



Disease Control Priorities in Developing Countries, 3rd Edition
Working Paper #9

Title: Setting Strategic Health Sector Priorities in Malawi

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ACRONYMS

AIDS	Acquired Immuno Deficiency Syndrome
AIP	Annual Implementation Plan
ADB	African Development Bank
AGD	Department of Accountant General
ARI	Acute Respiratory Infection
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral
BCC	Behaviour Change Communication
BCI	Behaviour Change Intervention
BEmOC	Basic Emergency Obstetric Care
BOD	Burden of Diseases
BLM	Banja la Mtsogolo (Family Planning NGO)
CABS	Common Approach to Budget Support
CC	Cost Centre
CFR	Case Fatality Rate
CHAM	Christian Health Association of Malawi
CLH	Child Lung Health
CMST	Central Medical Stores Trust
CPR	Contraceptive Prevalence Rate Community based
CPT	Cotrimoxazole Presumptive Treatment
CMAM	Management of Acute Malnutrition
DA	District Assembly
DAC	Development Assistance Committee
DALY	Disability Adjusted Life Year
DALYs	Disability Adjusted Life Years
DCP	Disease Control Priorities
DEHO	District Environmental Health Officer
DFID	Department for International Development (UK)
DHIS ₂	District Health Information System Version 2
DHPs	Donor Health Partners
DHMT	District Health Management Team
DHO	District Health Officer

DHS	Demographic Health Survey
DOTS	Directly Observed Therapy, Short Course
DPT	Diphtheria, Pertussis and Tetanus
EHP	Essential health Package
EMLS	Essential Medical Laboratory Services
EmOC	Emergency Obstetric Care
EPI	Expanded Program on Immunization
EU	European Union
FCDA	Foreign Currency Deposit Account
FISP	Farm Input Subsidy Programme
FM	Financial Management
FMIP	Financial Management Improvement Plan
FMP TWG	Financial Management and Procurement Technical Working Group
FMS	Financial Management Specialist
FMU	Financial Management Unit
GAVI	Global Vaccine Initiative
GDP	Gross Domestic Product
GNP	Gross National Product
HCT	HIV Counseling and Testing
HEU	Health Education Unit
HIAP	Health-In-All Policies Approach
HIV	Human Immuno Virus
HMIS	Health Management Information System
HR	Human Resources
HRH	Human Resources for Health
HSAs	Health Surveillance Assistants
HSSP	Health Sector Strategic Plan
ICT	Information Communications and Technology
IDSR	Integrated Disease Surveillance and Response
IEC	Information, Education and Communication
IMCI	Integrated Management of Childhood Illnesses
INDEPTH	International Network for the continuous Demographic Evaluation of Populations and Their Health
IPSAS	International Public Sector Accounting Standards
IPT	Intermittent Presumptive Treatment

IRS	Indoor Residual Spray
ITNs	Insecticide Treated Nets
IT	Information Technology
KCH	Kamuzu Central Hospital
LF	Lymphatic filariasis
LLITNs	Long Lasting Insecticide Treated Nets
MBTS	Malawi Blood Transfusion Service
MDGs	Millennium development Goals
MDHS	Malawi Demographic Health Survey
MDR	Multi-Drug Resistant
MICS	Multi Indicator cluster survey
MIS	Malaria Indicator Survey
MK	Malawi Kwacha
MMR	Maternal Mortality Rate
MOF	Ministry of Finance
MOH	Ministry of Health
MOU	Memorandum of Understanding
NCDs	Non-Communicable Diseases
NHP	National Health Plan
NLGFC	National Local Government Finance Committee
NMCP	National Malaria Control Program
NSO	National Statistic Office
NTDs	Neglected Tropical Diseases
OECD	The Organisation for Economic Co-operation and Development
OI	Opportunistic Infections
OPD	Outpatient Department
OPV	Oral Polio Vaccine
ORS	Oral Rehydration Solution
ORT	Other Recurrent Transactions
PAM	Physical Assets Management
PBI	Performance-Based Incentives
PHAST	Participatory Hygiene and Sanitation Transformation
PMTCT	Prevention of Mother to Child Transmission
POW	Program of Work
PV	Payment Voucher

QECH	Queens Central Hospital
RBF	Results-Based Financing
RED	Reach Every District
RHCC	Reproductive Health Coordinating Committee
RHU	Reproductive Health Unit
SADC	Southern African Development Community
SP	Sulfadoxine-Pyrimethamine
SRHP	Sexual Reproductive Health Program
STEPS	The WHO STEPwise approach to Surveillance of non-communicable disease risk factors
STI	Sexually Transmitted Infection
SWAp	Sector Wide Approach
TA	Technical assistant
TAs	Traditional Authorities
TB	Tuberculosis
TBA	Traditional Birth Attendant
TOT	Training of Trainer
TT	Tetanus Toxoid
TWG	Technical Working Group
UN	United Nations
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
VIA	Visual Inspection with Acetic Acid
WHO	World Health Organization
ZHSO	Zonal Health Support Offices

Setting strategic health sector priorities in Malawi

1 Background

1.1 Geography

Malawi is a sub-Saharan African country located south of the equator. It is bordered to the north and northeast by the United Republic of Tanzania; to the east, south, and southwest by the People's Republic of Mozambique; and to the west and northwest by the Republic of Zambia.

The country is 901 kilometres long and 80 to 161 kilometres wide. The total area is approximately 118,484 square kilometres of which 94, 276 square kilometres is land. The remaining area is mostly composed of Lake Malawi, which is about 475 kilometres long and delineates Malawi's eastern boundary with Mozambique.

Malawi's most striking topographic feature is the Rift Valley, which runs the entire length of the country, passing through Lake Malawi in the Northern and Central Regions to the Shire Valley in the south. The Shire River drains the water from Lake Malawi into the Zambezi River in Mozambique. To the west and south of Lake Malawi lay fertile plains and mountain ranges whose peaks range from 1,700 to 3,000 metres above sea level.

The country is divided into three regions: the Northern, Central, and Southern Regions. There are 28 districts in the country. Six districts are in the Northern Region, nine are in the Central Region, and 13 are in the Southern Region. Administratively, the districts are subdivided into traditional authorities (TAs), presided over by chiefs. Each TA is composed of villages, which are the smallest administrative units, and the villages are presided over by village headmen.

Malawi has a tropical continental climate with maritime influences. Rainfall and temperature vary depending on altitude and proximity to the lake. From May to August, the weather is cool and dry. From September to November, the weather becomes hot. The rainy season begins in October or November and continues until April.

1.2 Economy

The economy of Malawi is based primarily on agriculture, which accounts for 30 percent of the gross domestic product (GDP). The country's major exports are tobacco, tea, and sugar. They account for approximately 85 percent of Malawi's domestic exports. In 2009, the agricultural sector achieved growth of 13.9 percent. Tobacco production was high following favourable prices that were offered at auction in the 2008 marketing season. In 2010, estimated growth slowed to 1.3 percent because of dry spells and heavy rains.

Malawi experienced a food surplus during the 2008-2009 growing season due to favourable weather and the benefits of the government's Farm Input Subsidy Programme (FISP). These events led to the financial growth that occurred during the 2009-2010 fiscal year.

Poverty in Malawi has decreased from 52% in 2004 to 39% in 2009, and the proportion of ultra-poor decreased from 22% in 2004 to 15% in 2009. However, Malawi remains the 7th poorest economy in the world with a gross national income per capita of \$ppp 870 (2011) and gains in economic growth and development are fragile.

1.3 Population

The population of Malawi grew from 8.0 million in 1987 to 9.9 million in 1998. The 2008 Population and Housing Census found the population to be 13.1 million, representing an increase of 32 percent, or an intercensal population growth rate of 2.8 percent per year. Population density increased from 105 persons per square kilometre in 1998 to 139 persons per square kilometre in 2008.

In 1994 Malawi adopted a multiparty system and a strategy to eradicate poverty. The Malawi Growth and Development Strategy (MGDS) is a five-year strategy launched in July 2007 to reduce poverty. The MGDS is the overarching development strategy for the country.

1.4 The Malawi development context

Malawi is on track to meet 5 of the 8 Millennium Development Goals (MDGs); but achievement is not assured. The three predicted to be missed (including maternal health) partly reflect Malawi's deep seated gender inequalities. The constraints to MDG achievements include limited resources and inadequate capacity.

1.5 The health sector

There are three health related major challenges to Malawi's development. First, malnutrition which is a serious and persistent problem with 47% of children under 5 years being "stunted" – a sign of chronic malnutrition. Second, fertility remains high at 5.7 children per woman (a slow decline from 6.7 in 1992). If the population doubles to 26 million by 2030 as predicted, this will put a huge strain on basic services, land, water and other resources, and undermine economic growth. Third, HIV/AIDS has had a huge impact on Malawi's productivity through lost earnings. Malawi is the ninth worst affected country globally for HIV. Malawi passed an important milestone in June 2014: over half a million patients are now alive on ART. This is equivalent to 50% of the total HIV positive population and it means that close to 1 out of 20 Malawian adults is now living on ART.

These challenges, coupled with the strong evidence of the links between people's poor health and their poverty all demonstrate the critical importance of access to quality health services to Malawi's development.

1.6 Malawi's health delivery system

The Government is the largest provider of services and accounts for 61% of health facilities. This is followed by the not-for-profit CHAM (Christian Health Association of Malawi). Eighty percent of CHAM facilities are in rural areas. CHAM provide 37% of national facilities and train 70% of Malawi's frontline nurses. CHAM facilities charge for care and are often underutilised.

Access to services is a challenge: 19% of the population in Malawi live outside an 8km radius of a public health facility however; this is variable across the 28 districts with 43% of the districts above the average ranging from 20–100% outside the 8km radius. This, coupled with financial access, is being addressed by the expansion of government facilities and through the use of Service Level Agreements (SLA) with CHAM. Of the 172 CHAM facilities, 76 have SLAs through which the Ministry of Health (MOH) pay for maternal and neonatal health services which are then delivered free by CHAM.

Despite the provision of SLAs, money remains a barrier to poor families in mainly rural areas accessing basic health care. Quality is sub-optimal: only 23% of facilities have basic infrastructure, 98% of health centres do not qualify as providing basic emergency obstetric

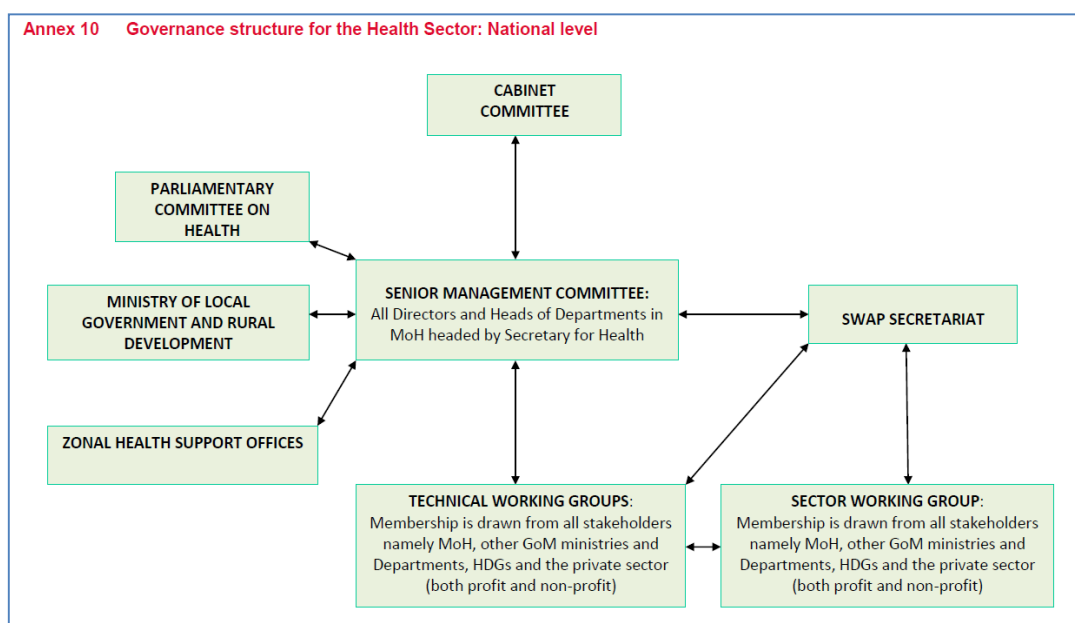
care and report a death rate for maternity care of 3.4%, three times the UN’s recommended level.

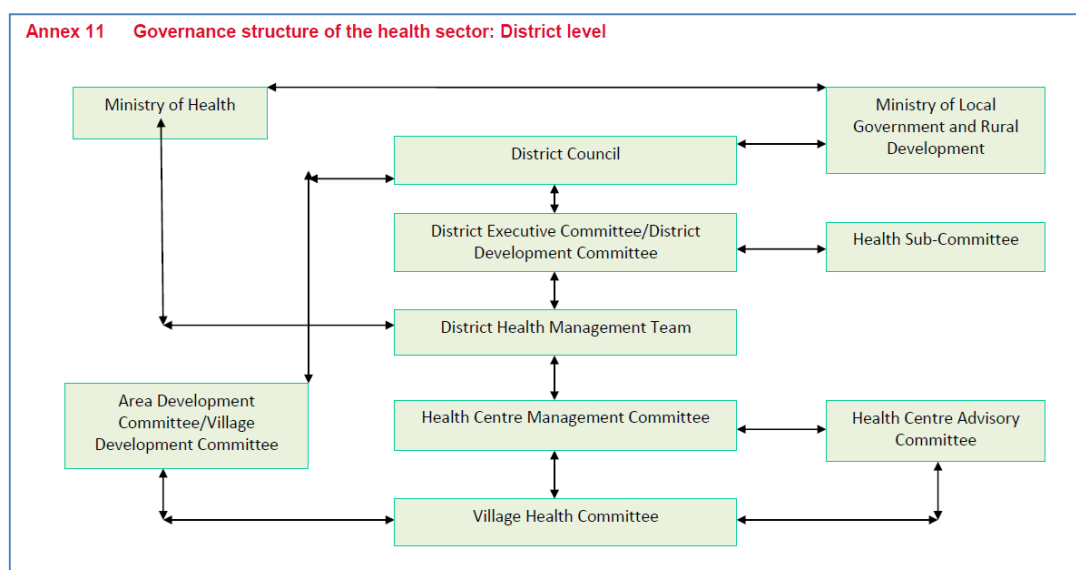
Provision of adequate numbers of nurses and clinicians is a challenge. Although the Emergency Human Resource programme resulted in a 53% increase in health workers, Malawi still has a low health worker to population ratio (particularly of physicians though the non physician clinicians ratio of 22.2 to 100,000 (2009) population is impressive [1]).

1.7 Health sector governance structure

The MoH is a government agency that, through its various departments, sets the agenda for health in Malawi in collaboration with stakeholders. It is responsible for developing, reviewing and enforcing health and related policies for the health sector; spearheading sector reforms; regulating the health sector including the private sector; developing and reviewing standards, norms and management protocols for service delivery and ensuring that these are communicated to lower level institutions; planning and mobilizing health resources for the health sector including allocation and management; advising other ministries, departments and agencies on health related issues; providing technical support for supervision; coordinating research; and monitoring and evaluation.

The MoH has established five Zonal Offices, whose role is to provide technical support to District Health Management Teams (DHMTs) in the planning, delivery and monitoring of health service delivery at the district level and to facilitate central hospitals’ supervision of districts.





1.8 Health Financing

Significant resources have been invested in the health sector and by the end of the Programme of Work 2004-2011 (PoW) a total of almost \$US900 million had been spent, with the Government of Malawi (GoM) dramatically increasing its level of spending from an estimated \$US46.3 million in 2004/05 to \$US134 million in 2009/10. Equally, support from health development partners (HDPs) increased from \$US21.3 million in 2004/05 to \$US63.4 million in 2009/10. However, there was a significant decline from the \$US103.2 million of DP pooled funds provided in 2008/09, down to \$US56.2 million disbursed in 2009/10.

Untimely disbursement of donor funds has forced GoM to borrow from the domestic market at high interest rates, which increases the cost of health service delivery. A significant amount of donor funds remain off budget, and without detailed analysis of interventions and activities per donor in relation to specific outcomes of the HSSP, it is difficult overall to attribute which resources have the highest impact on particular health service outcomes, or indeed on some outputs. In addition to this, administrative costs associated with contractors, including NGOs, have yet to be reviewed in detail. The number of projects funded by donors that fall outside the PoW increased over the period of the Program. Total health spending rose from \$US5.3 per capita in 2004/5, peaked at \$US16.3 per capita in 2008/09 and declined slightly to an estimated \$US14.5 per capita in 2009/10. The GoM budget allocated to the health sector increased from 11.1% in 2005 to 13.6% in 2008/9 before falling back to 12.4% in 2009/10.

Some progress was being made by GoM towards achieving the Abuja Declaration (2001) target of 15% of government funding to be spent in health although the percentage of domestic government spending has now slipped following the global financial crisis to 6.2% in 2012. A resource allocation formula, which is subject to review after three years, has been developed jointly by the MoH and Ministry of Local Government and Rural Development (MoLGRD). Public services are offered free of charge and household out-of-pocket payments have remained steady as a proportion of total health expenditure since 2002 (12.2% in 2002/3 and 10.5% in 2011/12 PoW).

2 Setting priorities in the Health Sector Strategic Programme

In 2010, the Malawian Ministry of Health began preparing a new Health Sector Strategic Programme (HSSP) [2] with the goal of delivering health services more efficiently and cost-effectively. The Planning Department in the Ministry of Health in Malawi knew it needed to

set priorities and concentrate on good value interventions because, notwithstanding very tight resources, it wanted to be responsive to the rapid increase in population, newly available interventions and the increasing health needs of non-communicable diseases. The Ministry used Disease Control Priorities in Developing Countries, 2nd Edition (DCP2) [3] to assist in the process of priority setting.

The government had been spending an annual average of \$14 per person on health care and knew that the likelihood of increasing the health budget beyond 11% of total government expenditure would be difficult. The Technical Working Groups (TWGs) devising the HSSP set about to set priorities systematically using DCP2 as one of its aids, particularly for the country's Essential Health Package (EHP) which would account for the majority of HSSP spending. The Ministry hoped to expand the focus of the EHP to include interventions targeting cancers, non-communicable diseases and mental health.

The TWGs had a wide range of studies, surveys and reports to help assess current activities. A critical look at existing services was undertaken before the consideration of new interventions. The studies used included:-

- Evaluation of Malawi's Emergency Human Resources Programme [4]
- Final evaluation of the Programme of Work 2004 - 2010 [5]
- National Health Accounts [6]
- Demographic and health surveys [7]
- National census 2008 [8]
- Multiple Indicator Cluster Survey 2006 [9]
- Emergency Obstetric Care survey [10]
- Malaria Indicator Survey [11]
- HIV reports [12]

2.1 The steps

The following steps were taken to revise the EHP

1. Assess the current disease burden incorporating new information about non-communicable diseases
2. List potential and existing interventions and assess their cost-effectiveness
3. Set priorities
 - a. are existing interventions cost effective and working well?
 - b. are interventions not currently being used cost effective and important in Malawi?
4. Revise the EHP
5. Cost and plan for the revised EHP
6. Estimate the cost-effectiveness of the whole Strategic Programme under different funding scenarios

2.1.1 Step 1 Assessing the current disease burden

The first step in constructing the new EHP was to update the burden of disease estimates in Malawi with the latest available information from the WHO Burden of Disease database [13] and the recent STEPS survey which measured risk factors for non-communicable diseases such as hypertension and diabetes [14].

The burden of disease assessment was needed to see how much had changed since the last strategic plan in 2004. Had some diseases been eradicated or reduced to insignificant numbers by preventive measures? Had some diseases been increasing? For instance there was considerable concern about non-communicable diseases following the WHO inspired STEPS survey which had identified high levels of hypertension [15]. And, was HIV/AIDS on the decline at last?

The Burden of Disease approach

The College of Medicine in Malawi had undertaken two assessments since WHO had produced its 2002 burden of disease (BOD) estimates for individual countries [13,16,17]. A revised set of estimates was produced for 2011 based on the original 2002 WHO estimates but updated using local data where available [18]. The method used was as follows:-

1. Age specific mortality rates were calculated from the 2008 census [19] providing best estimates of current infant, child and adult mortality (including females of reproductive age) using National Statistics Office (NSO) published life tables created using INDEPTH methodology. The INDEPTH network collects longitudinal data to better understand mortality trends of specific age groups of people. Actual deaths for 2011 were estimated using the age specific death rates and 2011 population figures.
2. The population figures were calculated using 2008 census data populating the SPECTRUM Demproj module. The module estimates future population growth and HIV and AIDS incidence and prevalence based on assumptions specific to Malawi [20]. By this approach the population has been calculated to expand from 13.1m in 2008 to 14.3m in 2011, which is very close to the recent NSO population estimates published in November 2010 [8].
3. Incidence rates of the 159 conditions that make up the BOD model had been assumed to remain as in 2008 except for:-
 - a. HIV/AIDS where incidences of HIV and AIDS have been taken from the 2010 SPECTRUM projections used by the MOH HIV Unit.
 - b. Hypertension and diabetes disability levels but not mortality (because the natural histories of these conditions are unknown in Malawi) were increased to reflect the results of the STEP study (hypertension 33% of adults; diabetes - 6% raised fasting blood sugar in adults) [14].
4. Important diseases causing a heavy burden such as malaria were assessed using recent survey data and found to remain similar to those used in 2008.

The estimates were used to rank the most important diseases as measured by deaths and risk factors by disability adjusted life years (DALYs). These were used to assess priorities, in revising the essential health package and in measuring the cost effectiveness of the whole programme.

Annex 8 The leading 10 risk factors and the leading 10 diseases or injuries in Malawi

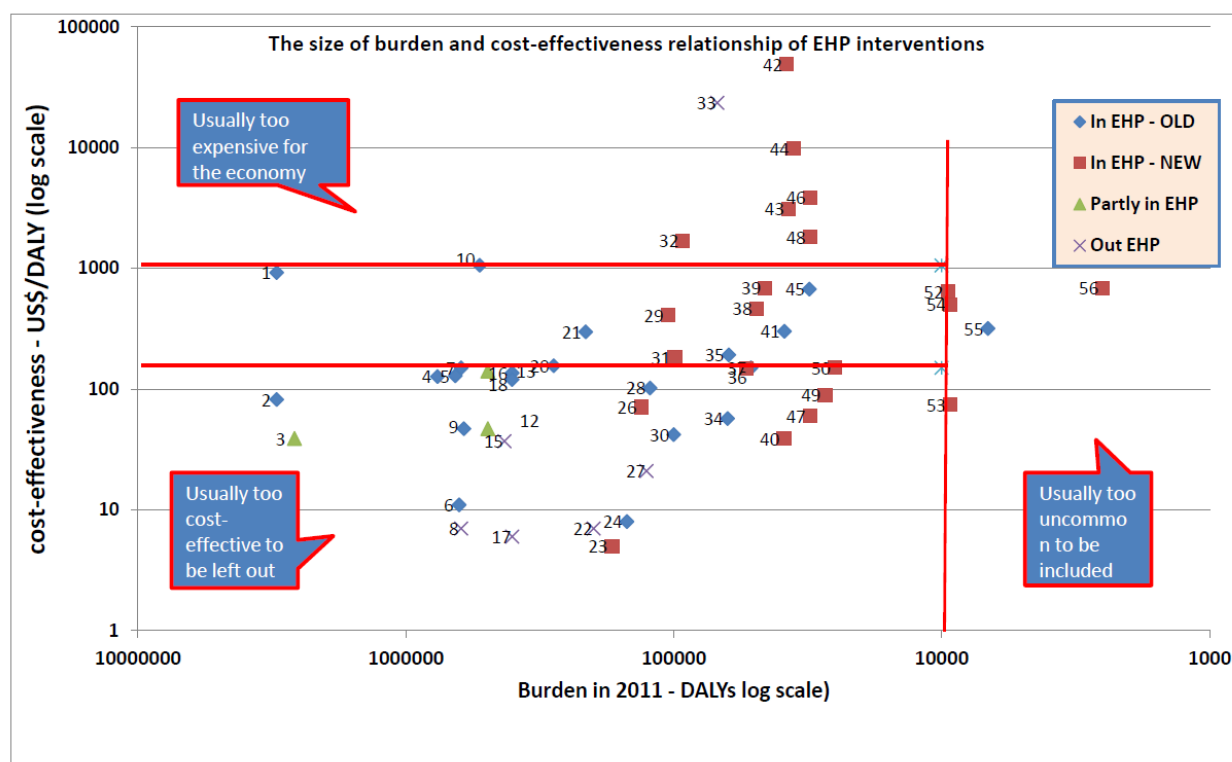
Top 10 risk factors			Top 10 diseases/injuries		
Rank	Risk factor	% of total	Rank	Disease	% of deaths
1	Unsafe sex	34.1	1	HIV/AIDS	33.6
2	Childhood and maternal underweight	16.5	2	Lower Respiratory Infections	11.3
3	Unsafe water, sanitation and hygiene	6.7	3	Malaria	7.8
4	Zinc deficiency	4.9	4	Diarrhoeal diseases	7.6
5	Vitamin A deficiency	4.8	5	Conditions arising from perinatal conditions	3.2
6	Indoor smoke from solid fuels	4.8	6	Cerebrovascular disease	2.8
7	High blood pressure	3.5	7	Ischaemic heart disease	2.6
8	Alcohol	2.0	8	Tuberculosis	2.4
9	Tobacco	1.5	9	RTA	1.3
10	Iron deficiency	1.3	10	Protein energy malnutrition	1.0

2.1.2 Step 2 - Categorising potential and existing interventions

The Technical Working Groups then turned to the DCP2 which provided a comprehensive list of cost-effective interventions for improving health in Sub-Saharan Africa. Using this list they were able to validate the inclusion of interventions already in the EHP using, among others, the surveys listed above. Further, Working Groups were able to justify new additions which were cost-effective in dealing with high burden diseases. For example, the mass treatment of neglected tropical diseases was considered for inclusion in the EHP because it is cost-effective at under \$10 per DALY while dealing with a disease burden of over 100,000 DALYs.

The TWG wished to identify cost-effective interventions which were or were not being used and interventions which were being used for relatively uncommon conditions. For each disease and condition, the level of burden of disease as found in the BOD 2011 and the estimate of the cost effectiveness of the relevant intervention as found in the publication Disease Control Priorities in Developing Countries were assembled. The findings were summarised below on log scales and show:

- the conditions with disease burdens above and below 10,000 DALYs per year,
- interventions above and below
 - \$150/DALY (the threshold below which interventions are particularly good value for money in developing countries) and
 - \$1050/DALY (the threshold above which interventions are considered too expensive for the economy of the country (amounting to three times the GNP).



Legend

1-ARV; 2-HIV prevention; 3-IMCI; 4-Maternal care; 5-ARI in under-5s; 6-Malaria – bednets; 7-Malaria in under 5s using ACT; 8-IPT child; 9-HCT; 10-Dehydration Thanzi; 11-Home made ORS; 12-Water supply; 13-Improved sanitation; 14-Family planning; 15-School health; 16-Wounds, fractures; 17-First aid training of volunteers; 18-Emergency ambulance service; 19-IRS; 20-Management of OIs; 21-Penta vaccine; 22-DPT Polio; 23-NTD mass treatment; 24-Measles vaccine; 25-Supplementary Feeding; 26-Rotavirus vaccine; 27-Prevention of RTAs; 28-Treatment - smear pos. TB; 29-BP - polypill; 30-Growth monitoring; 31-Cataract extraction; 32-Depression; 33-Cancer; 34-STIs; 35-PMTCT; 36-Aspirin for stroke; 37-Malaria in 4-year-olds + ACT; 38-Anxiety disorders; 39-IHD - drugs; 40-Trachoma surgery; 41-Treatment - smear neg. TB; 42-Drug misuse; 43-Bipolar disorders; 44-Schizophrenia; 45-CBHBC; 46-Diabetes - screening; 47-Diabetes - lifestyle change; 48-Diabetes - drugs; 49-Epilepsy; 50-CCF drugs; 51-IPT Preg; 52-Alcohol misuse - PC advice; 53-Cervical screening - cryotherapy; 54-HPV; 55-TB relapsed; 56-Rheumatic h d⁴².

2.1.3 Step 3 - Setting priorities

The EHP Technical Working Group recognised that the burden of mental illness could not longer be ignored. The needs of the mentally ill had been excluded from the previous EHP. It was also persuaded to look critically at cancer services, non-communicable diseases, which had also been ignored in the past, and neglected tropical diseases for which there were mass treatment options now available with the likelihood of free donated drugs.

Were interventions worth including in the package being missed? Were some of the current interventions poor value for money and worth removing from the EHP? Were some interventions inappropriate because of the low burden of disease contributed by the diseases at which the interventions were aimed? Were some interventions addressing serious and common conditions too expensive for the limited budget?

A critical review of all existing and potential interventions was undertaken using the DCP estimates of cost-effectiveness ratios. A set of criteria was used to scrutinise these interventions:-

1. Consider excluding from the EHP
 - a. interventions linked to conditions with disease burdens below 10,000 DALYs per year – potentially insignificant conditions
 - b. interventions above \$1050/DALY - the threshold above which interventions are considered too expensive for the economy of the country (amounting to three times the country's GNP) [21]
2. Consider including in the EHP
 - a. interventions with cost-effective ratios below \$150/DALY (the threshold below which interventions are particularly good value for money in developing countries) – potentially good value interventions [13].
 - b. interventions associated with earmarked funding, such as GAVI's offer of funding new vaccines and Global funds for antiretroviral drugs even if they were (in relative terms of the EHP) not cost-effective.

2.1.4 Step 4 - revising the EHP

Unexpected results from the detailed analysis of the surveys and evaluations of existing services were:

- a. the low out of pocket expenses - identified by the National Health Accounts
- b. the low proportion of functioning basic EMOC facilities - from the 2010 EMOC survey
- c. the lack of LA (the EHP antimalarial) - from the Malaria Indicator Survey.

The key decisions over priorities, based on an assessment of past and potential interventions were:-

1. All the interventions from the previous EHP were appropriate, with good reasons to justify the three outliers. ORS with Thanzi (marked 10 on the figure above) is much more expensive than homemade ORS with a health education input (marked 11 on the figure above), but it is largely funded by USAID and UNICEF; ARVs are expensive but funded by Global Fund; and relapsing cases of TB are uncommon but dealing with them is an integral part of TB control.
2. The interventions to be partly included in the EHP (marked "Partly EHP" on the figure above) are IMCI, water and sanitation and school health. These are good value interventions which are partly implemented in the EHP and partly in other development programmes, water and sanitation being the responsibility of the Ministry of Agriculture, Irrigation and Water Development.
3. Certain items fall outside the EHP (marked "Out EHP" in the figure) although they are good value interventions. Intermittent prophylaxis in children is an intervention being considered by the Malaria Unit but it is not yet included in their strategy. First Aid for volunteers as part of trauma services could be, but is not yet, a component which can be run by the Red Cross on a national scale. The prevention of road traffic accidents is the responsibility of the National Roads Authority. Homemade ORS and DTP vaccine

are being covered by alternative interventions. There are no other “value for money” interventions which could have been included in the programme of the HSSP.

4. Most of the new items in this EHP are cost effective and cover a significant burden of disease. Those that are expensive with cost-effectiveness ratios over \$150/DALY but dealing with high burden conditions such as mental illness and non-communicable diseases, are being piloted in year 1, so that services are set up which are cheaper than those elsewhere, thus bringing their cost-effectiveness ratios down to affordable levels.

The revised Essential Health Package

Since the diseases and conditions identified by the BoD study and the STEPS survey contribute to high levels of morbidity and mortality in Malawi, the national Technical Working Group on the EHP used the studies in identifying 13 conditions to be prioritised within the EHP. After wide consultations, the original EHP as contained in the PoW 2004-2010 was modified to include new interventions, while maintaining the original set of interventions.

The full list of conditions is as follows (with new ones marked with an asterisk *):

1. HIV/AIDS
2. ARI
3. Malaria
4. Diarrhoeal diseases
5. Perinatal conditions
6. NCDs including trauma *
7. Tuberculosis
8. Malnutrition
9. Cancers *
10. Vaccine preventable diseases
11. Mental illness and epilepsy *
12. Neglected Tropical Diseases (NTDs) *
13. Eye, ear and skin infections

The following table gives an overview of the key cost effective interventions for EHP conditions:

EHP condition	Interventions
HIV/AIDS/STIs	<ul style="list-style-type: none"> • Multi level BCC across all sectors • Health promotion¹ • Screening (HIV testing and counselling through all entry points) • Provision of home based care • Procurement and provision of male and female condoms • Provision of ART • Provision of PMTCT services • CPT

¹Health promotion includes IEC, behaviour change communication, social mobilisation, screening, etc.

EHP condition	Interventions
	<ul style="list-style-type: none"> • Blood and needle safety • STIs - Screening and treatment and promotion • Treatment of opportunistic infections • Peer and education Programs for high risk groups • Condom promotion and distribution
ARIs	<ul style="list-style-type: none"> • Health promotion on recognition of danger signs for ARIs • Early treatment of ARIs using standard protocols • Treatment of pneumonia
Malaria	<ul style="list-style-type: none"> • Health promotion • Early treatment of malaria at household, community and health centre level • Promotion and use of LLITNs • Promotion and use of IRS • Vector control - Larvaciding and control of breeding sites • IPT pregnancy
Diarrhoeal diseases	<ul style="list-style-type: none"> • Health promotion • Early care seeking – use of ORT • Provision of zinc • Construction of low cost excreta disposal • Provision of home solutions • Promotion of exclusive breastfeeding • Surveillance of water and food quality ²
Adverse maternal and neonatal outcomes	<ul style="list-style-type: none"> • Health promotion • Promotion and provision of family planning methods • Promotion of institutional deliveries • Provision of services for complications of delivery (BEmONC and EmoNC) • Screening for cervical cancer using VIA • Repair of obstetric fistula
NCDs and trauma	<ul style="list-style-type: none"> • Health promotion on awareness about health risks such as smoking and drinking of alcohol, safe driving and gender based violence • Screening for risk factors and conditions (cardiovascular, diabetes) • Promote physical activity • Promote healthy diets • Community and facility based rehabilitation, first aid
Tuberculosis	<ul style="list-style-type: none"> • Community DOTS • Health promotion • Treatment of TB including MDR
Malnutrition	<ul style="list-style-type: none"> • Promotion of exclusive breastfeeding • Growth monitoring • De-worming • Micronutrient supplementation • Treatment of severe acute malnutrition
Cancers	<ul style="list-style-type: none"> • Health promotion • Early screening (cervical and breast cancer, Kaposi's sarcoma) • Treatment with cryotherapy and surgery (scaling up)

²Other stakeholders such as Ministry of Irrigation and Water Development are involved.

EHP condition	Interventions
Vaccine preventable diseases	<ul style="list-style-type: none"> • Health promotion • Pentavalent • Polio • Tuberculosis • Measles • Tetanus
Mental illness including epilepsy	<ul style="list-style-type: none"> • Health promotion interventions to create awareness about mental health • Mental health promotion in schools and workplaces • Treatment of epilepsy • Treatment of acute neuropsychiatric conditions – inpatient • Rehabilitation
NTDs	<ul style="list-style-type: none"> • Case finding and treatment of Trypanosomiasis • LF mass drug administration • Mass drug administration for onchocerciasis • STH mass drug administration in school children • Mass drug administration
Eye, ear and skin infections	<ul style="list-style-type: none"> • Health promotion on prevention of eye, ear and skin infections • Treatment of conjunctivitis, acute otitis media, scabies and trachoma

2.1.5 Step 5 - Cost and plan the revised EHP

2.1.5.1 The "ideal" and the "resource based" budgets

The HSSP contains plans to increase access and the quantity of quality essential services sufficient to meet MDGs and their targets. Implementation of all these plans would cost what is contained in an “ideal” budget. The actual resource envelope which is thought to be available is considerably less than the "ideal" budget and is called the “resource based” budget.

The thrust of activities is through the EHP. Non-EHP activities include tertiary care such as cancer care and referrals abroad, and the less essential primary and secondary care services which are performed at all levels of care, such as treatment of musculo-skeletal conditions and other non-communicable disorders.

An estimate of the indirect costs of the ideal budget has been made by the MoH using expert groups, considering human resources, infrastructure, equipment, transport, health promotion and other recurrent transactions. An estimate of direct costs has been undertaken using a cost model which was developed for the first SWAp and Programme of Work and adapted, modified and updated since then. It models the direct costs of Essential Drugs and Supplies required achieving the planned targets of the HSSP through the EHP interventions. The model is also able to allocate costs to EHP and non-EHP activities and allows a comparison of these costs in relation to the total budget available. A significant feature of this programme is the predominant share of the total budget used by the EHP. It is this, as will be described in detail later, which makes the HSSP so cost-effective.

The cost model can also predict the level of Essential Drugs and Supplies needed for each EHP intervention for any level of funding. For planning purposes two scenarios have been constructed. One uses the resource based budget and the other the ideal budget. The analysis allows a comparison of activity for the two scenarios.

The full cost of the programme - the "ideal" budget - is \$3.2 billion over the five years, which is equivalent to an average per capita expenditure of \$41.3 per annum. This is modest in comparison with most other sub-Saharan African countries, where the average government health expenditure in 2009 was \$73 per capita [6]. A fifth of resources is channelled to non-EHP services and four fifths to EHP services.

Combining the government and donor funding provides an estimate of the total "resource based" budget available each year of the planning period. The five year budget is \$2.5 billion, of which 50% is from government and 50% from donor contributions. Inflation will reduce the value of the funding in real terms over the period of the programme.

This resource based budget has a per capita cost of \$31.6, which is below the minimum level believed to be necessary to provide a basic health service (\$34 per capita was the minimum level calculated by WHO's Macroeconomics and Health Commission in 2004 (\$47 at today's prices) before the cost of 2nd line ART drugs was known.

The cost of the HSSP can be analysed by comparing the budget of the ideal scenario with the budget of the resource based scenario (Table 7). As in the previous PoW the resource based budget is considerably less than the ideal budget, in this case meeting 75% of costs. The share between EHP and non-EHP remains at approximately 80:20.

Table 7 Direct and indirect costs of an ideal and a resource based budget for the 5 year HSSP derived from the cost model

Ideal 2011/2016 - \$m	EHP	Non-EHP	Total	Resource based 2011/2016 - \$m	EHP	Non-EHP	Total
Direct costs	1,277.84	392.43	1,670.27	Direct costs	917.13	285.14	1,202.27
Indirect costs - HR	651.33	45.50	696.83	Indirect costs - HR	546.26	47.79	594.04
Indirect costs - non-HR	487.43	38.59	526.02	Indirect costs - non-HR	364.24	29.34	393.58
Total recurring costs	2,416.60	476.51	2,893.11	Total recurring costs	1,827.63	362.26	2,189.89
Capital developments	190.05	139.05	329.10	Capital developments	213.59	62.75	276.34
Total	2,606.65	615.56	3,222.21	Total	2,041.22	425.01	2,466.23
Cost per capita	33.40		41.28	Cost per capita	26.15		31.60
% of total	0.81	0.19	1.00	% of total	0.83	0.17	1.00

2.1.5.2 An assessment of planned HSSP performance using the two budget scenarios

The under-funding of the HSSP will have a major impact on performance, as shown by taking the two budget scenarios and comparing the level of achievement of selected targets in the last year of the programme. It should be noted that many of the targets rise each year of the programme in an effort to reach Millennium Development Goals and other internationally recommended targets. The analysis uses the cost model which can be programmed to reduce two types of EHP interventions (in line with budget constraints) - those that are linked to earmarked funding such as ART and those that do not receive substantial earmarked funding,

such as reproductive health. It is assumed that earmarked interventions will be given some, but not complete, protection when resources are particularly scarce. For instance, even EPI will suffer if the vaccines can be procured but yet there is no money for fuel to distribute them to health centres or for supportive supervision. An average but more severe reduction in activity is modelled for interventions relying on pooled funding. The detailed results can be found in Annex 14 of the HSSP.

2.1.6 Step 6 - Estimate the cost-effectiveness of the Strategic Programme

Overall, the per annum cost of the EHP is estimated to be \$33.4 per capita and will avert nearly 9.5 million DALYs during the 5-year run of the HSSP.

An analysis has been undertaken to assess the cost-effectiveness of the programme with both scenarios – the fully funded HSSP and the resource based HSSP. The method used is described on the College of Medicine website [18]. A DALY is a year of life saved and measures not only deaths averted but also disabilities avoided or treated. The appropriate benchmark is that any intervention which costs less than the GDP of the country to save one DALY is highly cost effective (WHO-CHOICE) [22]. The IMF estimates Malawi will have a GDP of \$350 in 2012 rising to \$430 in 2016 and so any intervention which has a cost-effectiveness ratio of \$350/DALY or less is well worth considering. In terms of a whole-sector programme such as the HSSP (and not just a package of essential interventions), a programme in Malawi with a cost-effectiveness ratio of \$350/DALY or less is highly cost-effective and exceptional value for money.

Scenario	Resource based	Fully funded
Actual DALYS averted by EHP interventions	9,484,057	14,686,429
Potential DALYS averted by prevention activities	4,472,562	5,557,579
% of all actual DALYS - EHP and non-EHP averted	22%	34%
% of all potential DALYS averted	28%	35%
Total DALYS averted	13,956,619	20,244,008
Deaths averted	346,628	502,782
Cost	\$2,468,225,113	\$3,222,210,591
Cost/DALY	\$177	\$159

The fully funded scenario is very good value for money with a cost effectiveness ratio of \$159/DALY (Table 10). The resource based scenario is less cost effective but still excellent value. A key finding of this analysis is that more funding will increase the cost-effectiveness of the programme. The MoH will seek to reduce fixed costs if no additional funds are found, thus increasing the value for money of the programme. However the government will make it a priority to seek additional sources of funding to make the HSSP more valuable than it is already.

3 The health sector - recent trends and activity

The MOH and its stakeholders are implementing a second generation of SWAp through the HSSP that was approved in 2011. The focus of the HSSP is on strengthening health systems as the main WHO building blocks to deliver an EHP that targets major causes of morbidity and mortality in the country. To track progress on agreed upon targets of the HSSP, the MOH prepares and disseminates biannual and annual reports which are discussed at Joint Mid-Year (MDY) and Annual (JAR) Reviews.

The reports are expected to highlight the achievements, challenges and proposed solutions on the four outcomes of the HSSP namely: increased coverage of the EHP interventions, paying attention to impact and quality with the ultimate aim of achieving universal coverage; strengthened the performance of the health system to support delivery of EHP services; reduce risk factors to health; and improved equity and efficiency in the delivery of quality EHP services.

The following are some of the achievements realised as of the 2012-2013 Health SWAp Joint Annual Review:

- 1) On the outcome of increased coverage of the EHP interventions, the MOH and its partners continued to provide EHP services free of charge to the population through a network of primary health centres, community hospitals, district and tertiary hospitals. These facilities provide both preventive and curative for all 13 EHP conditions. Where communities are not served by a public health facility, District hospitals have continued to use SLAs with CHAM facilities for provision of maternal and child health services. Currently there are 74 SLAs operating throughout the country. Coverage has also been improved through building of additional primary health centres, renovation of existing facilities and use of village clinics. More than 1000 village clinics are operational. Other ancillary health interventions to improve coverage had been procurement of 28 ambulances that were distributed to all districts. This has improved referral care. These interventions are assisting the country to continue registering success in improving some health indicators such as maternal and infant mortality rates, HIV prevalence rates and malaria incidences that are on the decline, while there has been an increase in TB cure rates, HIV infected persons accessing ARV, and skilled attendants at birth.
- 2) On health systems strengthening outcome, the Ministry and its partners continued to focus on the WHO's building blocks which are human resources for health (HRH), supply chain, diagnostic services, procurement and maintenance of medical equipment, institutionalisation of total quality improvement interventions, and health management information system as well as improving the financial and procurement management systems. Progress made on HRH included continued support for school fees for students undergoing pre-services and post basic training in various health training colleges, recruitment of newly qualified graduates and those from the open labour market and supporting the regulatory bodies to address HRH professional issues. For, the supply chain, progress had been in the reducing stock outs of essential medicines at primary and secondary level of care through the emergency drug kits procured by the DHPs training of health surveillance assistants (HSAs) to support record keeping in pharmaceutical stores at hospital and health centre level, continued reform agenda at Central Medical Stores Trust (CMST). There was minimum progress in the procurement of new equipment due to lengthy procurement systems. The HMIS is undergoing improvement through the rollout of DHIS2.
- 3) To address issues of reduced risks to health, the MOH in collaboration with its partners have now developed a health promotion policy and is advocating for integrating of health issues in all development policies while addressing environmental health risks through implementation of sanitation and hygiene programs food quality assessments and vector control.
- 4) To achieve equity, efforts are underway to revise the resource allocation policy for appropriate budget allocation, analysing possible alternative health financing and designing pilot result-based financing and performance based incentives (RBF/PBI) to foster efficiency improve performance.

- 5) Main challenges faced during the implementation included but were not limited to:
- Most of the Health Sector performance was below the set targets, probably due to ambitious proposed targets;
 - There was reduced health investments in the year under review;
 - There was a reduced Government budgetary allocation to the health sector and compounded by devaluation of the Kwacha Currency resulting in reduced-buying-power on the market;
 - High health worker staff turn over;
 - Low data reporting rates by Districts and Zones, probably due to, among other reasons, new District Programme Coordinators who had been recruited during the period under review in the districts, non-documenting of health services the districts might have provided and many data from private-for-profit health sector facilities were not captured due to various reasons;
 - Inadequate resource envelope to execute all planned health sector activities during the period under review, such that the theme of the review is timely;
 - Stock outs of tertiary care drugs and medical supplies coupled with episodes of theft; and
 - Continued shortage of staff to deliver a comprehensive package of the EHP on 24 hour basis.

3.1 Progress in HMIS Indicator Matrix

IMPACT INDICATORS

No.	Indicator	Purpose	Data source	Monitoring Frequency	Aggregation	Baseline (2010-11)	Progress (2011-12)	Annual Progress (July 12-Jun 13)	Target (2015-16)
Health impact									
1	- Maternal Mortality Ratio (MMR)	Impact	DHS (NSO)	Quiennially	National/District	675/100000	675/100000	675/100000	155/100000
2	- Neonatal Mortality Rate (NMR)	Impact	DHS (NSO)	Quiennially	National/District	31/1000	31/1000	31/1000	12/1000
3	- Infant Mortality Rate (IMR)	Impact	DHS (NSO)	Quiennially	National/District	66/1000	66/1000	66/1000	45/1000
4	- Under five Mortality Rate (U5MR)	Impact	DHS (NSO)	Quiennially	National/District	112/1000	112/1000	112/1000	78/1000
5	Total fertility rate	Impact	DHS (NSO)	Quiennially	National/District	5.7(DHS, 2010)	5.7 (DHS, 2010)	5.7 (DHS, 2010)	
6	-% of eligible pregnant women receiving at least two doses of intermittent preventive therapy	Outcome	DHS (NSO)	Quiennially	National	60%	60%	38% (HIV/AIDS Dept)	
7	-% of pregnant women who slept under an insecticide treated net (ITN) the previous night	Outcome	DHS (NSO)	Quiennially	National/District	49.4% (MIS 2010)	49.4% (MIS 2010)	51% (MIS 2012)	
8	-% of under 5 children who slept under an insecticide treated net (ITN) the previous night	Outcome	DHS (NSO)	Quiennially	National/District	55.4% (MIS 2010)	55.4% (MIS 2010)	56% (MIS 2012)	
9	-Neonatal postnatal care (PNC) within 48 hours for deliveries outside the health facility	Output	DHS (NSO)	Quiennially	National	Baseline to be established from DHS 2010	Not available	NA	
10	- % of women who received postpartum care after delivery by skilled health worker within seven days	Output	DHS (NSO)	Quiennially	National/District	10%	10%	30%	20%
11	- Prevalence of HIV among 15-24 year old pregnant women attending ANC	Outcome	DHS (NSO)	Quiennially	National	12%	12%		
Coverage of Health Determinants									
12	-% of households with an improved toilet	Output	DHS (NSO)	Quiennially	National/District	46%	46%	72.4% (IHS 3 2012)	
13	-% of households with access to safe water supply	Output	DHS/MICS NSO)	Quiennially	National/District	88% (MICS 2006)	88% (MICS 2006)	78.7% (IHS 3 2012)	

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							80%(WMS 2009)		
							78.7% (IHS 3)		
14	- % of children that are stunted	Outcome	DHS (NSO)	Quiennially	National/District	47.1% (DHS 2010)	47.1% (DHS 2010)	48.1% (IHS 3 2012)	
15	- % of children that are wasted	Outcome	DHS (NSO)	Quiennially	National/District	4.0% (DHS 2010)	4.0% (DHS 2010)	11.4% (IHS 3 2012)	
	<i>Coverage of Risk factors</i>								
16	- Contraceptive Prevalence Rate (modern methods)	Outcome	DHS (NSO)	Quiennially	National	42% (DHS 2010)	42% (DHS 2010)		

ANNUAL INDICATORS

No.	Indicator	Purpose	Data source	Monitoring Frequency	Aggregation	Baseline (2010-11)	Progress (2011-12)	Progress (2012-2013)	Target (2012-13)
	Coverage of health Services								
17	- EHP coverage (% Facilities able to deliver EHP services)	Outcome	HMIS	Annually	National	74%	74%	75%	80%
18	- % of pregnant women starting antenatal care during the first trimester	Outcome	HMIS	Annually	National	9%	9%	9%	13%
19	- % of pregnant women completing 4 ANC visits	Outcome	HMIS DHS (NSO)	Annually	National	46%	46%	15%	
20	-Proportion of births attended by skilled health personnel	Outcome	HMIS	Annually	National	58%	72%	59%)	70%
21	-Penta III coverage	Outcome	EPI	Annually	National/District	89%	97%	92%	91%
22	- Proportion of 1 year-old children immunized against measles	Outcome	EPI	Annually	National/District	88%	91%	89%	89%
23	- Proportion of 1 year-old children fully immunized	Outcome	HMIS	Annually	National/District	63.7%	87%	43%	
24	-% of HIV+ pregnant women who were on ART at the end of their pregnancy (to reduce mother to child transmission and for their own health)	Outcome	HIV/AIDS Programme	Annually	National	35%	67% (April-June 2012, HIV/AIDS Dept.)	73%	75%

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25	- % of health facilities satisfying health centre waste management standards	Output	Environmental Health	Annually	National/District	35%	Not available	52%	
26	- % surveyed population satisfied with health services (by gender and rural/urban)	Outcome	SDSS (MHE N)	Annually	National	83.6% (urban) 76.4% (rural)	Not available	NA	
27	Cervical cancer screening							NA	
	Health systems Outputs (availability, access, quality, safety)								
28	- OPD service utilization (OPD visits per 1000 population)	Output	HMIS	Annually	National/District	1316/1000 pop	1108/1000 pop	1108/1000 pop	>1000/1000 pop
29	% of fully functional health centres offering basic EmOC services	Output	HMIS	Annually	National	98 90%	2% EmOC Report, 2010	26%)	94%
30	- % of non public providers in hard to reach areas signed SLAs with DHOs	Output	HMIS	Annually	National/District	76	67%		
31	-% of monthly drug deliveries monitored by health facility committees	Output	HMIS	Annually	National/District	85%	82%	96%	80%
32	- % of health facilities with stock outs of tracer medicines in last 7 days (TT vaccine, LA, Oxytocin, ORS, Cotrim-oxazole, Diazepam Inj., All Rapid HIV Test kits, TB drugs Magnesium Sulphate, Gentamicin, Metronidazole, Ampicillin, Benzyl penicillin, Safe Blood, RDTs)	Input	LMIS	Annually	National/District	TT vaccine= 98% LA=98% Oxytocin= 95% ORS= 97% Cotrim-oxazole= 99% Diazepam Inj.= 94% All Rapid HIV Test kits=89% TB drugs= 99% Magnesium Sulphate= 99% Gentamicin = Metronidazole= Ampicillin = Benzyl penicillin= Safe Blood= RDTs=	TT vaccine= 99% LA=87% Oxytocin= 98% ORS= 97% Cotrim-oxazole= 99% Diazepam Inj.= 84% All Rapid HIV Test kits=80% TB drugs= 97% Magnesium Sulphate= 99% Gentamicin = Metronidazole= Ampicillin = Benzyl penicillin= Safe Blood= RDTs=	TT vaccine= 99% LA=98% Oxytocin= 87% ORS= 99% Cotrimoxazole= 91% Diazepam Inj.= 89% All Rapid HIV Test kits= 91% TB drugs= 91% Magnesium Sulphate=99% Gentamicin = 81% Metronidazole=86% Ampicillin =61% Benzyl penicillin= 82% Safe Blood=88% RDTs=79%	TT vaccine= 100% LA=100% Oxytocin= 100% ORS= 100% Cotrim-oxazole= 100% Diazepam Inj.=100% All Rapid HIV Test kits=100% TB drugs= 100% Magnesium Sulphate= 100% Gentamicin = Metronidazole= Ampicillin = Benzyl penicillin= Safe Blood= RDTs=

33	- % of health facilities supervised and written feedback provided	Output	HMIS	Annually	National/District	63%	SE=62%		75%
34	-% facilities reporting data (according to national guidelines)	Output	HMIS	Annually	National/District	96%	93%	SW=99%	96%
35	-% districts reporting timely data	Output	HMIS	Annually	National	52%	58%	SW=75%	65%
36	- Bed occupancy rate	Outcome	HMIS	Annually	National	50%	NA		60%
Health Investment									
37	- % health facilities with functioning equipment in line with standard equipment list at time of visit	Input	PAMIS	Annually	National/District	Baseline to be established	Not available	NA	
38	- % health facilities with functioning water, electricity & communication at time of visit	Input	HMIS	Annually	National/District	79% w 81% e 90% c	N=63% CW=61% SE=53% CE= SW=	N= CW= SE= CE= SW= Composite: 44%	
39	- % health centres with minimum staff norms to offer EHP services	Input	HMIS	Annually	National/District	Clinician= 30% Nurses/Mws= 50% EHO/HA= 48% Composite= 19%	Clinician= 30% Nurses/Mws= 50% EHO/HA= 45% Composite= 17.7%	Clinician= 40% Nurses/Mws= 55% EHO/HA= 50% Composite= 21%	Clinician= 50% Nurses/Mws= 60% EHO/HA= 55% Composite= 30%
40	- % GoM budget allocated to health sector	Input	MOF	Annually	National	12.4%	11.3%	9%	13%

4 Lessons learned and suggestions for future editions of DCP

4.1 Lessons learnt

4.1.1 Developing consensus

Preparing a national strategic plan such as the Health Sector Strategic Programme (HSSP) is complex, and in Malawi involves a huge number of people. Malawi culture believes in the benefit of group discussion and decision making, and to be acceptable any such plan has to involve much discussion and debate to allow a consensus to immerge on the key objectives, the priorities and plans of action down to specific details on individual health programmes.

Donors believe they have a rightful contribution to make to strategic planning because half the funding of the health sector comes from aid. The stakeholders involved in the planning process therefore include development partners. Any plan requiring donor funding has to meet criteria required by donor countries as well as those chosen locally.

The development of consensus is more complex and time consuming when development partners have to be satisfied with the end results. An important lesson learnt is that a strong

planning department is required to steer the consensus formation, protect national aspirations and moderate stakeholder enthusiasms while trying to meet the technical requirements of donors. The use of cost-effective ratios helps this process.

4.1.2 The use of cost-effective ratios

Cost-effective ratios use purchasing power parity dollars and disability adjusted life years (DALYS) both of which are hard to understand by many health sector professionals. But the use of indicators to assess "value for money" is something which is most acceptable to Malawians, who are notoriously thrifty about the use of money. While cost-effective ratios have never been the sole reason for setting a priority, they have offered a means of comparing interventions proposed by different stakeholders and help those suggesting expensive and of relatively poor value that they may have to reconsider their proposal and come up with a more cost-effective solution.

4.1.3 Planning without a known budget - using scenarios

The Government of Malawi prepares 3 year annual budgets and offers advice about anticipating budgets in future years so the planning department is able to prepare a resource envelope for the government budget of the health sector. But donors are reluctant to pledge funding for years in advance. The ability to prepare a resource envelope for a strategic health plan is therefore difficult and time consuming. Assumptions, sometimes quite heroic, have to be made about future donor funding. Uncertainties are inevitable.

To deal with these uncertainty but allow planning to proceed in a credible fashion a double financial scenario approach was used. An "ideal" plan with its required budget - so called "ideal" budget was constructed. A budget using assumptions about donor pledges - a "resource based" budget was also assembled. Plans, activities and targets were developed for each scenario. Experience tells us that the final package of health care that is delivered will be somewhere between the "ideal" and the "resource based" scenario.

4.1.4 Transaction costs

Experience warns us that rarely are donor pledges delivered in full. This is partly due to transaction costs which reduce funds for actual service delivery. Transaction costs were calculated for each donor in order to more realistically count the funds available for the actual health sector strategic programme.

Donors have been understanding about this, perhaps because of their commitment to the Paris Declaration and because objective criteria from an EU study and data given to OECD DAC by each donor were used in the calculations. Transaction costs on average reduce pledges by 19%. The range between donors suggests that the MOH position of encouraging pooling of funds is to be encouraged.

There are a number of challenges facing the health sector and government as a whole that has had huge implications for effectiveness of partner funding to the health sector:-

- a. A recent mapping of resources flowing into the health sector shows that allocation of funding does not match the burden of disease (2013). There are large gaps in funding for specific areas such as maternal health, child health and non-communicable diseases which constitute a significant portion of the burden of disease. In addition health systems are severely under-funded and a disproportionate amount of funding from donors goes towards vertical disease programmes leaving big gaps at service delivery level.
- b. Suspension of budget support and pooled sector support by donors as a result of a corruption scandal has affected the total amount of resources going into health and the way that this support is being given. Donor partners have cushioned the impact to some

extent by establishing other temporary mechanisms to allow critical support to service at district level and direct procurement of drugs, vaccines and supplies.

Table 12 Donor overheads using OECD Indicators and EU estimates of aid efficiency
Donor overheads and estimate of the proportion of aid delivering HSSP using OECD Indicators and total planned funding

	Use of government financial arrangements - Indicator 5a	Cost of duplication of financial arrangements - Range 6-12%	Tied Aid - Indicator 8	Cost of tied aid - 15-30%	Volatility and predictability of Aid - Indicator 7	Cost of unpredictability - range 10-20%	Ownership and parallel implementation units - Indicator 6	Cost of parallel implementation - range 5-8% donors + 5% recipient	Total transaction and overhead cost factor
	b	c	d	e	f				
	Ind5a	9%*(1-Ind5a)	Ind8	(1-Ind8)*22.5%	Ind7	(1-Ind7)*15%	Ind6	Ind6*10%	b+c+d+e
AFDB	43%	0.052	96%	0.009	59%	0.062	38%	0.038	0.160
CHAI		0.050	96%	0.009	59%	0.062	38%	0.038	0.158
DFID	80%	0.018	100%	0.000	59%	0.062	0%	0.000	0.079
EU	76%	0.022	96%	0.009	60%	0.060	13%	0.013	0.104
GAVI	0%	0.090	96%	0.009	10%	0.135	0%	0.000	0.234
GTZ	73%	0.024	100%	0.000	50%	0.075	0%	0.000	0.100
JICA	67%	0.029	100%	0.000	44%	0.084	0%	0.000	0.113
UNAIDS	16%	0.076	96%	0.009	25%	0.113	100%	0.100	0.298
UNFPA	16%	0.076	96%	0.009	25%	0.113	100%	0.100	0.298
UNICEF	16%	0.076	96%	0.009	25%	0.113	100%	0.100	0.298
USAID	0%	0.090	76%	0.055	30%	0.105	63%	0.063	0.312
WHO	16%	0.076	96%	0.009	25%	0.113	100%	0.100	0.298
Norway/MFA	79%	0.019	100%	0.000	58%	0.063	0%	0.000	0.082
GF	100%	0.000	96%	0.009	33%	0.101	0%	0.000	0.110
TOTAL	45%	0.050	96%	0.010	40%	0.090	39%	0.039	0.189

Coping with the double burden of emerging epidemics and persistent problems

The double burden of disease associated with the epidemiological transition is now being realised in Malawi [23]. The recent STEPs survey finds age standardised hypertension rates higher here in Malawi than in the UK [14]. Diabetes is becoming a common presentation in hospital [24]. But the health service is unable to cope with the existing problems of communicable diseases and maternal health.

Few of the recommended interventions for non-communicable diseases (except perhaps some primary prevention ones) are as cost-effective as interventions for communicable diseases (such as mass treatment of the neglected tropical diseases). Yet the country faces an epidemic of hypertension and diabetes. The TWG took the view that one reason for the high cost of these interventions was that most of the economic evaluations were from high income countries. An approach in resource constrained settings had not been sought to find simple, cheap (using generic drugs) and prevention and treatment approaches appropriate to Malawi. Using the DOTS approach for diabetes, being piloted in Blantyre by the College of Medicine, is an example of what needs to be done [24].

The TWG was also aware that further epidemiological studies were needed to understand the true nature of these new epidemics. The decision made was to include the non-communicable diseases in the EHP and to start to pilot various approaches which was hoped would be more cost-effective than those imported from elsewhere. This decision was also adopted for the introduction of mental health interventions.

4.1.5 Health promotion and disease prevention

The risk factor assessment in the burden of disease work is a reminder that many of our top diseases are preventable and that there are cost effective ways of tackling them at their origins. The HSSP places emphasis on health promotion, including primary and secondary prevention and protection. Strategies include (i) addressing health through a "health in all policies" approach (HIAP), (ii) addressing risk factors through a healthy settings approach which is looking at healthy work places, healthy communities and learning institutions such as health promoting schools, promotion of healthy lifestyles, (iii) early diagnosis through screening and (iv) expanding vaccinations and the mass treatment of neglected tropical diseases.

More Malawi specific research is needed to review the cost effectiveness of interventions to address the key risk factors responsible for many of the preventable conditions.

4.2 *Suggestions for future DCP editions*

From the Malawi experience we believe that the following suggestions may make priority setting easier to do in developing countries.

4.2.1 Burden of disease

- The 2012 revised BOD WHO estimates will improve accuracy of BOD in individual countries
- Local adjustments necessary to take local studies into account and get buy in from local epidemiologists and programme managers need to be undertaken only every 5 years
- The 2012 BOD team needs to construct a similar set of spreadsheets as was made available in the earlier BOD version to allow individual countries to adjust estimates using up-to-date local information.

4.2.2 Choice of interventions

- Some DCP2 chapters do not convert non-DALY CERs to DALY CERs. One currency for cost-effective ratios would make it easier for the TWG to make choices between different options.
- Costs of interventions are a problem throughout the book. Which year and which currency (US\$ or PPP\$) were used? Were we comparing similar dollars? A table to allow conversions by DALY/QALY/YLL and by type of \$ by year would be helpful.
- Most non-communicable disease interventions have not been trialled in SSA. Epidemiologists are now studying the causes and natural histories of the types of hypertension and diabetes found in Africa. It would be helpful if a new edition were able to use and label evidence appropriate to SSA.
- Trauma and mental health contribute significantly to the burden of disease and towards the costs on both family, communities and health services. More research is needed on both prevalence and costs but also linkages, such as mental health on the prevalence of HIV, incidence of road traffic accidents and violence.

4.2.3 Overall cost effectiveness of programme

- An estimate of the effectiveness of individual interventions at the case level is required to calculate the effect on disease burden (DALYs). LIST values (available for children) with some DCP ones where available and UNFPA values for FP were used in this analysis. A section in each chapter offering estimates of treatment effectiveness and affected fraction would be useful.
- No benchmarks are available with which to compare our results – i.e. other countries in SSA (or elsewhere that we could find).

5 References

1. Mullan F, Frehywot S (2007) Non-physician clinicians in 47 sub-Saharan African countries. *The Lancet* 370: 2158–2163. doi:10.1016/S0140-6736(07)60785-5.
2. Ministry of Health (2012) Malawi Health Sector Strategic Plan 2011 - 2016. Lilongwe, Malawi: Ministry of Health. Available: <http://www.medcol.mw/commhealth/publications/3%20Malawi%20HSSP%20Final%20Document%20%283%29.pdf>. Accessed 29 September 2012.

3. Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, et al. (2006) Disease Control Priorities in Developing Countries. 2nd ed. World Bank Publications. 1452 p.
4. O'Neill M (2010) Evaluation of Malawi's Emergency Human Resources Programme. Lilongwe, Malawi: Management Sciences for Health.
5. Euro Health Group (2010) Final Evaluation of the Health Sector Programme of Work 2004-2010. Available: <http://low.ehg.dk/project.php?id=149>. Accessed 27 January 2011.
6. Global Health Expenditure Database (n.d.). Available: <http://apps.who.int/nha/database/DataExplorerRegime.aspx>. Accessed 24 September 2013.
7. National Statistics Office (NSO) [Malawi], OCR Macro (2011) Malaŵi Demographic and Health Survey 2010. Calverton, Maryland: NSO and Macro.
8. 2008 Population and Housing Census (n.d.). Available: <http://www.nsomalawi.mw/index.php/2008-population-and-housing-census.html>. Accessed 24 September 2013.
9. Office MNS, UNICEF (n.d.) Malawi Multiple Indicator Cluster Survey (MICS), 2006. Monitoring the situation of children and women. Preliminary report. Monit Situat Child Women.
10. Ministry of Health, Malawi, UNFPA, UNICEF, WHO, AMDD (2010) Malawi 2010 EmONC Needs Assessment Final Report. Lilongwe, Malawi.
11. MEASURE DHS - Malawi: MIS, 2012 (n.d.). Available: <http://www.measuredhs.com/what-we-do/survey/survey-display-432.cfm>. Accessed 24 September 2013.
12. HIV Unit: Ministry of Health Malawi | Main / Antiretroviral Therapy browse (n.d.). Available: <http://www.hivunitmohmw.org/Main/AntiretroviralTherapy>. Accessed 24 September 2013.
13. WHO | Global Burden of Disease (GBD) (n.d.). Available: http://www.who.int/healthinfo/global_burden_disease/en/. Accessed 31 January 2011.
14. Msyamboza KP, Ngwira B, Dzowela T, Mvula C, Kathyola D, et al. (2011) The burden of selected chronic non-communicable diseases and their risk factors in Malawi: nationwide STEPS survey. *PloS One* 6: e20316. doi:10.1371/journal.pone.0020316.
15. Msyamboza KP, Kathyola D, Dzowela T, Bowie C (2012) The burden of hypertension and its risk factors in Malawi: nationwide population-based STEPS survey. *Int Health* 4: 246–252. doi:10.1016/j.inhe.2012.09.005.
16. Bowie C (2006) The burden of disease in Malawi. *Malawi Med J* 18: 103–110.
17. WHO (2004) WHO | The global burden of disease: 2004 update. Available: http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/index.html. Accessed 21 October 2009.

18. Bowie C (2012) A selection of national research undertaken by the College of Medicine. Research report webpages. Blantyre, Malawi: College of Medicine, University of Malawi. Available: http://www.medcol.mw/commhealth/publications/national%20research/national_research.htm.
19. The National Statistical Office of Malawi (2010) Population and Housing Census: Preliminary Report. Zomba, Malawi: The National Statistical Office of Malawi. Available: <http://www.nso.malawi.net/>. Accessed 10 January 2011.
20. Stover J, McKinnon R, Winfrey B (2010) Spectrum: a model platform for linking maternal and child survival interventions with AIDS, family planning and demographic projections. *Int J Epidemiol* 39 Suppl 1: i7–i10. doi:10.1093/ije/dyq016.
21. Ad Hoc Committee on Health Research Relating to Future Intervention Options, World Health Organization. Special Programme for Research and Training in Tropical Diseases (1996) Investing in Health Research and Development: Report of the Ad Hoc Committee on Health Research Relating to Future Intervention Options. Geneva: World Health Organization.
22. WHO-Choice (2010) Cost-effectiveness thresholds. WHO. Available: http://www.who.int/choice/costs/CER_thresholds/en/index.html. Accessed 23 September 2012.
23. WHO | The world health report 1999 - making a difference (n.d.). WHO. Available: <http://www.who.int/whr/1999/en/>. Accessed 25 September 2013.
24. Allain TJ, van Oosterhout JJ, Douglas GP, Joukes S, Gadabu OJ, et al. (2011) Applying lessons learnt from the “DOTS” Tuberculosis Model to monitoring and evaluating persons with diabetes mellitus in Blantyre, Malawi. *Trop Med Int Health* 16: 1077–1084. doi:10.1111/j.1365-3156.2011.02808.x.