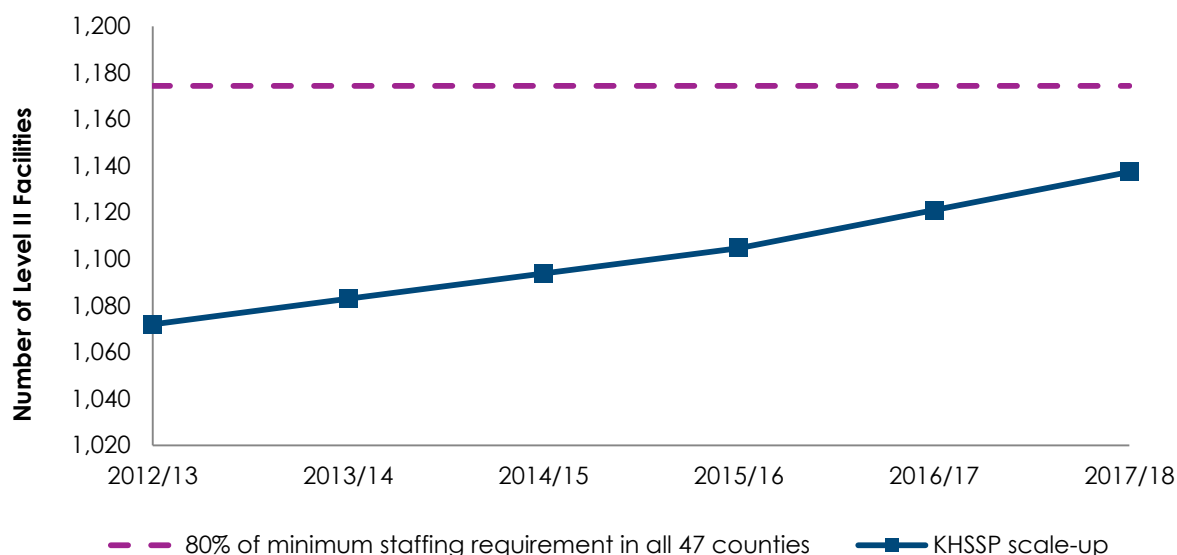
**Table 5. KHSSP III minimum facility population norms and equipment requirements**

	HOSPITALS			PRIMARY CARE UNITS		COMMUNITY UNITS
	Level VI	Level V	Level IV	Level III	Level II	Level I
Catchment populations	5,000,000	1,000,000	100,000	30,000	10,000	5,000
Facilities required	9	44	440	1,468	4,404	8,808
ICT equipment required	25,640	5,508	2,242	178	36	0
Transportation equipment required	12,820	4,131	2,242	178	36	0

Quantifying the *KHSSP III* infrastructure scale-up targets is problematic because both requirements and availability vary significantly by county. Without priority districts identified for scale-up at the time of this analysis, national-level health infrastructure scale-up targets could not be determined. Instead, the average health infrastructure gap per county was quantified by comparing the average physical infrastructure, medical equipment, transportation, and ICT equipment availability to the

average need to meet 80 percent of the minimum requirements. The result is the average infrastructure shortage or surplus per county. If an input was in surplus, no scale-up was targeted under the KHSSP III. By this measure, level II, IV, V, and VI facilities meet or exceed the minimum facility requirement. In contrast, 65 level III facilities and 4,217 community units must be constructed by 2017/18 to meet 80 percent of the minimum requirement in 30 counties (Figure 30).

**Figure 30. Scale-up of level II facilities, FYs 2012/13–2017/18**



Source: Author's calculations

The *KHSSP III* also aims to improve the functionality of existing vehicles, ICT equipment, and facility maintenance units. Annual maintenance costs are assigned to all existing health infrastructure inputs throughout the *KHSSP III*.

### Cost analysis

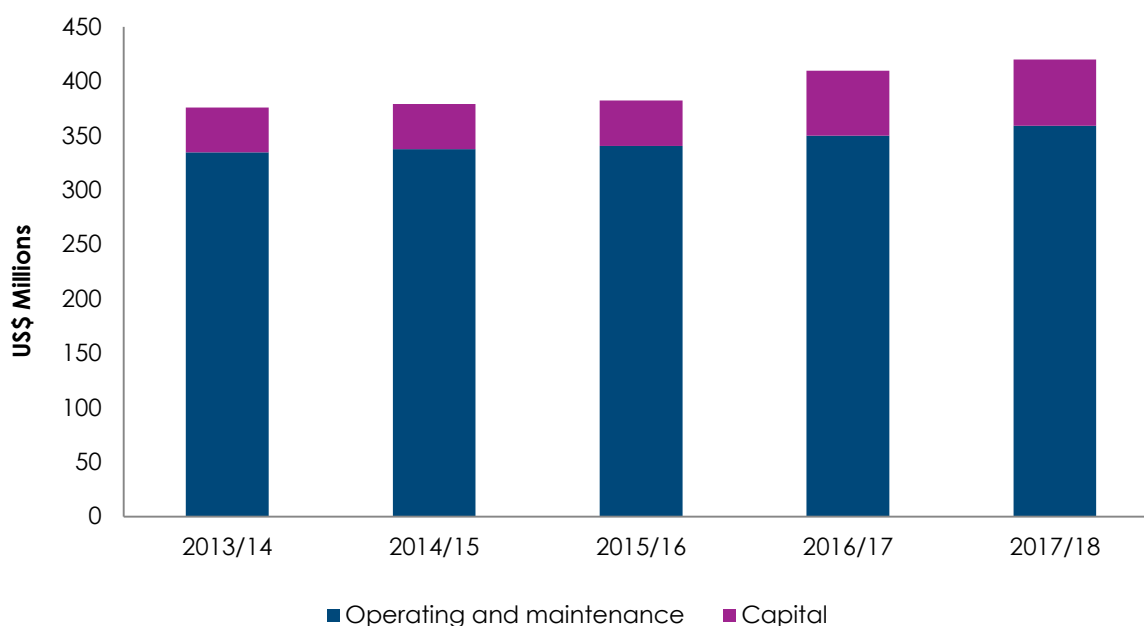
Health infrastructure investments are comprised of capital costs and operating costs. Capital costs capture the cost of providing or developing new, non-recurring inputs into the health system. Examples include the procurement of vehicles, medical equipment, and ICT; and facility rehabilitation and construction. These costs reflect the *KHSSP III's* aim to expand the availability of health infrastructure. Operating costs, on the other hand, include the cost of running health facilities and reflect *KHSSP III's* aim to improve the functionality of existing health infrastructure. The maintenance of vehicles, two-way radios, and facilities; facility water and electric supply; and vehicle fuel are included in operating costs. The unit costs for such capital investments were collected from the MOH's Planning and Policy Department (PPD), the Task Force for Service Delivery, past Global Fund proposal budgets, and the Economic Recovery Strategy's Annual Operation Plan.

Public health infrastructure investments are coordinated by the division of Biomedical and Hospital Engineering within the MOH, which worked with the PPD to provide annual operating costs and capital unit costs for this analysis. Infrastructure investments in the private, for-profit sector, however, are not coordinated by an organization and it is likely that investments vary significantly by financing mechanism and construction management firm. Due to the dearth of costing information related to private sector health infrastructure, the analysis team applied public sector unit costs to private sector infrastructure investments.

To achieve *KHSSP III* infrastructure targets, US\$1,966 million (KSh 165 billion) must be invested in the health sector's physical infrastructure, medical equipment, ICT, and transportation over FYs 2013/14–2017/18. Capital costs will make up 12 percent of the investment, while operating costs will make up 80 percent of the investment (Figure 31). Less than 1 percent of the *KHSSP III* infrastructure

cost derives from other activities that make up public sector program management under the division of Biomedical and Hospital Engineering.

**Figure 31. Cost of health infrastructure, FYs 2013/14–2017/18**



Source: Author's calculations

Despite ambitious scale-up targets under the *KHSSP III*, the implication for cost growth over time is moderate. The annual growth rate of the health infrastructure cost will average 3 percent over FYs 2013/14–2017/18. This is because the largest cost driver at baseline is the operating costs of facilities, for which expansion will be limited to only level I and III facilities under the *KHSSP III*. Lower-cost investments such as ICT and transportation will scale up more rapidly, but will have a relatively smaller impact on total cost.

## Logistics

### *Situation analysis*

Ensuring the availability of health products is the primary purpose of supply chain and logistics management. It is also integrally linked to the success of service delivery and health outcome targets. In 2012, the SARAM and PETS-Plus studies assessed the availability of tracer items. SARAM reported maternal health commodities were the least-available tracer items for priority health outcomes, averaging 24 percent in primary care facilities and 29 percent in hospitals (GOK, 2014). In contrast, PETS-Plus adopted a broader definition of maternal health drugs and reported such drugs were available in 40 percent of facilities (Onsomu et al., 2014). Since maternal health stagnated under the *KHSSP II*, improving supply chain and logistics management will be essential to achieve the *KHSSP III* priority impact target of reducing maternal deaths by half.

In Kenya, the procurement, storage, and distribution of drugs and medical supplies is managed by KEMSA, MEDS, and private distributors. The three agencies supply locally manufactured and imported drugs and medical supplies to all markets. KEMSA primarily supplies the public sector, MEDS supplies the private, not-for-profit sector, and private distributors are the main supplier for the private, for-profit sector (African Center for Technology Studies, 2013). Because the public sector dominates the health sector, KEMSA has operated the largest centralized supply chain network in Kenya since 2001 (Raja, 2009).

In recent years, the health sector supply chain has been advanced by a nationwide “pull” system<sup>18</sup> and the National Pharmaceutical Policy, established under the *KHSSP II* (MOH, 2013a). Nevertheless, operational setbacks and underfunding continue to hurt the effectiveness of the supply chain (Raja, 2009). As a result, shortages of essential medicines and medical supplies persist. These shortages are likely exacerbated by the lack of MOH oversight for KEMSA and disconnect between pharmaceutical policies (MOH, 2013a).

### Strategic objectives

The strategic aim of the *KHSSP III* is centered on minimizing stockouts for essential medicines and medical supplies (MOH, 2013a). However, ensuring the availability of health products is a multifaceted process which requires that the “right quality product, in the right quantities, and in the right condition is delivered to the right place, at the right time, for a reasonable cost” (WHO, n.d.b). The *KHSSP III* aims to reduce the percentage of time that essential medicines and medical supplies are out of stock from 8 percent to 2 percent between 2012 and 2015. To attain this goal, investments will focus on regulation, production and trade, procurement, supply and distribution, and rational utilization.

Box 18. Highest health product wastage rate	
BCG vaccine	85%
Measles vaccine	70%
Pentavalent vaccine	65%
Reconstitution syringe	60%
Oral polio vaccine	50%

(Multi Media University, 2013)

### Cost analysis

Direct investments in the health sector supply chain include warehouses, vehicles, human resources not associated with a health facility, and program management of the aforementioned managing authorities. When the supply chain fails to ensure procured products are consumed by the end user, wastage results. Wastage is the expiry, damage, nonuse, or partial use of drugs or commodities. To adopt a comprehensive view of the cost of the supply chain, the technical team included the cost of wasted drugs and commodities within the logistics health system component. As discussed with PPD, the team assumed a 5 percent wastage rate for all health products except vaccines. Historically, vaccines experience elevated levels of wastage due to dependence on cold chain supply and bundled packaging by producers. The health products for which the Division of Vaccines and Immunizations observes the highest wastage rate are summarized in Box 18 (Multi Media University, 2013).

Over FYs 2013/14–2017/18, the supply chain and logistics management will cost US\$2,350 million (KSh 197 billion). Due to a lack of available data in the private sector, this cost analysis is limited to the storage and distribution of health products through KEMSA and wastage costs.

Over half of the total logistics cost will derive from the operation of 78 existing central, regional, and district warehouses. The cost of warehouse construction was not included because the business plan on the creation of new warehouses was not finalized at the time of this analysis. The size, and therefore operating costs, of existing warehouses varies dramatically; the annual cost of water and electricity alone ranges from US\$12 million (KSh 1 billion) to over US\$1 million (KSh 92 million) per warehouse. As a result, four warehouses contribute 51 percent of the total warehouse operational cost in Kenya (Figure 32).

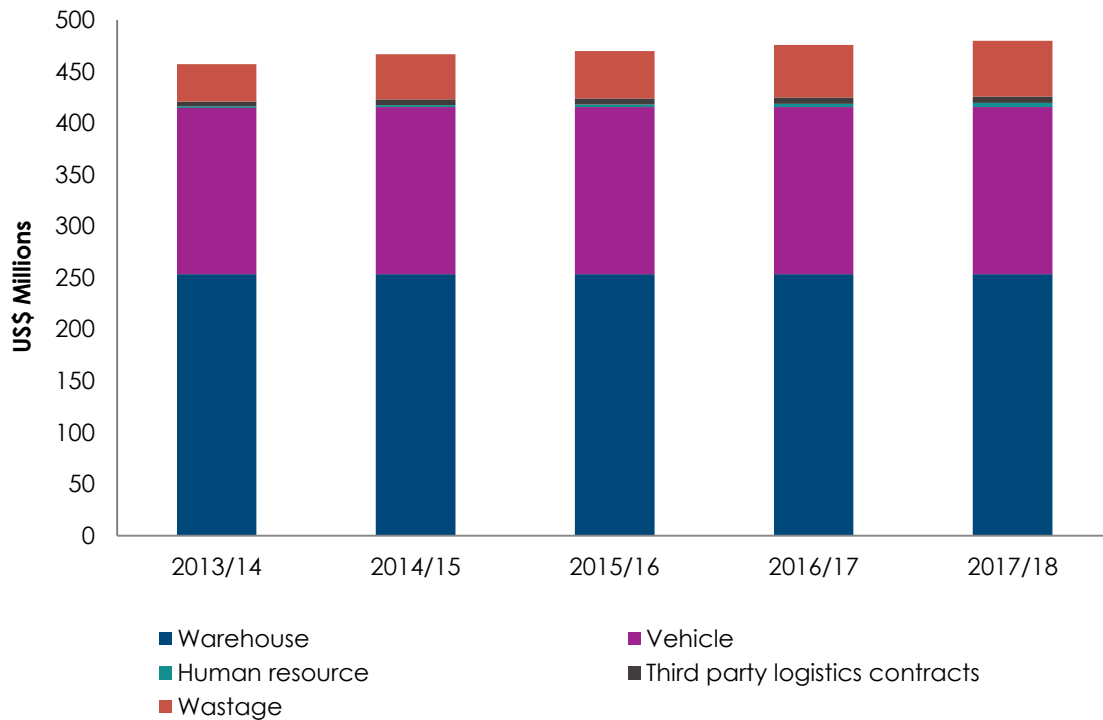
Transportation constitutes one-third of the logistics cost and is the second-highest cost driver. This cost reflects the replacement purchases, maintenance, and fuel needed to support 100 existing distribution vehicles. KEMSA does not plan to expand the number of vehicles because it will increasingly contract out distribution to the private sector. These investments are captured within third-party logistics contracts which will cost US\$28 million (KSh 2 billion) under the *KHSSP III*.

<sup>18</sup> A pull-based supply chain is demand driven. In a push-based supply chain production is based on historical patterns. Some vestiges of the “push” system continue in Kenya (e.g., for ARVs).



However, the technical team assumed a seven-year working life for vehicles and accounted for ongoing procurement of replacement vehicles to maintain the baseline vehicle strength.

**Figure 32. Cost of health logistics, FYs 2013/14–2017/18**



Source: Author's calculations

Transportation constitutes one-third of the logistics cost and is the second-highest cost driver. This cost reflects the replacement purchases, maintenance, and fuel needed to support 100 existing distribution vehicles. KEMSA does not plan to expand the number of vehicles because it will increasingly contract out distribution to the private sector. These investments are captured within third-party logistics contracts which will cost US\$28 million (KSh 2 billion) under the *KHSSP III*. However, the technical team assumed a seven-year working life for vehicles and accounted for ongoing procurement of replacement vehicles to maintain the baseline vehicle strength.

## Health information systems

### *Situation analysis*

Health information systems are meant to be “comprehensive and integrated structures” that collect, collate, analyze, evaluate, store, and disseminate health information for use by all (MOMS and MOPHS, 2010, p. 3). The origin of Kenya’s HMIS dates back to 1972 when a committee of government and international agency representatives was formed to design a pilot health information system for Kenya (Health Metrics Network, 2008). Now a national system exists under the MOH’s Division of Health Informatics Monitoring and Evaluation, extending from the facility level to the MOH and other government ministries (MOMS and MOPHS, 2010). The HMIS also incorporates innovative electronic and online databases and is supported by the ICT unit within the MOH.

Under the *KHSSP II*, the public sector’s routine reporting system improved and research expanded. Still, no unified information system existed to reach all service providers (MOH, 2013a). In response to these issues and the weak institutional regulatory framework that guides HMIS, the government developed the *Health Information System Policy 2010–2020* to support the health sector’s aim “to provide timely, reliable and accessible quality health information for evidence-based decision making to promote [...] health” (MOMS and MOPHS, 2010, p. 6).

### Strategic objectives

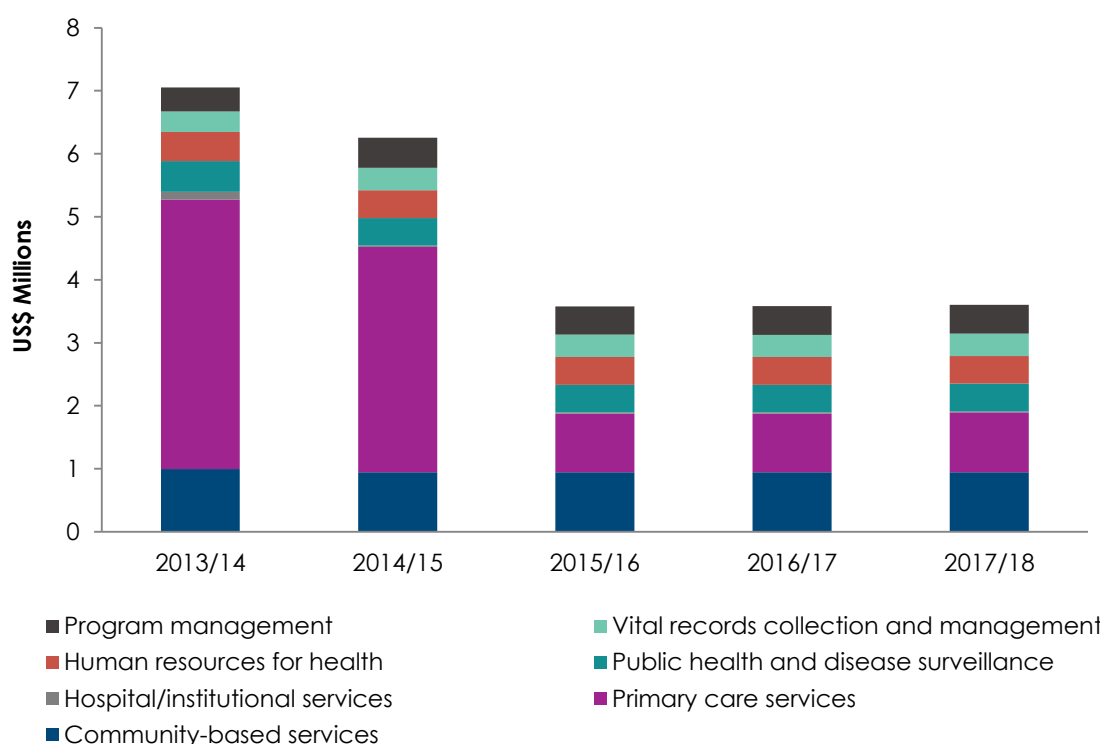
The *KHSSP III* aims to improve the entire continuum of the information system, from data collection to information use. Monitoring indicators will specifically track progress related to the timely submission of high-quality information and the sharing of health information. As outlined in the strategy, priority investments to support such outcomes should focus on a routine health information system, vital statistics, disease surveillance, surveys, and research (MOH, 2013a).

### Cost analysis

Health information system investments are categorized into six functional domains: community-based services, primary care services, hospital/institutional services, public health and disease surveillance, HRH, and vital records collection and management. Together, the functional domains encompass both the *KHSSP III* priority investments and the priority actions outlined in the *Health Information System Policy 2010–2030*. Although these investments target the public and private health sectors, management for the functional domains is provided through the aforementioned MOH divisions.

Over FYs 2013/14–2017/18, health information system investments will total US\$24 million (KSh 2 billion). Between FY 2014/15 and FY 2015/16, the total cost will fall by nearly half (43%) (Figure 33). This change is mostly due to large investments in primary care services over FY 2014/15 and FY 2015/16. In FY 2013/14, training to review minimum data sets will cost US\$2.9 million (KSh 241 million), while in FY 2014/15, establishing a manual on the integrated community-based health management information system will cost US\$2.6 million (KSh 222 million).

**Figure 33. Cost of health information systems, FYs 2013/14–2017/18**



Source: Author's calculations

In total, the functional domains will make up 91 percent of the health information system investments under the *KHSSP III*. The remaining 9 percent of the system cost will derive from program management activities, such as procurement of general office supplies and other recurrent costs needed to maintain the management bodies for the HMIS within the MOH. Program management investments will also support national coordination, country review, monitoring and evaluation, and marketing initiatives for HMIS products.

## Health Financing Interventions

### *Situation analysis*

The WHO identifies three “fundamental, interrelated problems” that restrict countries from expanding access to health services: availability of resources, overreliance on direct payments, and inefficient and inequitable distribution of resources (WHO, 2010b). These problems are echoed in the *MTP II*, which highlights the high cost of healthcare as an impediment to health (MOH, 2013a). These issues are collectively addressed by health system financing, which serves to both raise sufficient funds and provide financial risk protection to the population (WHO, 2008). In Kenya, a team of economists within the PPD is responsible for coordinating health financing for the public health sector.

The Kenya health system was initially tax-funded but has evolved to incorporate user fees and absorb an influx of external resources (Carrin, 2007). By FY 2009/10, the source of health spending in Kenya was relatively evenly distributed across donors (34%), households (37%), and the government (29%) (MOMS and MOPHS, 2011). Over the past decade, the government introduced innovative schemes to reduce the contribution of households through user fees. In 2004, the MOH introduced a cap on the fees incurred at primary care government health facilities and the government of Kenya passed the first National Social Health Insurance Fund bill. In 2012, the MOH abolished the remaining user fees at primary care government facilities and committed to free maternal health services at all government facilities. However, the percentage of total government expenditures on health decreased rapidly from 10.6 percent in 2000 to 5.9 percent in 2010 (The World Bank Group, 2014a). The *MTP II* also emphasized low health insurance coverage as a priority area to be addressed (MOH, 2013a).

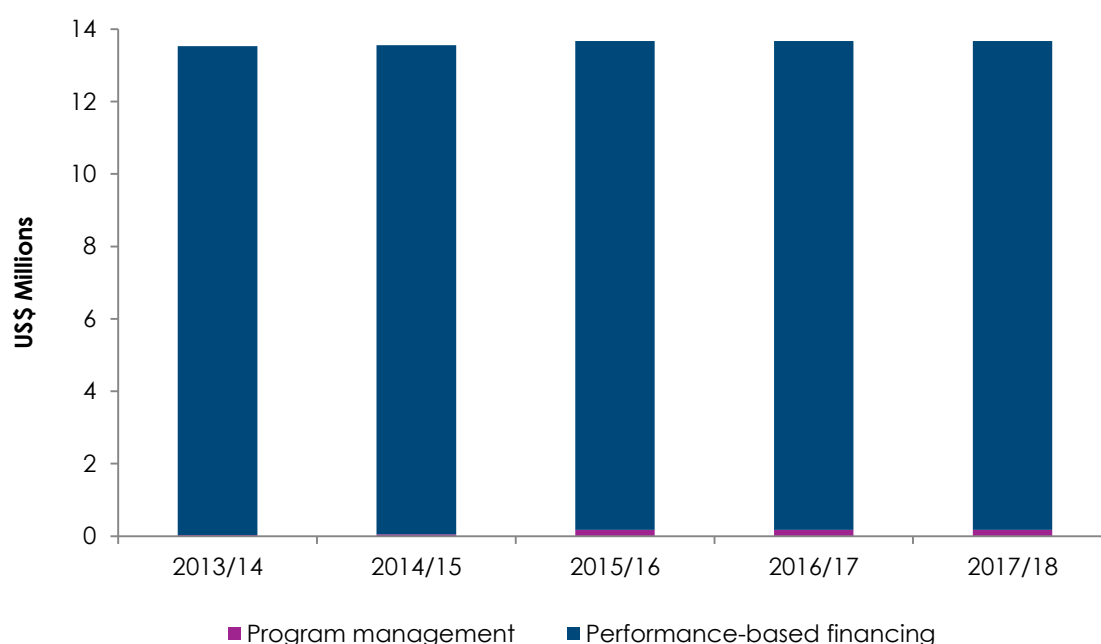
### *Strategic objectives*

The *KHSSP III* aims to increase the percentage of total government expenditures on health to 8 percent by 2015/16 and 12 percent by 2017/18. Furthermore, the plan targets a decrease in off-budget resources for health, improvement in health expenditure reaching the end users, and a decrease of out-of-pocket contributions. To achieve this, priority investments will center on resource generation, risk pooling, and purchasing of services.

### *Cost analysis*

Kenya has piloted many innovative health financing schemes, aiming to minimize cost barriers to accessing the health sector. Output-based vouchers for pregnant women and social health insurance for poor indigenous populations subsidize the direct, cost-of-service delivery for its beneficiaries, while the Hospital Management Services Fund and Health Sector Services Fund finance public health facility maintenance and operation. For the purposes of this analysis, however, the cost of such financing schemes is already reflected in the respective service delivery and health system cost analyses.

The only health financing mechanism that represents an incremental cost to the health sector is performance-based financing to incentivize HRH, which is funded by the World Bank. This was first implemented on a pilot-basis in the Samburu District. However, the MOH plans to scale up the program in 20 arid and semi-arid counties starting in FY 2014/15. The annual number of performance-based beneficiaries under the *KHSSP III* exceeds 42,000 staff, each receiving US\$314 (KSh 26,454) on average. In total, this will require US\$67 million (KSh 5 billion) from FY 2013/14 to FY 2017/18, and program management through the PPD will require an additional US\$1 million (KSh 50 million) (Figure 34).

**Figure 34. Cost of health financing interventions, FYs 2013/14–2017/18**

Source: Author's calculations

## Governance

### *Situation analysis*

The model for health governance or leadership centers on the linkages among the state, providers, and clients or citizens (Luoma, 2010). The Kenyan health sector identifies three essential functions for these linkages: stewardship, governance, and partnerships. Stewardship relates to government management of the health sector through the MOH, while governance relates to the regulatory and legal system to which all actors must adhere (MOH, 2013a). Health partnerships refer to the need for coordination and consolidation across different actors (MOH, 2013a).

How all three functions are implemented is subject to the legal framework in Kenya, including the 2010 constitution and various acts passed by Parliament. In 2013, the *Health Sector Leadership Framework* was developed to determine the responsible actors within each function, in light of the 2010 constitution (Table 27). The national and county governments are responsible for coordinating the governance structures outlined in the framework and defining, making functional, and strengthening the committees and management teams across the sector (MOH, 2013a).

### *Strategic objectives*

The *KHSSP III* highlights six priority objectives to be achieved through strengthening health stewardship, improving health governance, and consolidating health partnerships:

1. Improved voice and accountability
2. Political stability and lack of violence
3. Government effectiveness
4. Regulatory quality
5. Rule of law
6. Control of corruption

Measurable outcome targets and priority areas for investment to achieve those outcomes are extensive. Each centers on establishing and monitoring the governance structures identified in the *Health Sector Leadership Framework*, enacting health laws, and carrying out a national survey.

**Table 6. Health Sector Leadership Framework**

	Partnership	Stewardship	Governance
<b>National</b>	<ul style="list-style-type: none"> <li>Kenya Health Forum (Joint Interagency Coordinating Committee)</li> <li>Health Sector Coordinating Committee</li> </ul>	<ul style="list-style-type: none"> <li>National Ministry of Health</li> </ul>	<ul style="list-style-type: none"> <li>Inter-Governmental Forum for Health</li> </ul>
<b>County</b>	<ul style="list-style-type: none"> <li>County Health Stakeholders Forum</li> </ul>	<ul style="list-style-type: none"> <li>County Health Management Team</li> </ul>	<ul style="list-style-type: none"> <li>County Health Committee</li> </ul>
<b>Facility</b>	<ul style="list-style-type: none"> <li>Hospital (and/or sub-county) Stakeholders Forum</li> <li>Facility Stakeholders Forum</li> </ul>	<ul style="list-style-type: none"> <li>Hospital (and/or sub-county) Management Team</li> <li>Facility Management Team</li> </ul>	<ul style="list-style-type: none"> <li>Hospital Board</li> <li>Facility Management Committee</li> </ul>
<b>Community</b>		<ul style="list-style-type: none"> <li>Community Unit</li> </ul>	<ul style="list-style-type: none"> <li>Community Health Committee</li> </ul>
<b>Clients</b>			

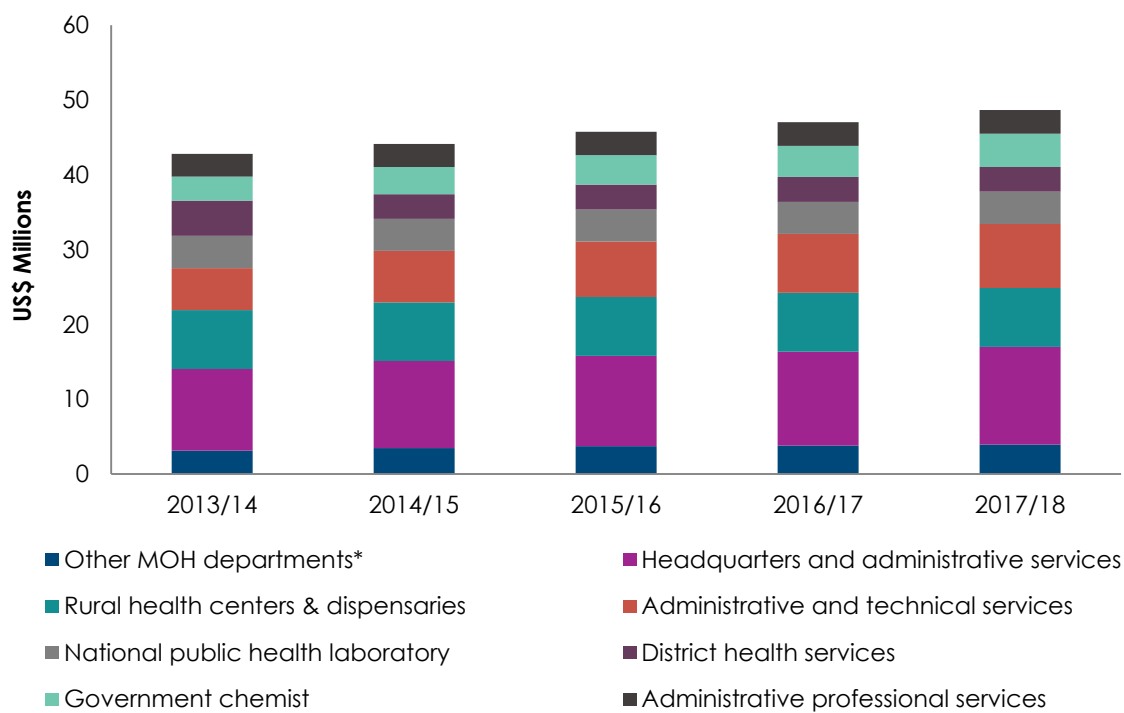
Source: Adapted from MOH, 2013a

### Cost analysis

The estimated cost of governance under the *KHSSP III* focuses on investments in stewardship through the MOH, including a broad range of management entities at the national and district levels. At the time of this analysis, many of the new governance structures introduced by the *Health Sector Leadership Framework* did not yet exist formally. Although consultative processes were underway to develop these structures, formal operational plans or budgets were not finalized. Therefore, in partnership with PPD, HPP identified 14 existing MOH structures which would remain under the new system of health governance.

By analyzing the historical, committed, and anticipated government budgets, HPP projected the cost to continue strengthening stewardship of the health sector through the MOH. Over the FY 2013/14–2017/18 period, the 14 structures will cost US\$228 million (KSh 19 billion) (Figure 35). This excludes the cost of human resources and other health system inputs included in the related health system analyses. The largest share of cost to govern the health sector through the MOH will derive from headquarter and administrative services (26%), followed by rural health centers and dispensaries (17%), and administrative and technical services (16%).

**Figure 35. Cost of governance, FYs 2013/14–2017/18**



\*Combines all other MOH departments that make up less than 3 percent of the total governance cost.  
Source: Author's calculations

## DISCUSSION

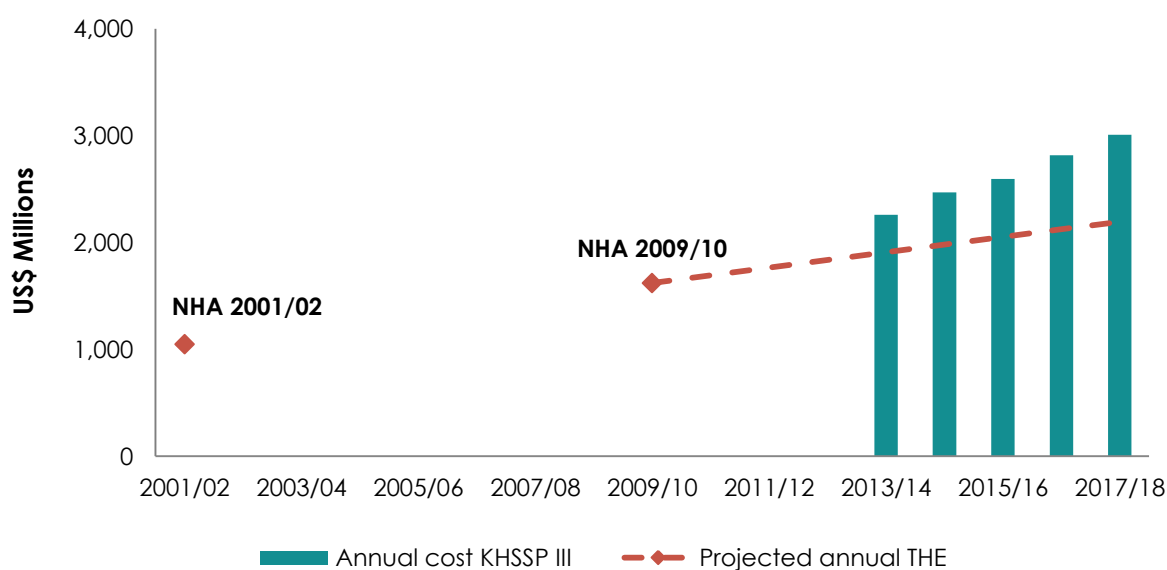
The results of the OneHealth Tool represent a robust resource base for answering questions related to epidemiology, programmatic reach, implementation strategy, and cost in the Kenyan health sector. From the results of the current exercise, the technical team estimates the health sector will require investments totaling US\$13.1 billion (KSh 1,103 billion) to successfully implement the *KHSSP III* over FYs 2013/14–2017/18. While many investments will be front-loaded in the initial years of the strategy, a growing population and ambitious service delivery scale-up targets mean the annual cost will grow over the five years of implementation. This increase in resource needs does not factor in anticipated epidemiological shifts, such as the rising burden of NCDs, potential for new disease outbreaks, or other unexpected disruptions to the health system. By FY 2017/18, Kenya’s health sector is projected to require US\$1.28 billion (KSh 107 billion) annually, which is accompanied by various financial, management, and logistical demands for which the MOH will need to prepare.

## Policy Implications

### Financing implications

Financing the needed health sector investments as outlined in the *KHSSP III* presents a large challenge to the health sector. A full fiscal space analysis for health was not conducted as a part of this report, though other sources have recently estimated the total resources available for health in the public sector. Here, the technical team presents an indicative analysis of the total resources across public and private sector in order to mirror the aggregate resource need estimate from the OneHealth Tool. This suggests the resource gap. In FY 2009/10, the analysis of Kenya National Health Accounts estimated the total health expenditure (THE) was US\$1.6 billion (KSh 122 billion) (MOMS and MOPHS, 2011). If the average annual THE growth from FYs 2001/02 to 2009/10 were projected over the period of *KHSSP III* implementation, THE would equal approximately US\$1.9 billion (KSh 160 billion) in FY 2013/14 and US\$2.19 billion (KSh 184 billion) by 2017/18 (Figure 29). Given these projections, the *KHSSP III* would experience a cumulative funding deficit of about US\$2.9 billion (KSh 242 billion) over the period FY 2013/14 to FY 2017/18. Therefore, mobilizing additional resources for priority investment areas in the short-term is key to achieving the desired reductions in maternal and neonatal mortality and other priority health outcomes by FY 2017/18.

**Figure 36. Comparison of *KHSSP III* cost and projected THE, FYs 2001/02–2017/18**



Source: Author's calculations

Considering the fiscal space for health at a macro level does not sufficiently capture the nuances of health cost drivers and financing in Kenya. At present, the distribution of available financial resources across health program areas is not proportionate to the distribution of financial resources needed to achieve the baseline service delivery targets under the *KHSSP III*. Hence, the projected funding deficit will not affect the various disease programs in equal proportion. The indicative differences in funding gaps would be best estimated by comparing the committed domestic and external financing for drugs and commodities within each health program area to the projected level of resources required that are presented in this analysis. While such an analysis cannot be conducted at present, the technical team expects the relative financial deficit to be smaller for priority public health programs that are donor-funded or that benefit from targeted domestic financing schemes. The team would expect the relative financial deficit to be larger for NCD, chronic condition, and specialized acute care programs. This trend is also suggested by the results of the *2013/14 SARAM*, which measured the mean availability of tracer products measured within different program areas. The survey results showed a 60 percentage point difference in the availability of products for health program areas at primary facilities and hospitals (GOK, 2014).

### **Planning implications**

This detailed analysis of the drivers of total health sector costs provides a unique opportunity for program managers to review their implementation approach critically, on a more granular level. Given the anticipated gap in financial resources for health at the aggregate level, ongoing review of the national strategy is essential to focus on prioritized investment areas, rationalize service delivery targets, and eliminate cost inefficiencies. There may be other ways to identify areas for potential financial savings. For example, over FYs 2013/14–2017/18, the cost of drugs, commodities, and program management for health programs will increase by 43 percent. At the same time, salaries and other resources needed for the health workforce will increase by 22 percent. A question in this case is whether the intensity of scale-up across *KHSSP III* investment areas is balanced. How could better coordination and planning across *KHSSP III* investment areas lead to a more responsive health system?

Here the technical team presents a synthesis of key implications for policy, further research, and financial feasibility related to key health program areas.

#### *Maternal, newborn, and reproductive health*

To achieve the *KHSSP III* goal of reducing maternal mortality by 50 percent, the MOH targets suggest an appropriate response involving ambitious service delivery targets, especially related to basic ANC and long-acting and permanent methods for family planning, supported by health provider training. Service delivery through the private, for-profit sector contributes significantly to the goals of the MNRH program. The relative contribution of the private, for-profit sector to MNRH cost (20%) is second only to that of the NCD program area (26%). Rapid scale up in the health sector would require resource mobilization efforts. Specifically for the MNRH program area, resource mobilization will be required for the public and private not-for-profit sectors where user fees for maternal health services have been removed. Strong coordination with the private, for-profit sector to promote preventive maternal health services and minimize financial barriers for maternal health services is also required.

Overcoming the insufficient availability of lifesaving commodities for mothers in facilities, as evidenced by the PETS-Plus and SARAM surveys, will be an important challenge to service delivery scale-up. More evidence is needed on the prevalence of obstetric complications (e.g., through actual commodity consumption data or facility-based surveys) which would allow for more sophisticated, morbidity-based forecasting and quantification analysis for commodities.

#### *Child health and immunization*

Evidence suggests that diarrhea and pneumonia are the most significant causes of under-five mortality in Kenya, yet service delivery scale-up under the *KHSSP III* focuses on the treatment of diarrhea. The prevalence of ARI symptoms and related health-seeking behaviors is well documented in the *DHS 2008/09*, but coverage targets for the treatment of pediatric pneumonia for the public and private not



for-profit sectors stagnate over the five years of *KHSSP III* implementation. Therefore, policymakers should consider a more comprehensive, integrated approach to management of childhood illness, which may imply a greater resource requirement. This also suggests that even greater resource mobilization efforts are needed alongside improved drug and commodity availability.

As the largest cost driver for commodities, community-based growth monitoring and promotion should also be examined for potential cost savings using a bottom-up costing approach.

### *Malaria*

The malaria response benefits from the cooperation between the public and private sectors in the provision of ACT (malaria treatment) through the AMFm process. The response is utilizing evidence effectively to secure commodity availability. The program area has leveraged consumption data for ACT and sentinel surveillance data to establish precise testing and treatment targets, routine ITN distribution targets for endemic districts, and a phase-out coverage strategy for IRS in endemic districts. As a result of these efforts, the malaria program is moving toward greater efficiency, which includes targeting populations at higher priority for prevention.

There are some challenges to overcome. Over two-thirds of the program's commodity costs relate to prevention of malaria. Based on consultation with the program, the OneHealth Tool analysis assumed 70 percent of Kenyans will be in geographic areas at risk of malaria throughout the *KHSSP III* period. Therefore, the impact of prevention was not factored into the forecasted programmatic reach. Future costing and planning exercises would benefit from a malaria impact model which allows for current investments in malaria prevention to forecast changes to district-level malaria endemicity, enabling better use of resources.

### *Tuberculosis and leprosy*

There is evidence of declining TB incidence in Kenya. The DLTLD is currently focusing on using electronic reporting systems to precisely record and project the potentially plateauing numbers of new and re-treatment patients and the increasing caseload of MDR-TB. While future commodity costs may stabilize, the TB program currently experiences high programmatic support and equipment costs, estimated at 80 percent of the total TB response. This is largely due to the rollout of 44 different trainings and the expansion of diagnostic equipment in 120 laboratories. There are opportunities for cost-saving in training, especially from the development of integrated in-service training programs and via coordination with other health areas.

### *HIV and AIDS, STIs, and RTIs*

Due to the overwhelming impact of HIV on morbidity and mortality in Kenya, the HIV and STI/RTI program is projected to require the largest share of financial resources under the *KHSSP III*. However, the total program cost presented here is likely to be underestimated because the estimates produced by the OneHealth Tool were conducted prior to the change in Kenya's ART guidelines (August 2014) which will increase future resource needs. In addition, the estimation of resource needs to implement the *KASF* was in progress during OneHealth Tool data collection and analysis for the *KHSSP III* and was not available to inform its results. More generally, while NASCOP undertakes advanced forecasting and quantification exercises for HIV-related commodities biannually, the overall HIV response lacks an integrated planning and forecasting process for resource needs across both health and non-health sectors (e.g., support activities through NACC civil society and key development partners). Better coordination among all HIV stakeholders will be needed in the future to update the resource needs based on the 2014 *KASF* estimates and may be revisited during the country's proposal process for the Global Fund's new funding model.

### *Nutrition*

While the majority of interventions under the nutrition program are preventive, the total cost of drugs and commodities is dominated by curative services. Curative services in this context are driven by the prevalence of low BMI in adult Kenyan women and acute malnutrition in children, as reflected in the

*DHS 2008/09* results. Due to a lack of empirical data, however, the baseline coverage levels for nutrition interventions in the OneHealth analysis were assumptions provided by the MOH nutrition program. The DHIS system collects facility-based data on the integrated management of acute malnutrition, but complete reporting is hindered by a lack of diagnostic tools and insufficient training (Transform Nutrition, 2011). The commodities to treat malnutrition are also inherently costly. Given resource gaps, there is a need for better coverage data to improve advocacy toward resource mobilization for nutrition in Kenya.

#### *Environmental health*

Under the *KHSSP III*, the cost of all primary WASH interventions is borne by the health sector, with the exception of improved excreta disposal, for which the health sector's financial contribution is limited to the labor of public health officers. There are significant resource gaps in this area. The additional capital costs needed to meet the MOH targets for improved excreta disposal over FYs 2013/14–2017/18 are 30 fold the total *KHSSP III* environmental health costs. Coordination with communities and the water sector to ensure adequate resource mobilization for the successful expansion of latrine and septic tank utilization relies on support across all stakeholders, beyond the health sector's contribution.

#### *Neglected tropical diseases*

The NTD program relies on strong data to prioritize and target its prevention efforts. District-level endemicity mapping and projections allow the NTD program to effectively target low-cost MDA activities to at-risk populations. Case management for lymphatic filariasis and trachoma trichiasis, on the other hand, requires high-cost commodities and still relies on historical disease burden estimates. Programmatic coverage assumes those persons needing LF hydrocele surgery and lymphoderma management in 2012 will be treated over the course of *KHSSP III* implementation. To do so would require more than 60 percent of the total cost of NTD drugs and commodities and does not consider newly infected or symptomatic persons. Better case-reporting mechanisms are essential to target an adequate level of case management to reverse the burden of lymphatic filariasis.

#### *Noncommunicable diseases*

Under the *KHSSP III*, the cost of the NCD program area will experience the highest annual growth rate. While the management of diabetes has flat coverage (%) over the period, it will be largest driver of the NCD drug and commodity cost due to increasing prevalence and the high per-patient cost. The 2012 HMIS data indicate a high proportion of NCD patients receive diabetes care in the private, for-profit sector. As diabetes and other NCDs increasingly affect a broader segment of the population, this has affordability and equity implications. Given the high cost of treatment for most NCDs and the growing disease burden, it will be important for the MOH and its development partners to ensure equitable access to treatment.

## **Conclusion**

In Kenya, as in other middle-income countries, the health sector is expanding. As the health sector better responds to the needs of the population, the cost of providing health services will grow rapidly. This analysis provides unprecedented insight into the source of the projected growth (i.e., cost drivers) and how the total growth relates to the fiscal space for health. Nevertheless, certain questions remain unanswered: Is the intensity of scale-up across *KHSSP III* investment areas balanced? Could better coordination and planning across *KHSSP III* investment areas lead to a more responsive health system? These and other questions are living debates in Kenya. Cost analyses will provide only one perspective on these critical issues. By combining the results of this analysis with evidence of impact and implementation feasibility, these debates can support a national consensus on evidence-based solutions for the Kenyan health sector.

## ANNEX A. SPECTRUM IMPACT MODELS

Impact Module	Description
<b>DemProj</b>	DemProj projects the population for an entire country or region by age and sex, based on assumptions about fertility, mortality, and migration.
<b>AIM</b>	The AIDS Impact Model (AIM) projects the consequences of the HIV epidemic, including the number of PLHIV, new infections, and AIDS deaths (each disaggregated by age and sex); new cases of TB; and the number of AIDS orphans.
<b>TB</b>	The TB model projects the consequences of incident TB, including the number of cases notified for treatment, the number of MDR-TB cases, and the number of deaths due to TB. It further projects deaths averted in accordance with increasing case detection.
<b>LiST</b>	Lives Saved Tool (LiST) projects the changes in child survival in accordance with changes in coverage of different child health interventions.
<b>FamPlan</b>	FamPlan projects the family planning requirements to reach national goals for addressing unmet need or achieving desired fertility.

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