

REPUBLIC OF RWANDA



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# Rwanda Non-communicable Diseases National Strategic Plan

July 2014 – June 2019

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## **EXECUTIVE SUMMARY**

According to the Rwandan National statistics 2013, the Rwandan population is ageing and the demand of NCDs service from people in 40' and 50' is likely to increase.

The WHO Rwandan burden of disease of NCDs and Injuries account 42% of the total deaths on the age group 10-40 surging to 63% in the over 40's.

Decentralized and comprehensive NCDs services are currently provided to a limited number of facilities.

The vision for Rwanda is to have the entire population in Rwanda protected from premature morbidity and mortality related to NCDs. The target is to decrease mortality of under 40's of 80% by 2020 and save around 8,300 lives per year.

In order to reach our target Rwanda should aim at the following outcomes:

1. Improved access and quality of care;
2. Improved general knowledge about prevention of risk factors and early detection;
3. Development of a reliable M&E system, coordination and fund raising.

The yearly cost to reach the targets is around 20 billion RWF per year or 30 million USD. Even if the trend of the resource available is increasing, the financial gap remains high at 15 million USD (50% unfunded). In comparison with mortality of other diseases, the fight against NCDs appears underfunded.

Given the funds available, the priorities for this year are to start the decentralization of service to district hospitals and to reinforce the demand for service by community awareness and early detection.

In order to save more lives and reach our targets we still need to raise funds investment in equipment, CHWs, M&E, supervision and coordination.

## PREFACE BY THE HON. MINISTER OF HEALTH

*“... the world stands at a ... crossroads in the movement to confront the rapidly growing burden of non-communicable diseases such as heart disease, cancer, diabetes, and respiratory disease. We now face the challenge of equipping health systems with the means to adequately prevent, treat and monitor this group of complex chronic conditions... the complexity of this task is enormous and its urgency fierce, but there is no question of whether we possess the tool to meet it head on. History will judge us by our efforts to meet the challenge.”*

*Dr. Agnes Binagwaho, Rwanda Minister of Health, March 2012<sup>1</sup>*

### Foreword

The National Non-Communicable Diseases (NCDs) Strategic Plan 2014-2019 is results from the experiences and lessons learnt from the global concern to prevent and control NCDs. This is also in the effort to find ways to expand access to health care for NCDs, as they are a significant and often silent killer, particularly in low-income countries and low-income areas of middle income countries. This strategic plan builds on the National NCDs Policy 2013, the Rwandan Health Sector Strategic Plan 2013-2018, and the Rwandan Economic Development and Poverty Reduction Strategy II (EDPRS), 2013-2018.

The Government of Rwanda recognizes that the problem of access to health care for all health conditions, particularly NCDs is not only a health sector issue, rather a multi-sectorial challenge that needs all sectors to work together in synergy so as to deliver a comprehensive health care package with fully community participation. Specifically, the full health care package for NCDs prevention and control is made of the community sensitization for behavioral change, primary and specialized health care and treatment, and prevention and control of NCDs risk factors.

The elaboration of this strategic plan is a clear statement of the Government of Rwanda's commitment to decrease significantly the mortality and morbidity related to NCDs by implementing the full package of NCDs prevention and control as defined by the National NCDs Policy, 2013. This strategic plan aims at reaching 6 key strategic objectives as defined by the World Health Organization (WHO) to prevent and control NCDs and their risk factors, and this concord with the 6 key strategic objectives for NCDs as outline in the Rwandan HSSP III 2013-2018. These key strategic objectives will guide the Ministry of Health and its partners in the implementation of NCDs prevention and control programs. This includes

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<sup>1</sup> Agnes Binagwaho, “Meeting the Challenge of NCD: We Cannot Wait,” *Global Heart* 7, no. 1 (March 1, 2012): 1–2, doi:10.1016/j.gheart.2012.01.004 (Binagwaho, 2012).

the community mobilization and strengthening the capacity of decentralized health structures for program design, implementation, monitoring and evaluation for the provision of holistic and sustainable health care services to communities with their full participation, this through district community health plans which will be integrated in the overall district plan.

It is hoped that all stake holders for this strategic plan will rise to challenge and provide both technical and other resources necessary to move this forward. The Government of Rwanda is committed to lead this multi-sectorial process to achieve the set objectives and ensure that the whole country is fully implementing the NCDs health care package at all levels, the decentralized NCDs interventions playing the rightful role in sustainable development of Rwanda.

**Dr Agnes BINAGWAHO**

**Minister of Health of Rwanda**

DRAFT

## LIST OF ABBREVIATIONS AND ACRONYMS

CBHI	Community-Based Health Insurance
CDC	Center of Diseases Control
CHUK	Centre Hospitalier Universitaire de Kigali
CHWs	Community Health Workers
CVDs	Cardiovascular Diseases
DHs	District Hospitals
DPOs	Disabled People's Organizations
ECG	Electrocardiogram
EDPRS	Economic Development and Poverty Reduction Strategy
EMR	Electronic Medical Record
FHI	Family Health International
HC	Health Center
HRH	Human Resources for Health
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency syndrome
HMIS	Health Management Information System
HSSP	Health Sector Strategic Plan
IEC	Information Education Communication
IMR	Individual Medical Records
KIH	Kigali Health Institute
LMIC	Low and Middle Income Countries
M&E	Monitoring and Evaluation
MDG	Millennium Development Goals
MDR	Multidrug Resistance
NCDs	Non-Communicable Diseases
NGOs	Non-Governmental Organizations
NISR	National Institute of Statistics of Rwanda
NUR	National University of Rwanda
OBP	Objectives-Based Planning
PIH	Partners in Health
PWDs	Persons living with disabilities
RBC	Rwanda Biomedical Center
RDA	Rwanda Diabetes Association
DHS	Demographic Health Survey

TB	Tuberculosis
TWG	Technical Working Group
UN	United Nations
WHO	World Health Organization

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# 1 INTRODUCTION AND OBJECTIVES

## 1.1 Background and objectives of the document

The process of planning of Non Communicable Diseases (NCDs) started in July 2013 when the Hon. Minister of Health Dr. Agnes Binagwaho announced at the inaugural meeting of the NCD Synergies network the target of decreasing the NCDs mortality by 80% for people under 40 by 2020 or "80x40x20". Since then the Rwandan Biomedical Center has taken the lead to draft and implement a clear strategy to reach the 80x40x20 target.

The key challenge of the strategic planning process was the lack of internal reliable data about the burden of disease for NCDs that might have informed a strong evidence based approach for planning. Given the limitation of data, 3 progressive phases were identified with the goal of having a data driven, ambitious, realistic and cost effective National Strategic Plan for NCDs. Key objectives for the period 2014-2019 include:

1. Phase 1: "Understanding phase". To be carried out in the next 2 year and concerning the following strategic goals:
  - a. Goal 1: Pick the low hanging fruits by addressing the obvious needs and priorities;
  - b. Goal 2: Design a reliable mechanism for systematic data collection and analysis and develop a one-year plan for its implementation.
2. Phase 2 and 3: "Planning and implementing phase". To be carried out from 2015 on and relative to:
  - a. Goal 3: Review and develop an ambitious, realistic and cost effective plan for the remaining 3 years 2016-2019, based on the information collected by the mechanism implemented by the goal 2 and implement the plan in the following 3 years.

## 1.2 Planning process

According to the strategic goals reported above, the planning methodology was based on the combination of qualitative considerations from experts and the best available quantitative evidences.

A series of workshops took place during the month of March 2014 involving staff from Referral Hospitals, the RBC/NCD division, developing partners, MOH/clinical service, RBC/MPPD, RBC/NRL. The goals of the workshops were to have consensus on the burden of disease for each medical condition, carry out a prioritization exercise and identify for each prioritized medical conditions the gaps and the suggested strategies.

Following the completion of the prioritization exercise and the identification of gaps and strategies, the planning team reviewed all the activities and

produced an initial costing. The costing was then analyzed in a dedicated workshop with the goal to find efficiencies by integrating activities and finding the most cost effective way to deliver services.

The last step of the process was the estimation of the funding available in from different sources of funds and the relative gap analysis. This last step was strongly supported by the Health Financing Unit.

## 2 SITUATIONAL ANALYSIS

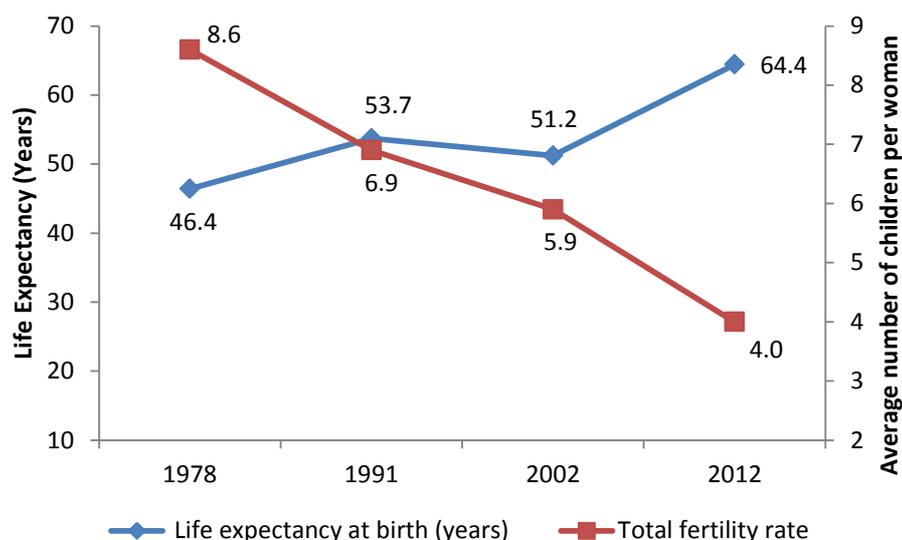
### 2.1 Demographics and epidemiology of NCDs

According to 2013 National Statistics<sup>2</sup>, in the last 36 years Rwanda has more than double its population's size growing from 4.8 million of 1978 to almost 10.5 million of 2013.

The growth of the population is explained by the combination of 2 key indicators (see figure below). While from one side the life expectancy has surged from 46 years in 1978 to almost 65 years in 2012, on the other side the average number of children per woman has decrease sharply from 8.6 children in 1978 to around 4 children in 2012.

The combination of the 2 indicators outlines the fact that the Rwandan population is ageing and the health system will gradually need to adjust to a greater demand of Non Communicable Diseases (NCDs) services from people in the 40's and 50's as it is expected that the trends of life expectancy and fertility will continue in line with the national targets.

Figure 1: Life Expectancy and average number of children per woman (TFR)

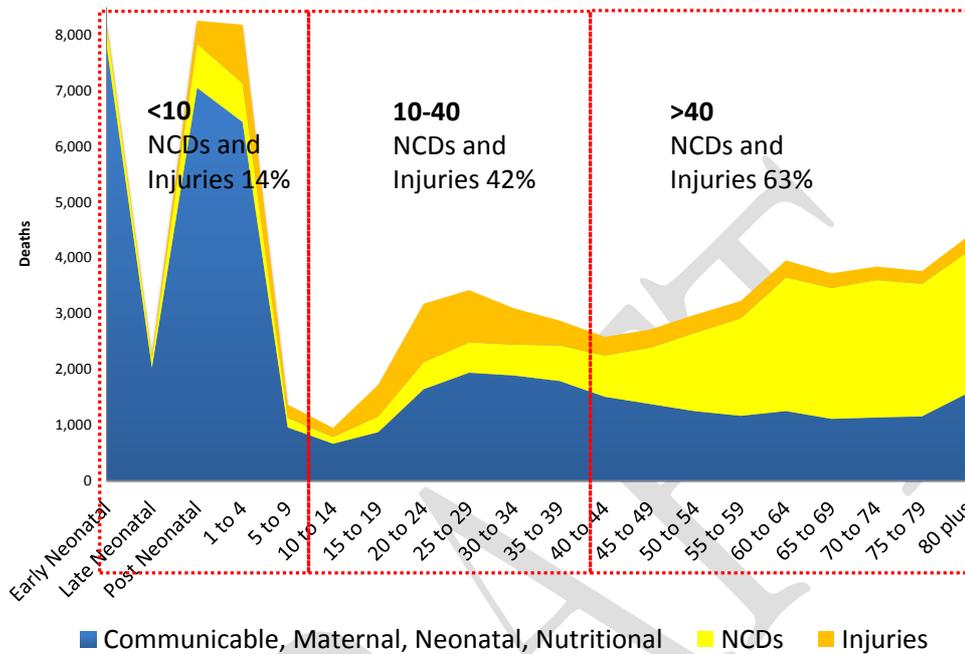


Source 1: Rwanda Statistical Yearbook 2013

<sup>2</sup> Rwanda Statistical Booklet 2013 (NISR, 2013)

Even though the demand on NCD's service might soon come from over 40's, estimated data<sup>3</sup> shows that while in less than 10 years old only 14% of the overall mortality is due to NCDs and injuries, in the age group 10-40 and over 40 the mortality due to NCDs skyrocket to 42% and 63% respectively.

Figure 2: Rwanda deaths by broad cause by age (GBD 2010)



Source 2: Global Burden of disease 2010

The data of the Rwandan Global Burden of Disease (GBD) estimated by the WHO gives also important information about the epidemiology of NCDs in Rwanda. Between 10 to 40 years old the major part of the NCDs and Injuries mortality is due to road accidents and interpersonal violence (25%) with the remaining part is represented by cancer (3%), cardio vascular diseases (4%) and other NCDs (9%).

In the older range over 40's the NCDs epidemiology changes and the main causes of mortality are mainly represented by cardiovascular diseases (26%), cancer (10%) and other NCDs (12%) while injuries mortality drop down to 8%.

In order to double check the reliability of the WHO data, the figures of deaths due to injuries reported in the GBD were compared with the national data of the injury registry held by referral hospitals (CHUK, CHUB). The injury registry data indicates that around 15% of the overall deaths in hospitals are caused by injuries. This figure is almost aligned with the national estimate of the GBD of 11%. The discrepancy of 4% might be

<sup>3</sup> Global Burden of Disease 2010 for Rwanda

explained by the high level of emergency care provided by CHUK to road traffic injuries that might not be applicable to other hospitals around the country.

## **2.2 Accessibility to NCDs service**

One of the key priorities outlined in the Health Sector Strategic Plan III is the accessibility (geographical, community health and financial,) to quality health service.

The provision of comprehensive NCDs service in Rwanda started in 2005 when an innovative model to provide NCDs service in rural settings was piloted in 3 districts (see map below). The model has been based on an integrated approach establishing NCDs programs in 3 district hospitals where Rwandan doctors and nurses had protected time to practice side by side with international professionals, becoming mentors for the colleagues of the hospital and of all the health centers in the relative catchment area. During the years the model has evolved and included the community health workers or other identified people in the community to follow up adherence to treatment on the patient.

Outside the 3 districts covered by the pilot project the strategy to provide NCDs service at decentralized level has been based on providing one-off didactical training to specific personnel of district hospitals and the training of medical students at central level through the HRH program.

According to the data of the Integrative and Supportive supervision<sup>4</sup> while around 80% of the district hospitals had at least one staff trained in NCDs only 2 district hospitals (5%) have the capacity to perform systematically the HbA1c to diabetic patients.

Data of the integrated supervision integrated supported by the reflections raised during the planning workshops suggest that while staff has been trained, the comprehensive NCDs service still need to be made available country wide.

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<sup>4</sup> ISS performed by RBC/MOH in February/April 2014

Figure 3: District with comprehensive NCDs services



Source 3

The following sub-chapters report the analysis of programmatic gaps divided by:

1. Cross cutting gaps among NCDs and
2. Specific programmatic gaps of NCDs clusters

### 2.3 Cross cutting gaps among NCDs

The table reported in the annex B reports the gaps identified during the planning workshops regarding the health systems (Human Resource, Infrastructure, Equipment, Supply chain, Health financing). In summary key themes identified across all the clusters are:

- The lack of specific equipment, mainly at district level affects the provision of decentralized NCDs services;
- There are challenges on the supply chain and on the availability of specific NCDs drugs and consumables. The issues affect the readiness of NCDs services;
- The quantity and quality of human resources is not sufficient especially at decentralized level. Challenges of staff retention and motivation affect the effective provision of quality services;
- Poor data collection on NCDs cases;

- Clinical Services and procedures should be improved (palliative care, medical follow up, referral system, rehabilitation, counseling).

The following paragraphs will investigate the specific gaps and priorities of each cluster.

## **2.4 Clusters analysis: burden of disease, priorities and gaps**

The following sub-chapters report for each programmatic area, the key information available on the burden of disease, the operational gaps identified and the risk factors. The programmatic areas have been organized in the following 5 clusters:

1. Cardiovascular, diabetes, and chronic respiratory disorders;
2. Cancers;
3. Injuries and disabilities;
4. Oral and eye health;
5. Palliative care

### **2.4.1 Cluster 1: Cardiovascular, diabetes, and chronic respiratory disorders**

#### ***2.4.1.1 Burden of disease***

Facility-level data in Rwanda and information from the planning workshop confirm that the burden of disease of cardiovascular disease is mainly represented by hypertension, cardiomyopathies, stroke/TIA, rheumatic and congenital heart disease. For some of these medical conditions the treatment is “simple” and relatively cheap or preventable. For other diseases, such as the coronary heart disease, data indicates a low burden of disease likely as a result of under diagnosing and it might deserve attention as it is an emerging disease that it is preventable through cross cutting strategies.

For diabetes, in Rwanda there are an unusually high proportion of patients with low body-mass index and insulin dependence. While there is a global correlation between overweight populations and increasing metabolic disorders, endocrine disorders in Rwanda most commonly arise in the context of under nutrition. The highest burden is represented by the diabetes mellitus (type 1, malnutrition-associated, gestational, and type 2), that is highly treatable with good success rate but expensive to be treated.

For the respiratory disease, the highest burden of disease is represented by asthma and bronchiectasis. For asthma there is a “simple” and affordable treatment available. For the bronchiectasis (sequel of pulmonary TB) the treatment and diagnosis pose several challenges.

Regarding the other medical conditions, the burden of diseases is driven by the thyroid disease and chronic kidney diseases (glomerulonephritis, nephritic syndrome, renal failure). For the thyroid disease, there are

challenges of diagnosis that require follow up and lab investments at the decentralized level but the treatment has a very good outcome.

#### 2.4.1.2 Programme priorities and specific gaps

Out of 15 medical conditions, 11 were selected as a priority for the period 2014 – 2019. The figure below shows the selected medical conditions, and the table in annex A provides the rationale for the selection.

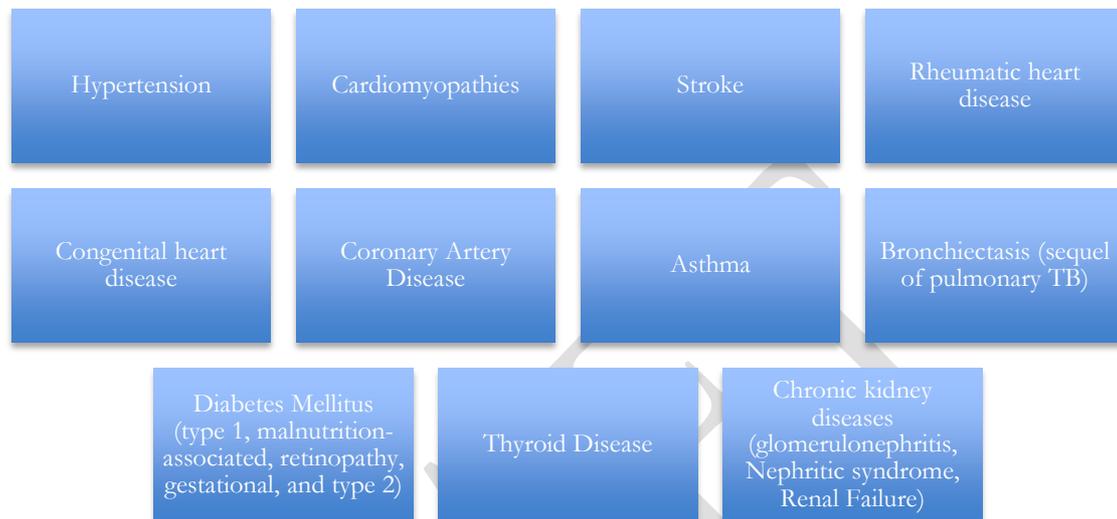


Figure 4 – 11 medical conditions selected as a priority on cluster 1

The gaps identified for the selected medical conditions are reported below:

- On **hypertension**, lack of follow up is particularly concerning, given that at the health center level diagnosing is easy, but seeing a patient with high blood pressure does not trigger a response.
- On **cardiomyopathies**, follow up is very critical. It is also important to not stock out in critical medications.
- Treatment from **stroke/TIA** is only available at King Faisal (streptokinase) and RHs (surgical).
- On **rheumatic heart disease**, there is a lack of national coordination and follow up of post-surgical cases. There is also a lack of registry-based penicillin prophylaxis.
- On **congenital heart disease**, there is a lack of in-utero and perinatal diagnosis.
- On **bronchiectasis**, delay in diagnostic is the biggest issue, caused by lack of awareness (people are treated for TB instead).
- On **diabetes mellitus**, there is a lack of diabetes education for prevention and follow up, and there is also delay in diagnosis.
- On **thyroid disease**, there is lack of adequate treatment (radiology) for Grave's disease. There is also lack of specific medications in public hospitals, due to their high cost.



HIV											✓
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Source 4: Panel experts – Planning workshop

## 2.4.2 Cluster 2: Cancers

### 2.4.2.1 *Burden of disease*

Among children the most common cancers are Nephroblastoma (Wilm’s tumor), burkitts lymphoma, Hodgkin’s disease and eyes cancer (Retinoblastoma/Rhabdomyosarcoma and others), bones cancer (osteosarcoma).

The Nephroblastoma is highly treatable with good success rate and one key element is early diagnosis when the size of tumor is manageable. The Hodgkin’s disease is less frequent than non-hodgkins in Rwanda and usually affects people between 6-30 years old and it responds very well to chemotherapy and radiotherapy. It seems to be an high association between HIV and the lymphoma. The burkitts lymphoma is highly treatable with response rate of 50%. The bone cancer is mainly affecting children and it has an high success rates with chemotherapy.

Among adults common cancers are the Non-Hodgkin’s Lymphoma (Large B-cell), Prostate cancer, Breast cancer, Cervix cancer, Gastric cancer, Liver cancer, Leukemia.

The Non-Hodgkin’s Lymphoma is highly treatable with response rate of 50%. The prostate cancer is the most common cancer for male in Rwanda and a key element is to make people aware that people, even if they are in advanced age, should seek medical attention as it is a slow growing cancer. The prostate cancer is highly treatable. The breast cancer is common in Rwanda, often affecting people in their 20s. If detected early, it’s almost 100% treatable and there are some prevention strategies (awareness) that can be implemented. The Cervix cancer is one of the most common causes of death in women, mainly because of lack of awareness. The gastric cancer is also very common in Rwanda, mostly in young patients below 30. Usually, the high number of cases is associated with bacteria (helicobacter Piloni). At later stages, success rate is relatively low and most cases are identified because people go to hospitals with abdominal pains. The chronic myeloid leukemia (CML) has an high success rate with molecular targeted treatment.

Some cancers like the Kaposi’s sarcoma or the anus cancer have a connection with HIV

Regarding the Kaposi’s sarcoma the numbers of cases have dropped significantly because of HIV treatment. The sarcoma is treatable if detected early and currently the treatment is combined with HIV treatment. For Rectum and colon cancer, there is chemotherapy intervention in addition to surgery solutions with an high success rate (70%+).

### 2.4.2.2 Programme priorities and specific gaps

Out of 22 medical conditions, 13 were selected as a priority for the period 2014 – 2019. The figure below shows the selected medical conditions, and the table in annex 2 provides the rational for the selection.

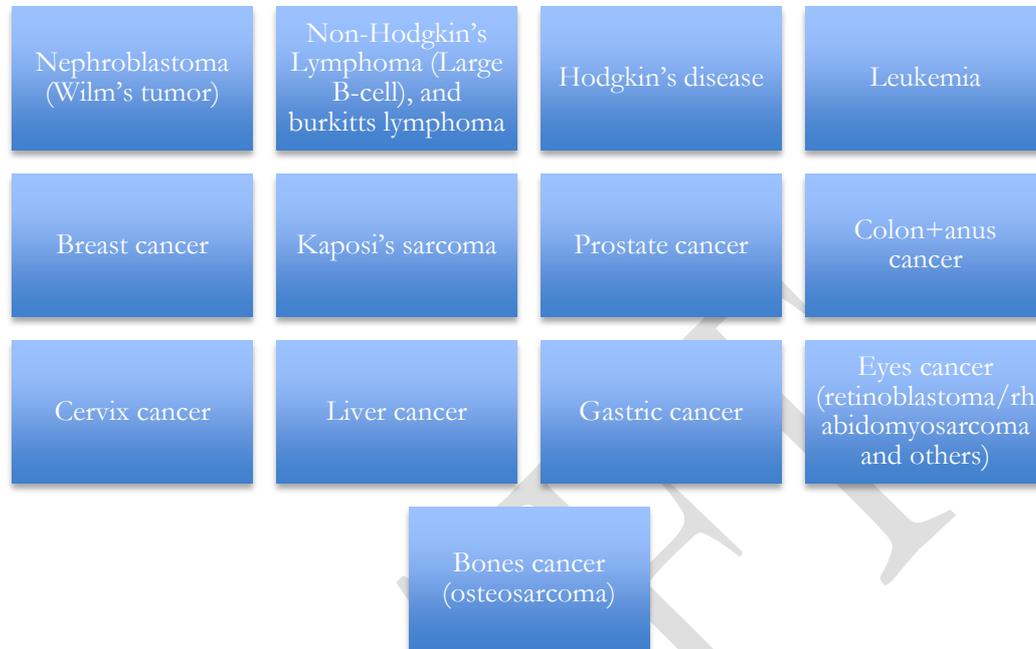


Figure 5 – 13 medical conditions selected as a priority on cluster 2

The specific gaps identified, not covered in the health system section, are reported below:

- On breast cancer, there is lack of self-examination. There is also a lack of awareness regarding family history.
- On gastric cancer, there is lack of systematic endoscopy and biopsy.

### 2.4.2.3 Risk factors

In addition to understanding the current gaps in our approach to fight these diseases, it is also important to understand the risk factors associated with these medical conditions, to justify the prevention strategies.

As reported in the table below, the main risk factors of the prioritized medical conditions of cluster 2 are:

- The leading risk factors for breast cancer are represented by smoking, lack of exercise, abuse of alcohol, pregnancy at advanced age, no breastfeeding;
- Risk factors for liver cancer is aflatoxine, Hepatitis B and C;
- Other risk factors are represented by Helicobacter Piloni, HPV, Malaria, HIV, low intake of fibers.

Table 2 - main risk factors associated with the prioritized medical conditions of cluster 2

Risk factor / medical condition	Nephroblastoma (Wilm's tumor)	Non-Hodgkin's and Burkitt's lymphoma	Hodgkin's disease	Leukemia (CML)	Breast cancer	Kaposi's sarcoma	Prostate cancer	Colon and anus cancers	Cervix cancer	Liver cancer	Gastric cancer	Eyes cancer	Bones cancer
Smoking					✓								
Lack of exercise					✓								
Alcohol					✓					✓			
Pregnancy at advanced age					✓								
No breastfeeding					✓								
Helicobacter Piloni											✓		
HPV									✓				
Malaria		✓											
HIV		✓											
Aflatoxine										✓			
Hepatitis B										✓			
Hepatitis C										✓			
Low intake of fibers									✓				

Source 5: Panel experts – Planning workshop

## 2.4.3 Cluster 3: Injuries and disabilities

### 2.4.3.1 Burden of disease

In general term, injuries represent a large burden of disease in Rwanda and field information indicates that around 15% of the deaths in hospitals are caused by injuries.

The leading causes of injuries are the road traffic injuries (including cycling), interpersonal violence and unintentional injuries like falls or fire/burns.

Data from traffic police indicates that 40% of deaths by road traffic injuries are of pedestrians. Bicycles are involved in 15% of all road accidents while motorcycles are involved in 34% of all road accidents. Motorcycles accidents account for a relatively small share of causes of deaths, and for a relatively high share of causes of injuries.

Interpersonal injuries are the least documented as only severe ones are reported to health facilities. During harvesting (Feb-May), it seems that interpersonal violence increases.

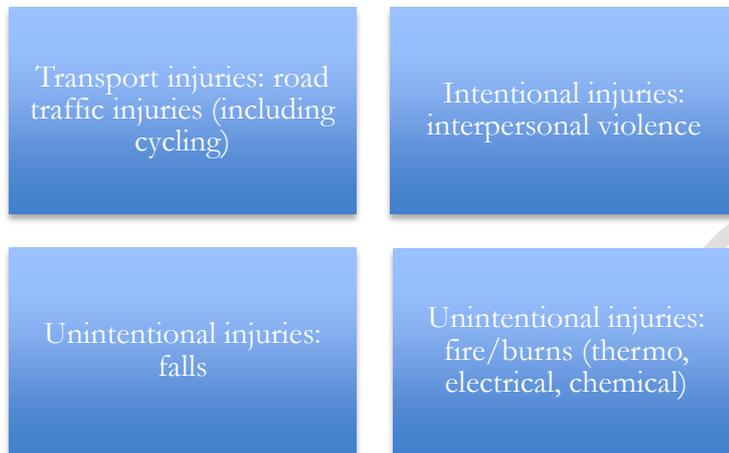
Falls are the main cause of injury in CHUB and most of the falls associated injuries are associated with work.

Burns are the fourth cause of injuries in the Rwanda Injury Registry. Most burns are thermo burns, mostly from fires (for general population) and hot fluids (for children).

### 2.4.3.2 Programme priorities and specific gaps

Out of 10 medical conditions, 4 were selected as a priority for the period 2013 – 2015. The figure below shows the selected medical conditions, and the table in annex 3 provides the rationale for the selection.

Figure 6: Medical conditions selected as priority for cluster 3



The specific gaps identified, not covered in the health system section, are reported below:

- Most people without medical insurance are not treated in hospitals as there is a lack of information about the insurance coverage of the patients that come to the hospital with road traffic related injury;
- First responders are not yet fully trained in management of spinal cord injuries;
- Rwanda is still missing a national center for and rehabilitation of spinal cord injuries;
- The emergency system is functional but could be strengthened in term of supply chain of drugs and consumables and capacity building of human resources;
- The trauma management guidelines are not standardized.

The main gaps causing road accidents are:

- Lack of helmet use (for motorcycle related injuries)
- Ignorance or lack of respect of road laws
- Over speeding
- Use of phone while driving
- Lack of use of seating belt
- Lack or non use of baby car seat
- Lack of escape space that pedestrians can use when avoiding an incoming vehicle (most road sides have gutters)

### 2.4.3.3 Risk factors

In addition to understanding the current gaps in our approach to fight these diseases, it is also important to understand the risk factors associated with these medical conditions, to justify the prevention strategies.

As reported in the table below, the main risk factors of the prioritized medical conditions of cluster 3 are:

- The leading risk factors for road injuries are abuse of alcohol, lack of helmet use, over speeding, use of phone while driving, lack of use of safety belt, no baby seats, lack of escape space that pedestrian can use when avoiding an incoming vehicle.
- Regarding falls the risk factors are abuse of alcohol, non-safe building constructions, visual impairment

Table 3 - main risk factors associated with the prioritized medical conditions of cluster 3

Risk factor / medical condition	Road traffic injuries	Interpersonal violence	Falls	Fire/burns
Alcohol and other drugs	✓	✓	✓	
Non-safe building construction			✓	
Visual impairment	✓		✓	
Lack of helmet use	✓			
Over speeding	✓			
Use of phone while driving	✓			
Lack of use of seat belt	✓			
No baby seat	✓			
Lack of escape space that pedestrians can use when avoiding an incoming vehicle	✓			

Source 6: Panel experts – Planning workshop

## 2.4.4 Cluster 4: Oral and eye health

### 2.4.4.1 Burden of disease

#### 2.4.4.1.1 Eye Health

The last available data regarding eye health are coming from the National strategic plan 2008-2013. A new National Plan of Action for Eye Health will be developed during 2014.

According to HMIS 2011, eye conditions represent 12% of all the causes of morbidity.

Information from the planning workshop confirms that the burden of disease of eye health is mainly represented by cataract, refractive error, glaucoma, allergic conjunctivitis and diabetic retinopathy.

Regarding the cataract, the 2006 RAAB (population based survey) carried out in western province reported that 65% of blindness and visual impairment were due to cataract. The last available data about the Cataract Surgical Rate (CSR) (total number of cataract surgeries per million people per year) indicates that Rwanda had in 2007 around 285 surgeries per million people. Recent estimates indicate that the surgical rate is less than 500, well below the WHO recommended rate of 2.000 surgeries per million people adopted as a target in sub-Saharan Africa. According to these figures, we can assume that the incidence of cataract is higher than the current cataract surgery rate. Cataract is fully treatable and cost-effective and early diagnosis can prevent blindness.

Regarding the refractive errors, the prevalence is estimated at 12% of population (2007 National Plan.) with 10% with age>40 and 2% other people needing distance glasses. The condition is easily correctable.

Regarding the Glaucoma, the 2006 RAAB survey carried out in western province, reported that 2.6% of blindness is due to Glaucoma. Glaucoma then represents the second cause of blindness in Rwanda. It's a disease for aged people but it's becoming more common in children due to misuse of steroid eye drops for allergy. The medical condition is treatable but the service is available only in Kigali and Kabgayi hospitals. Early diagnosis has a high success rate.

The allergic conjunctivitis is one of the leading causes of consultation at HCs and DHs (estimate of 80% of total eye cases). The medical condition is treatable with anti-allergic eye drops that in 2012 were added in the essential drugs list. The medical condition is due to environmental factors and affects mainly children.

The diabetic retinopathy is estimated to affect 10% of all diabetics. Regional data shows that 30% of diabetic have diabetic retinopathy. The medical condition is treatable and increasingly important because of trends in diabetes prevalence and low awareness of diabetic retinopathy. A planned survey for early 2015 will provide more accurate figures.

#### 2.4.4.1.2 Oral health

Data of 2010 shows that oral diseases contribute to 15% of overall morbidity in Rwanda. Information from the planning workshop confirms that the burden of disease of oral health is mainly represented by dental caries and abscess (periapical, periodontal, cellulitis, Ludwig angina) and gum and periodontal disease.

Facility data of CHUK shows that 60% of total outpatients have dental caries. The burden is mainly explained by low dental hygiene and a diet rich of sugar. The burden is recently affecting more children, mainly for the new

living styles coming with urbanization. Brushing (teeth, tongue) correctly can prevent the risk of having dental caries up to 90%.

The gum and periodontal disease it's prevalent in aged people. Access to service is not high as many aged people don't feel the need to come for consultation. It is a treatable condition and can be prevent with oral hygiene. If not treated appropriately it has an impact on diabetes.

#### 2.4.4.1.3 Otolaryngology health

Information from the planning workshop confirms that the burden of disease of otolaryngology health is mainly represented by otitis media, pharyngitis and tonsillitis.

In Rwanda, otitis media is the main cause leading to deafness. It is common in children and early diagnosis and treatment of can prevents deafness. It is also preventable with infection control.

Pharyngitis and tonsillitis are predisposing condition for other NCDs as they might lead to complication like rheumatic heart disease, and nephropathy disease.

#### 2.4.4.2 Programme priorities and specific gaps

Out of 24 medical conditions, 8 were selected as a priority for the period 2013 – 2015. The figure below shows the selected medical conditions, and the table in annex 4 provides the rational for the selection.

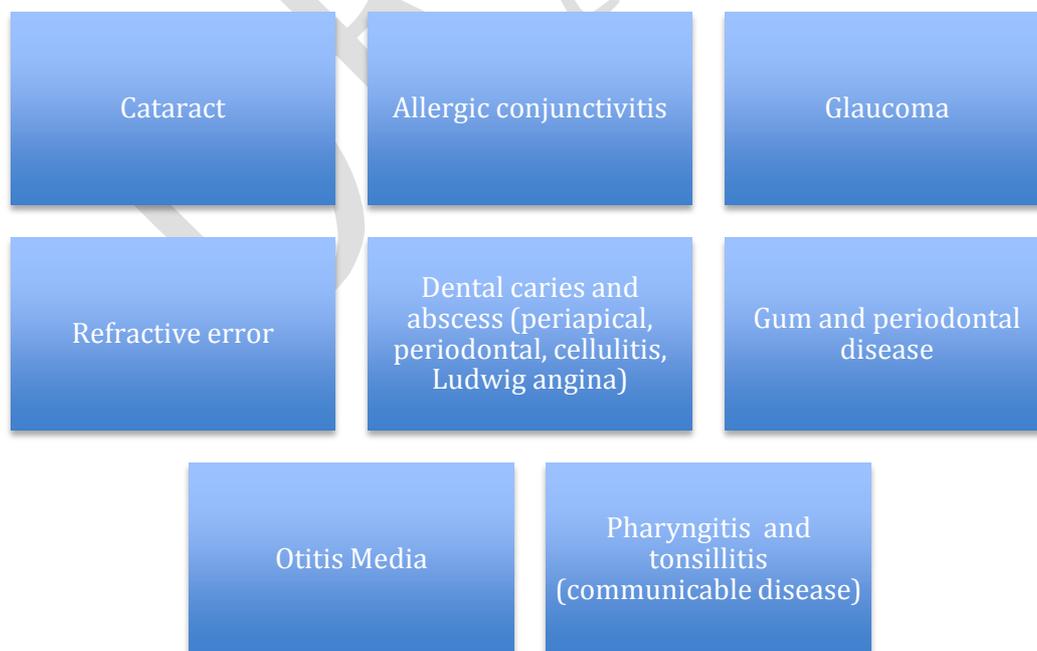


Figure 7 - 8 medical conditions selected as a priority on cluster 4

The table in annex 4 reports the rational for the process of prioritization.

The specific gaps identified, not covered in the health system section, are reported below:

- At District Hospital level, the **eye health service** is only available in 23 hospitals out of 43 at the time of writing. The refractive errors service is available only in 1 District Hospital out of 42. There is a general lack of quantity and quality of ophthalmologists and ophthalmic technicians, consumables and equipment;
- On **refractive error**, spectacles are currently not available at District Hospitals and Health Centers provide only basics ones. Patients do not go for regular checkups because of lack of awareness of the condition. This medical condition is not currently screened at school;
- On **cataract**, there is lack of demand for service because people don't reach for service until the cataract is in advanced stage. There is a lack of cataract surgery in all the District Hospitals (except Kabgayi and Gisenyi hospitals). There is also lack of awareness in health care providers about that the service is available at central level. Material for surgery is not available in District Hospitals and it is distributed on demand;
- On **glaucoma**, there are challenges of detection and diagnosis as it is a "silent" disease combined with a lack of regular checkups. Moreover medications are expensive and funds for procurement are not available;
- On **oral health**, most of the units at district level are not operative, mainly because of lack of quantity and quality of personnel (only 1 specialist dentist) and lack of equipment. The current Ratio of dentists /population is 1 out of 800.000 against a WHO target of 1 dentist out of 10.000. At referral and provincial hospitals the equipment is limited and this fact limits the range of services available.;
- On **dental caries, gum and Periodontal disease** there is a general lack of awareness of oral hygiene, and lack of dietary counselling;
- On otolaryngology health, there is lack of service demand and people are referred at central level at later stage. After medication there is lack of follow up back at the health facility. There is a general gaps in skills of nurses, medical doctors and basic equipment at Health Centers;
- Finally, on **otitis media**, many Health Centers lack of basic equipment such as the otoscope for ear examination.

### 2.4.4.3 Risk factors

In addition to understanding the current gaps in our approach to fight these diseases, it is also important to understand the risk factors associated with these medical conditions, to justify the prevention strategies.

As reported in the table below, the main risk factors of the prioritized medical conditions of cluster 4 are:

- For oral health the main risk factors are represented by poor dental hygiene, tobacco, abuse of alcohol and unhealthy diet.
- For glaucoma, one of the risks is misuse of steroid eye drops for allergy.

Table 4 - main risk factors associated with the prioritized medical conditions of cluster 4

Risk factor / medical condition	Cataract	Allergic conjunctivitis	Glaucoma	Refractive Error	Dental caries and abscess	Gum and periodontal disease	Pharyngitis and tonsillitis	Otitis Media
Misuse of steroid eye drops for allergy			✓					
Poor dental hygiene					✓	✓		
High consumption of sugar					✓			
URTI								✓
Tobacco					✓	✓		
Alcohol					✓	✓		
Unhealthy diet					✓	✓		

Source 7: Panel experts – Planning workshop

## 2.4.5 Cluster 5: Palliative care

### 2.4.5.1 Programme priorities and specific gaps

The WHO defines “Palliative care as an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual”(Who 2002).

Palliative care was not considered as priority in many developing countries. However, there has been some progress in palliative care awareness in sub Saharan Africa since the World Health Assembly in 2005 which identified palliative care as an urgent humanitarian need. Palliative care is now recognized as a basic human right and momentum has gathered to translate this into action. From being significantly present in only 5 countries in 2004, palliative care is now being delivered in nearly half of all African countries.

The last World Health Assembly held in May 2014 (WHA67.19) further recommends Member states to

- a) To develop palliative care policies,
- b) To ensure adequate domestic funding and allocation of human resources,
- c) To provide basic support to families, community volunteers and other individuals acting as caregivers, under the supervision of trained professionals, as appropriate
- d) To aim to include palliative care as an integral component of the ongoing education and training offered to care providers, in accordance with their roles and responsibilities
- e) To assess domestic palliative care needs, including pain management medication requirements, and promote collaborative action to ensure adequate supply of essential medicines in palliative care, avoiding shortages
- f) To review and, where appropriate, revise national and local legislation and policies for controlled medicines, with reference to WHO policy guidance;
- g) To update, as appropriate, national essential medicines lists;
- h) To foster partnerships between governments and civil society, including patients' organizations, to support, as appropriate, the provision of services for patients requiring palliative care;
- i) To implement and monitor palliative care actions included in WHO's global action plan for the prevention and control of non-communicable diseases 2013–2020.

The Government of Rwanda has started the process of integrating palliative care into the national health system as a means of increasing access to care for people with chronic incurable diseases. To this end, a number of steps have been undertaken which include the development of:

- The national palliative care policy and the strategic plan for palliative care for incurable diseases for a timeframe of 5 years (2010-2014). The policy commits to providing all Rwandans with an incurable illness with high-quality palliative care services to meet their physical, psychological, social and spiritual needs by 2020;
- Standards and guidelines for the provision of palliative care for incurable diseases;
- Training materials for palliative care.

Currently the palliative care program is coordinated by the Rwanda Biomedical Center under the division of Non Communicable Diseases (NCD). The division is rolling out the implementation of palliative care services in the country and has provided leadership for the development and access to palliative care services, working closely with its partners to develop appropriate tools and protocols needed to integrate palliative care. Significant capacity buildings through basic palliative care trainings and

advocacy workshops have been undertaken including a recent TOT refreshers training to roll out the tools developed and formulation of multi-disciplinary teams at various hospitals.

#### 2.4.5.1.1 Program priorities

The key priorities for the next 5 years for palliative care are represented by:

### **1. Integrating palliative care into the health system**

The key priority is to decentralize the palliative care to Districts. Like many other countries there are competing priorities for limited funding and therefore significant resource constraints which need to be overcome in order to successfully integrate palliative care into the health care system. An incremental roll out to decentralize the palliative care program would seem to be a pragmatic way forward. In other words selecting a further group of hospitals and their surrounding areas in which to train staff and establish palliative care teams who can manage in-patients appropriately, and then another group, and so on.

Currently national tools have been published including a palliative care patient record, a palliative care patient register, a referral form to palliative care and a home visit record for care providers. These have begun to be distributed and disseminated.

Alongside the hospital work, developing more community care must be a short term priority as this is where most palliative care is usually delivered in an integrated system. The objective is to prevent hospital admissions and enable people to die at home or in their local community as appropriate.

Key challenges identified are:

- a. to set up a referral system between MoH/RBC, district hospitals, health centers and community;
- b. to introduce home based care in the Rwanda health system;
- c. to integrate the palliative care services into national health budgets to ensure financial sustainability;
- d. to improve access to pain relief, including opioids such as morphine, by making opioids available in the country and training the health professionals on how to prescribe and administer them.

### **2. Advocacy, public awareness and research**

Palliative care is a relatively new approach worldwide and pain control has been widely recognized as basic human right. The main challenge to roll out palliative care is about increasing the demand for it. From one side, the

population is currently not aware of the availability of service and the traditional culture of dealing with deaths is just based on traditional healing through prayers to ancestors, causing a delay in diagnosis and suffering. On top of that health care providers have beliefs that morphine is addictive and they fear to prescribe it.

A key priority is then to create awareness in the population on the availability of service and to connect with the community to introduce palliative care along the traditional healing.

### **3. Improving accessibility and quality of PC services at all levels**

There is a strong need to train health professionals working in district hospitals, health centers and community health workers, to equip them with the right skills and attitudes to provide integrated palliative care using a multidisciplinary team approach.

Regarding the pre-service training it is needed an integration of palliative care into the nursing, medical school and other relevant training curricula and pre-service training programs such as those for pharmacists, social workers, psychologists and the clergy.

Morphine is now on the national essential drugs list but oral morphine is not readily available within district hospitals. However, 10mg and 30mg tablets and 30mg SR tablets are now available in the country.

### **3 OBJECTIVES AND STRATEGIES**

#### **3.1 Strategic log frame and NCDs objectives**

The strategic log frame identified to reach the NCD vision for the goal 1 is organized as per illustrated by the Figure 8: NCDs outcomes.

In line with NCDs policy issued on April 2014, the vision of the NCDs National Strategic Plan is to have the entire population in Rwanda protected from premature morbidity and mortality related to NCDs.

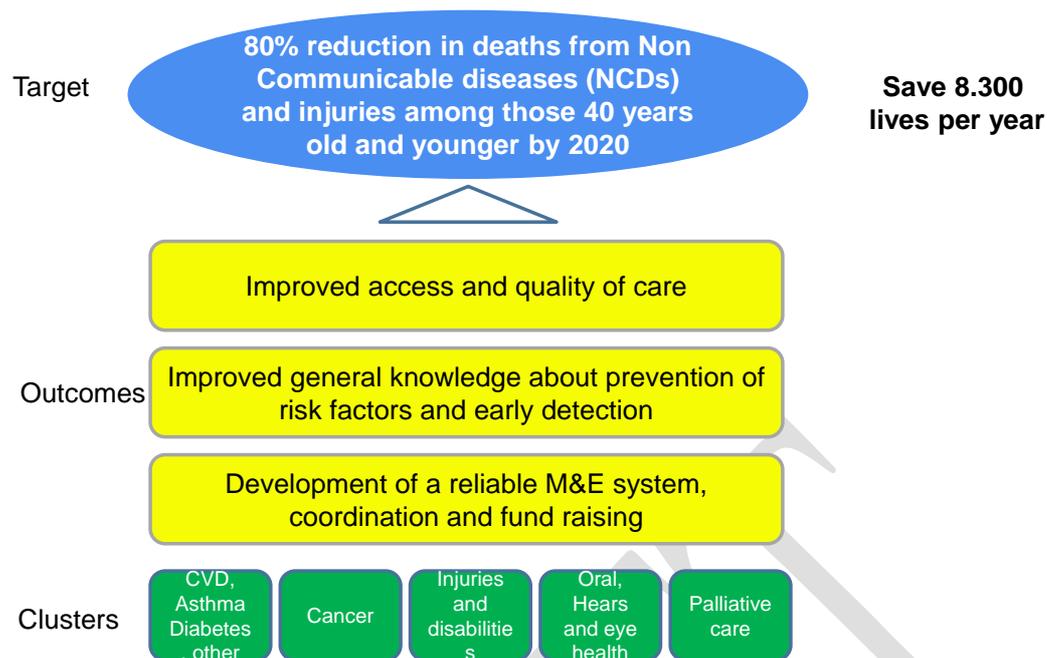
The key target is the reduction of 80% of deaths due to Non Communicable Disease in 40 years old and younger by 2020 (“80\*40\*20”). The target for Rwanda can be achieved through the following key outcomes:

1. Improved access and quality of care;
2. Improved general knowledge about prevention of risk factors and early detection;
3. Development of a reliable M&E system, coordination and fund raising.

The strategic log frame of NCDs was develop starting from the consideration that the response to the NCDs should be based on a mix of interventions that from one side aim to build a solid foundation to tackle health system in an integrated way and on the other side to tackle high value specific medical conditions.

On the base of the data reported on the Rwandan burden of disease, published by the World Health Organization, the target can be translated in saving 8.300 lives every year that represents 80% of the current deaths due to NCDs and Injuries in under 40s’.

Figure 8: NCDs outcomes



The following paragraphs will provide more in detail about the operational strategies to reach the outcomes.

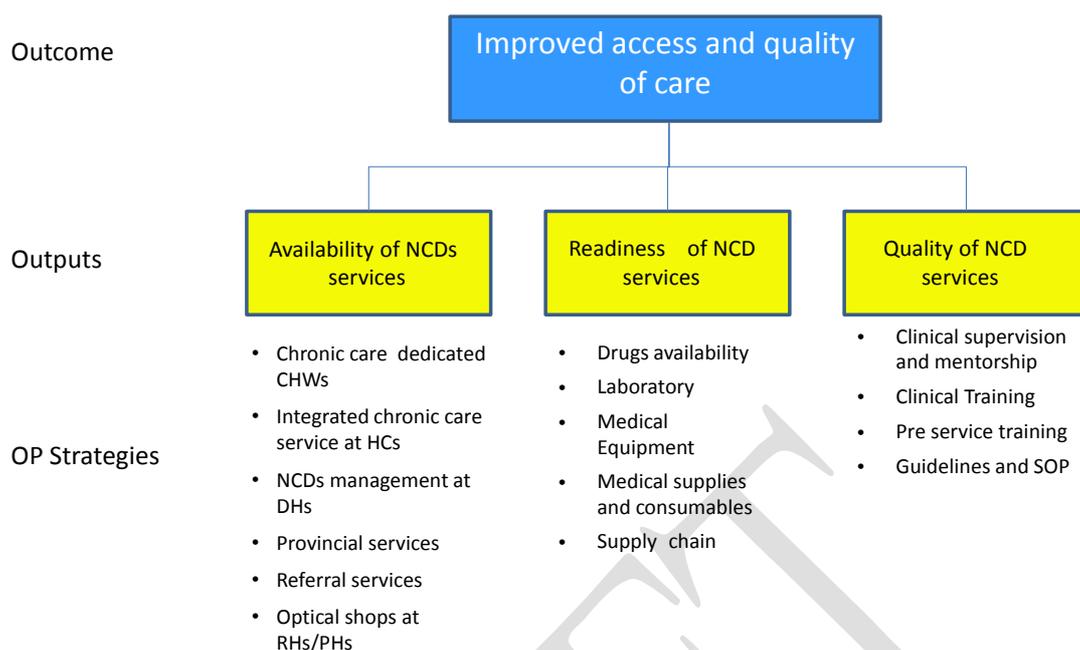
### 3.2 Improved access and quality of care

The analysis of gaps reported above suggests that in order to have a cost effective impact on NCDs epidemiology the strategy should be based mainly on strengthening the health systems and set up a goal to have an improved access and quality of care.

The table below reports the log frame with outputs and operational strategies. As showed in the figure the outcome of having a primary and specialized health care and treatment can be reach trough 3 key outputs:

1. Availability of service to Referral, Provincial, District and community level, in order to have chronic care services close to the people in need.
2. Readiness of NCD service to assure continuity of care.
3. Quality of NCDs health services, i.e. they are effective, safe, centered on the patient's needs and given in a timely fashion.

Figure 9: Improved access and quality of care



The paragraphs below will provide details on the operational strategies for the three outputs defined.

### 3.2.1 Availability of NCDs service

NCDs programs, including palliative care, needs to be fully decentralized to provincial and district level. This will be achieved by establishing inside each district and provincial hospital comprehensive NCDs services with:

- At least two A1 or A0 nurses at each district hospital with advanced training in NCDs and palliative care. These nurses will manage NCDs patients at their facilities.
- General practitioners trained on advanced care for NCDs patients providing direct care and mentoring for inpatients.

District Hospitals that have already decentralized their NCDs and palliative services should decentralize these services further to the level of the health center. This should be accomplished by training A1 and A2 nurses already certified in anti-retroviral therapy. These nurses would then be able to provide chronic care services in all domains, including basic elements of neuropsychiatric care, non-communicable disease care, and palliative care.

Regarding eye health, the objective is to have a functioning eye health unit in each district and provincial hospital. Moreover 7 optical shops will be set up at referral and provincial hospitals selling eye glasses, while the production of lens will be done in one national workshop. The sale of glasses will partially contribute to the eye revolving fund that has the goal to support the treatment of specialized eye conditions.

At referral level the service should be strengthened by establish one national cardiac surgery center, 5 cancer centers inside referral hospital, radiotherapy service based in one referral hospital, a national center for orthotic and prosthetic and a national cancer registry. It's is planned also to strengthen the pathology service and extend the full services to 3 referral hospitals.

The plan to decentralize service in term of human resources and equipment is reported below:

**Table 5: Plan decentralization of NCD service**

	Baseline	2014/2015				2015/2016			
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
NCD service at DHs	3	5	11	17	29	35	41	47	47
Cancer center at RHs	1	1	1	3	3	3	3	5	5
Radiotherapy at 1 RH (onchology)	-	-	-	-	-	1	1	1	1
Cardiac surgery center	-	-	-	-	-	-	-	-	1
Pathology at RHs	2	2	2	3	3	3	3	3	3
Cancer registry	-	1	1	1	1	1	1	1	1
DHs with eye service (full services)	10	10	27	27	27	28	28	28	28
DHs with eye service (only personnel)	17	17	-	-	-	-	-	-	-
Optical shops at RHs and PHs	1	2	3	5	7	7	7	7	7
PH with eye service	1	1	2	2	3	3	4	4	4
RH with eye service	5	5	6	6	7	7	8	8	8
Villages with 3 CHWs trained in NCDs	-	-	-	2,500	2,500	5,000	14,837	14,837	14,837
Villages with 2 additional CHWs for chronic care	-	-	-	-	-	-	1,484	2,967	4,451

As reported in the table the objective for the first year is to decentralize NCDs service to 66% of all the DHs, completing the decentralization by the end of the second year.

### 3.2.2 Ensure quality of NCD service

In order to contribute to the overall vision of NCDs the quality of service should be of high level i.e effective, safe, centered on the patient's needs and given in a timely fashion. This can be achieved through the following operational strategies:

- Clinical supervision and mentorship
  - Central level staff, physicians and specialists at referral and provincial hospitals should be encouraged to provide outreach services to district hospitals to support care and training. Similarly doctors and specialist nurses at district hospitals will be tasked to mentor chronic care nurses at health centers. Chronic care nurses at health centers, will in turn mentor and chronic care community health workers.
- Clinical training and mentoring
  - The goal of building NCDs clinical capacity can be achieved through the following strategy:

- a) Support of the HRH program to both medical students on their *stage* (general practitioners) and to the post graduate residency program (specialists)
- b) Targeted trainings and on the job mentoring to have skilled staff at all levels,
- c) Refresher course on diagnosis and referral.

The key goal is to increase the capacity of district hospitals on NCDs management. One of the cost effective strategies identified is to reinforce the pre-service training for NCDs provided by medical schools.

It has to be outlined that a successful training and mentoring program is also depending on health system wide challenges such as retention and staff motivation, which goes beyond the NCDs program.

- Continuing professional education (CPD)
  - The institutional program of CPD is a cornerstone to foster a learning environment where staff is self-motivated for learning. The national policy of CPD and annual renovation of the license is expected to be extended also to nurses.
- Pre service training
  - Pre service training should be reinforced, especially in discipline not currently covered such as eye and oral health where curriculum should be developed.
- Procedures and guidelines
  - Enable personnel to apply standardized quality care and further motivate them in caring for patients, by developing procedures and guidelines.
- Telemedicine
  - The plan to connect Rwandan hospitals through telemedicine – the use of telecommunication and information technologies to provide distant clinical health - is in the implementation phase and it will shortly connect referral hospitals to all District and Provincial Hospitals.

### **3.2.3 Ensure readiness of NCD services through improvement of supply chain, equipment, laboratory and internal process**

The main goal for a primary and specialized health system is to assure continuity of care. This can be achieved through the following operational strategies:

- Availability of drugs, consumables and supplies
  - The procurement of NCDs medications and consumables will be modeled on existing medical supply system for Rwanda. It has to be outlined that the plan for palliative care will consider the availability of drugs at all levels. Quantification exercise for procurement through MPPD (former CAMERWA) will be essential.
  - Procurement of consumables to district hospitals to perform biopsy, ECG, echography, INR tests, and other NCDs activities (Monofilament fishing lines, mouth piece of peak flow meters, syringes for insulin, basic reading and adjustable glasses).
  - Procure cataract materials to conduct cataract surgeries at RHs, PHs and DHs. The plan to scale up cataract surgeries includes around 7,000 surgeries in the first years and 10,000 surgeries on the second year.
- Strengthens laboratory service
  - Procure equipment for NRL for prevention chemotherapy toxicity and diagnose hematological cancer.
  - Procure one CardioChek PA analyzer for each District, Provincial and Referral Hospitals to perform tests total/HDL cholesterol, triglycerides.
  - Procure equipment to District Hospitals and Provincial to perform INR tests to check level of blood coagulations
- Availability of medical equipment and related maintenance
  - Provide equipment to District and Provincial Hospitals to measure blood pressure (Blood pressure machine), perform Electrocardiogram (ECG), to monitor the oxygen saturation of a patient's blood (Pulse oximetry), to monitor asthma (peak flow meters), to provide basic pulmonary function tests (spirometers), to estimate the glucose in the blood (glucometers), to perform echography (ultra sound machine), to treat of asthma, COPD and other respiratory diseases (nebulizer), to perform basic check-ups (weighting scale, height ruler, stethoscopes), to help babies and small infants take inhaled medicine (BabyHaler).
  - Provide equipment to health centers to measure blood pressure (Blood pressure machine), to monitor the oxygen saturation of a patient's blood (Pulse oximetry) to perform basic check-ups (weighting scale, height ruler, stethoscopes) to help babies and small infants take inhaled medicine (BabyHaler).

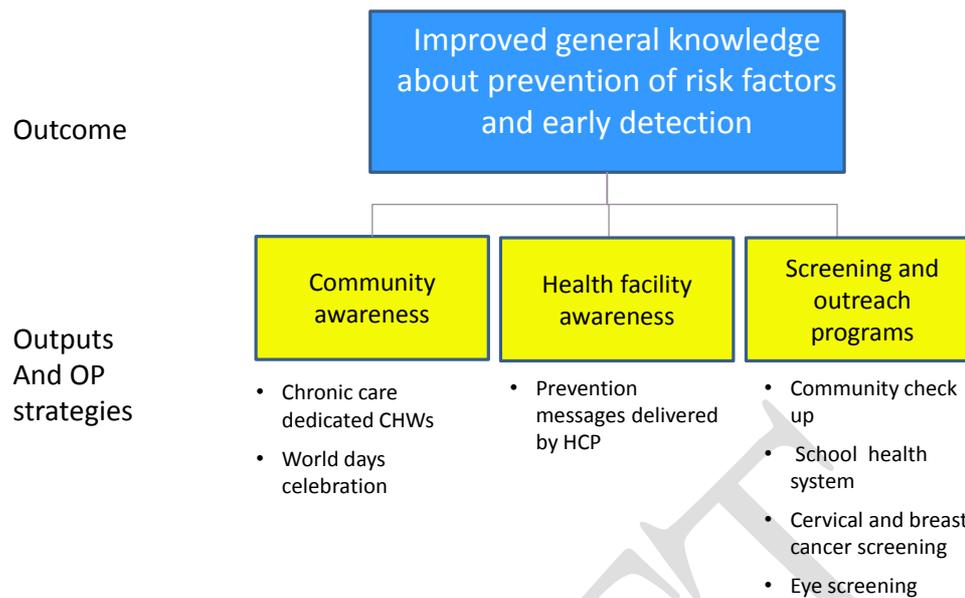
- Provide equipment and consumables to Referral Provincial and District Hospital to establish a fully operative eye health unit.
- Provide radiotherapy equipment and infrastructure to one Referral Hospitals.
- Procure equipment for 38 DHs for screening and treatment of cervical cancer: HPV diagnostic accessories and consumables, Cryotherapy equipment, LEEP equipment, Colposcopy equipment.
- Reinforce the supply chain for planning storage and transportation.
  - Institutionalize annual quantification exercise for drugs and consumables led by the NCDs division that will inform procurement.
  - Conduct drugs quality control of NCDs drugs and contribute to the supply chain management fees.
  - Conduct quarterly review and evaluation meetings to improve communication between district pharmacies and DHs, so that there is some foresight (anticipation) of future needs.

### **3.3 Improved general knowledge about prevention of risk factors and early detection**

The figure below reports the log frame with outputs and operational strategies. As showed in the figure the outcome of improved general knowledge about prevention of risk factors and early detection can be reach trough 3 key outputs:

1. Community awareness;
2. Health facilities awareness;
3. Screening and outreach programs.

Figure 10: Improved general knowledge about prevention of risk factors and early detection



The paragraphs below will provide details on the operational strategies for the three outputs defined.

### 3.3.1 Community awareness

The community awareness it is mainly planned throughout the network of community health workers, the execution of the World days and the related use radio messages to reinforce the NCDs messages.

#### 3.3.1.1 Community Health Workers

At community level, the first step will be to train the entire current cadre of 3 community health workers per village in NCDs. After this first round of training a cadre of additional 2 community health workers for each village should be identified and trained in chronic and palliative care including adherence support for advanced chronic conditions such as HIV, heart failure, insulin-dependent diabetes, and cancers. These CHWs should also be trained in an evidence-based group psychotherapy technique and provide home based support to chronic patients.

#### 3.3.1.2 World days

The world days represent a key initiative to raise awareness on Non Communicable Diseases. The plan includes the following awareness campaign:

- NCD Week
  - Annual awareness campaign for NCDs delivered through press conferences, broadcast of messages for the 4 clusters through radio and television shows during the entire week.

Demonstrative sport activities and mass screening of hypertension, diabetes and eye conditions.

- World diabetes day
  - Public speaking, sensitization walk, mass screening of diabetes, hypertension and eye condition with involvement of Rwandan diabetic association, Agarwal eye hospital and Ministry of sport and culture under the coordination of RBC / NCD.
- Cancer World Day
  - Public event with screening campaign for cervical and breast cancer, events. Sensitization walk and mass media campaign through the radios, TV and Newspapers. Public discussions with health officials to address any/all questions regarding cancer that are broadcast simultaneously over the television and radio networks with a focus on cervical cancer and breast cancers.
- World No Tobacco Day
  - Activities of the celebration day are oriented to sensitization activities reminding communities to not smoke in public places and closed areas. The messages are conveyed to general public but especially to young people.
- Palliative Care Day (Hospice World Day)
  - Hospice visits, sensitization walk, radio and tv, public discussion.
- Injury & Disability World Day (Road safety Day)
  - The Road Safety Week is an annual event aimed at raising awareness to enforce road security. It is also aimed at advising road users to fine tune their road culture in the interest of their own safety and that of others and is implemented by the Traffic Police.
- World sight Day at national level

### **3.3.2 Health facility awareness**

An important channel to build awareness and drive behavioral change is the health facility where both health care providers and patients can be informed about prevention of NCDs. Specific activities are:

- Printing and distribution of posters for prevention and availability of services of NCD for health facilities (including PWD);
- Video production about modifiable risk factors adapted to urban and rural setting to be shown at health facilities;
- Multiplication and distribution of video material about modifiable risk factors to be shown at facility level.

### 3.3.3 Screening and outreach programs

Screening campaigns and outreach programs represent an important channel to not only build awareness and also provide early detection of specific medical conditions. The key platform for screening has been defined in

- **Primary and secondary schools.** The current system already defines an integrated school health system where a nurse periodically supervises the school from a nearby health center. The key screening activities for NCDs could be initially based on eye health (refractive error) and oral health. Eye and oral health educational and health material for school can be distributed to schools.
- **Maternity unit.** Screening campaign at for Retinitis of Prematurity (ROP). The project can be initially structured with a pilot in 2 maternity units to be extended to 3 maternity after the first results.
- **Community**
  - Community checkup provided by Health Facilities providing physical examination and basic tests like blood pressure measurement and glucose test;
  - Bi annual screening campaign at community level to improve early detection of eye condition;
  - Cervical and breast cancer screening.

Outreach surgeries for eye condition might take place to both District Hospitals and Health centers. It is also planned to conduct outreach program to screen and manage cases of streptococcus pharyngitis.

## 4 DEVELOPMENT OF A RELIABLE M&E SYSTEM, COORDINATION AND FUND RAISING

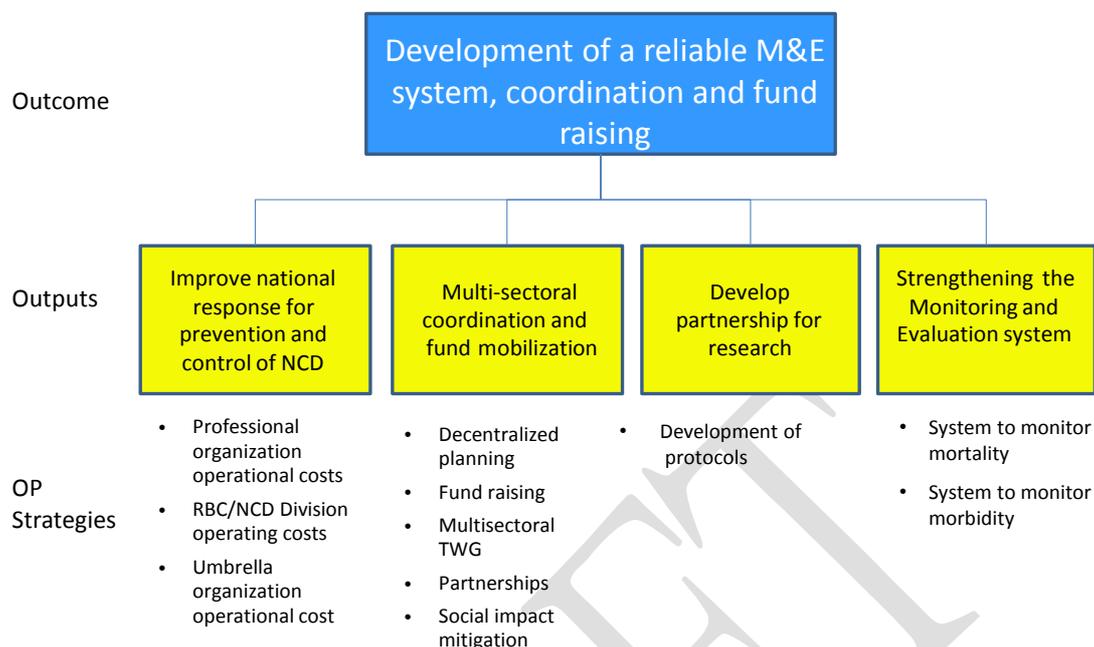
The main principles for prevention and control of NCDs risk factors are represented by coordination, accountability and efficiency. These values are fulfilled when local area health service networks are actively coordinated, health services are well managed with a minimum wastage of resources and managers are allocated the necessary authority to achieve planned objectives and held accountable for overall performance and results.

The figure below reports the log frame with outputs and operational strategies. As showed in the figure the outcome of strengthening the prevention and control of NCDs risk factors can be reach trough 4 key outputs

1. Improve national response for prevention and control of NCD
2. Inter-sectorial coordination and fund mobilization
3. Design a reliable mechanism for systematic data collection and strengthening the Monitoring and Evaluation system for NCDs

#### 4. Develop partnership for research

Figure 11: Development of a reliable M&E system, coordination and fund raising



The paragraphs below will provide details on the operational strategies for the three outputs defined.

##### 4.1.1 Improve the national response for prevention and control of NCD

The key institutions involved in the national response for NCDs prevention and control are represented by the RBC/NCD division, Professional and academic organizations (OCO) and patients and faith based umbrella organizations (diabetic retinopathy and glaucoma organization). The key operational strategy is to make sure these organizations are operational and fulfill their leaderships and coordination duties effectively. The activities required are:

- Provide salaries, training and PBF for all required positions
- Contribute to facility running costs
- Meetings to improve and support activities

##### 4.1.2 Inter-sectorial coordination and fund mobilization

A key output to strengthen the prevention and control of NCDs risk factors is represented to both an integrated and multi-sectorial approach to Non communicable diseases and to fund mobilization. The key operational strategies are represented by:

- Decentralized planning:

- Organize NCDs symposium in Kigali and ensure that NCDs district staff are involved in the integrated district health planning process;
- Meeting with members of disability sector on the inclusion of PWDs equipment and devices in MPPD.
- Fund raising:
  - Attending international conference on NCDs, assign one full time staff inside RBC/PMEC division to the elaboration and implementation of fund raising strategy and mobilize fund for the eye revolving fund to provide specialized eye service not covered by the National Health Insurance.
- Inter-sectorial TWG:
  - Quarterly meetings of TWG of concerned entities (Ministries, agencies, partner) with the role of advising on cross cutting issues (Eg taxes on alcohol, tobacco, salt intake, etc).
- Partnerships:
  - Meeting with religious leaders, academic institutions and private sector for dissemination and sensitization.
- Social impact mitigation:
  - Develop strategy to design social impact mitigation for people affected by NCDs, Advocacy on accessibility of health facilities for PWD.

### **4.1.3 Develop partnership for research**

Regarding the research components the key activities lay in the development of sounding protocols for grants and quarterly working session to develop research protocols.

### **4.1.4 Design a reliable mechanism for systematic data collection and strengthening the Monitoring and Evaluation system for NCDs**

As mentioned in the par 1.1, the key priority for the phase 1 2014-2016 is to develop a reliable data collection system for NCDs for both mortality and prevalence.

The following paragraphs will provide more details on the M&E strategy to designing a reliable mechanism of data collection for both mortality and morbidity of NCDs.

#### ***4.1.4.1 Monitoring the mortality of NCDs***

One of the key priorities for Rwanda is to have internal estimates of the burden of diseases for NCDs. The key objective identified is to establish a vital registration monitoring system that might allow Rwanda to track and monitor the burden of disease of Rwanda.

A possible range of activities identified that could be implemented in the next 2 years are:

1. Rapid assessment of cause of deaths led by a team of 3 doctors that could be tasked for 3 months to perform verbal autopsy in 3 different districts. The doctors will connect with community health workers that will inform the death to the team. The doctors will then outreach to the community to perform a verbal autopsy according to a standard framework.  
The additional 2 CHWs for each village might be trained to perform directly verbal autopsy and a routine system of monitoring vital registration might be put in place.
2. Rapid assessment of prevalence conducted by a team of doctors might track the typology of cases entering the Emergency Room of district hospital and few health centers. Moreover specialist deployed at Referral Hospital might track the medical condition experienced for a specific amount of time.
3. The aspirational goal for Rwanda would be to have a mobile clinic to perform rapid assessments around the country, involving all infectious disease and NCDs.

#### ***4.1.4.2 Monitoring the morbidity of NCDs***

Given the specificity of chronic conditions, the monitoring system require a patient based collection system with the ability to track cases diagnosed and the follow up.

The current situation of M&E system for NCDs could be summarized in the following points:

- HMIS data collection for chronic patients is complex as the system track visits (but not lost follow up) and there is uncertainty on number of cases;
- There is a need for a system that tracks clinical status of individual cases for follow up, visit scheduling and quality of care;
- The HMIS team has develop inside DHIS 2 a module for individual medical record (from now on “DHIS 2 IMR”) currently piloted with TB MDR and can be adjusted for chronic care;
- The implementation of Open MRS is facing challenges and it might not likely serve chronic patient in the short medium term.

The long term key strategy to build an M&E system for NCDs remain based on having Electronic Medical Record (EMR) implemented also for NCDs. In the short and medium term the M&E strategy for NCDs would be based on the following actions point:

- For non-chronic conditions (Injuries) HMIS will remain the main data collection process;
- For chronic conditions, the HMIS might initially work along with the DHIS 2 IMR that can be piloted on targeted conditions, in order to establish the real feasibility to roll out the system to all the chronic conditions;
- The DHIS 2 IMR will be initially piloted on targeted medical conditions (1 year, starting from December 2014);
- A unique simplified (one page), integrated, paper based form for intakes patients, that can be filled by clinicians will be developed;
- Organize health facilities to have dedicated days of follow up of specific chronic medical conditions (E.g. Tuesday all diabetes patients);
- Keep physical folders with the patient forms for follow up.

## **5 COSTING AND GAP ANALYSIS**

### **5.1 Objective and process**

The NCD NSP is driven by the overarching principle of delivering an “ambitious but realistic” plan by identify the most cost effective interventions.

The strategic planning process started from the definition of the aspirational target to reduce NCD mortality by 80% in people 40 years older or younger by 2020.

In order to reach the target the planning process considered the following iterative planning steps:

1. Identification of gaps and development of bottom up, activities, carried out by 5 programmatic working groups (Crosscutting, Cluster 1: CVD and Diabetes, Cluster 2: Cancer, Cluster 3: Injuries and disabilities, Cluster 4: Oral and eye health, Cluster 5: Palliative Care) that included members from the Rwanda Biomedical Center (RBC), developing partners, civil society organizations and the private sector;
2. Initial estimation of costing information carried out by the planning team.
3. Perform efficiency checks of activities identified by grouping activities together and find more integrated, cost-effective way to deliver service
4. Forecast of funds available and gap analysis.

The first paragraph provides an overview of the costing methodology, while the second paragraph introduces the costing results to reach the targets of the NCD NSP. The last 2 sections introduce the analysis of the expected funds and the implementation plan for the current year.

## **5.2 Costing methodology**

The NSP costing was carried out to understand only the amount of financing required for the 5 years National Strategic Plan.

It has to be outlined that while the costing of the 2 years has been developed analytically identifying the cost for each activity, the costing for the remaining 3 years has been extrapolated according to aggregated consideration.

The methodology of costing considers the cost of activities for the fight against NCDs at all levels of the health system (National, District, Community) and excludes any financial implication for the patients and their careers or the society as a whole.

The methodology used was inspired by both the strategic framework of the World Health Organization (WHO) and an integrated health sector approach and is based on a bottom up activity based methodology.

## **5.3 Costing results**

As reported in the table below the estimated total cost for 5 years plan is 97.5 billion RWF or around 140 million USD. The average annual cost of the activities reported in the NCDs NSP is equal to around 19.5 billion RWF or around 30 million USD per year.

The majority of the cost is driven by the outcome of improving that access and quality of care (66%) followed by the improved general knowledge about risk factors and early detection (25%) and developing a M&E reliable M&E system, coordination and fund raising (9%).

**Table 6: Costing results**

*Figures in Mln RWF*

	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL 5 YEARS	%
<b>1) Improved access and quality of care</b>	<b>13,305</b>	<b>14,352</b>	<b>11,801</b>	<b>12,318</b>	<b>12,871</b>	<b>64,647</b>	<b>66%</b>
Ensure quality of NCD services	2,454	2,532	2,532	2,532	2,532	12,581	13%
Ensure readiness of NCD services	7,785	5,670	1,890	1,890	1,890	19,125	20%
Availability of NCD service	3,066	6,150	7,380	7,896	8,449	32,940	34%
<b>2) Improved general knowledge about</b>	<b>755</b>	<b>3,438</b>	<b>6,605</b>	<b>6,576</b>	<b>6,605</b>	<b>23,978</b>	<b>25%</b>
Community awareness	595	3,103	6,175	6,175	6,175	22,223	23%
Health facilities awareness	28	-	28	-	28	85	0%
Screening and Outreach program	131	334	401	401	401	1,670	2%
<b>3) Development of a reliable M&amp;E sy</b>	<b>1,758</b>	<b>1,785</b>	<b>1,785</b>	<b>1,785</b>	<b>1,785</b>	<b>8,900</b>	<b>9%</b>
Strengthening the Monitoring and Evaluat	819	844	844	844	844	4,194	4%
Develop partnership for research	42	44	44	44	44	218	0%
Improve national response for preventior	217	217	217	217	217	1,087	1%
Multisectoral coordination and fund mob	680	680	680	680	680	3,401	3%
<b>Grand Total (Mln RWF)</b>	<b>15,819</b>	<b>19,575</b>	<b>20,192</b>	<b>20,680</b>	<b>21,261</b>	<b>97,525</b>	<b>100%</b>

#### 5.4 Funding estimates and gap analysis

The funding available for NCDs has been estimated from information reported in the Health Resource Tracker that incorporate the expense 2011-2012 and the budget 2012-2013. For the remaining year data are based on information provided by developing partners on the action plan 2013-2014 and 2014-2015. It has to be pointed out that overheads and non-programmatic expenses were deducted from the overall budget envelope.

The table below shows that in the last 4 years the trend of NCDs funds has increased, shifting from less than 12 million USD in 2011 to around 15 million USD of 2014. The analysis of the data reveals also that the role of the GoR is crucial as it account to more than 80% of the funding available.

**Table 7: Estimates of funding available for NCDs**

		<i>Figures in USD</i>				
		Actual 2011-2012	Actual 2012-2013	Actual 2013-2014	Budget 2014-2015	
Developing partners	Other NCDs (CVD, Injuries, Disabilities)	American Refugee Committee	16,321	-	-	-
		Intrahealth	107,844	-	-	-
		Handicap International	354,493	320,852	-	-
		Partners in Health (PIH)	188,592	686,121	TBD	TBD
		WHO	44,954	17,310	-	28,273
		Cure International	-	-	56,235	95,912
		Team Heart Rwanda	-	505,935	-	-
	Cancer	Breast Cancer Initiative East Africa	34,511	62,800	-	-
		CDC/ COAG HIV	-	-	-	106,864
	Eye health	Fred Hollows Foundation	-	-	463,236	823,581
		Vision for a Nation	-	-	TBD	TBD
		RIIO	-	-	TBD	TBD
		CBM	-	-	450,656	486,383
	Palliative care	THET	-	-	-	93,034
		ROROS	-	-	-	82,712
GOR	Ministry of Health (MoH)/ RBC dire	338,393	430,719	271,483	487,588	
	Contribution to Medicines, PBF and	11,138,172	12,390,254	11,896,293	11,808,240	
<b>TOTAL NCDs funds</b>		<b>12,223,280</b>	<b>14,413,991</b>	<b>13,137,903</b>	<b>14,012,587</b>	

Source 8: Health Resources Tracker, expense 2011-2013, budget 2012-2013

Given the costing of around 30 million USD per year, the financial gap is identified in of 15 million USD.

The following chapters will identify the priorities for the financial year 2014-2015

## 6 IMPLEMENTATION PLAN FOR THE FINANCIAL YEAR 2014-2015

### 6.1 Priorities and action plan 2014-2015

The table below reports the NCDs priorities for the financial year 2014-2015, given the current level of funding available:

**Table 8: Implementation plan 2014-2015**

OUTCOMES	ACTIVITES	RESPONSIBLE	TIMEFRAME
1) Improved access and quality of care	Training of HCP and central level mentorship	NCDs division	November – June 2015
	Quantification and procurement of essential medicines	MPPD division	October – November 2014
2) Improved general knowledge about prevention of risk factors and early detection	Public awareness, through the execution of world days and limited training to community health workers	NCDs division	November 2014
	Community Checkup performed at health facilities to refer	NCDs division	TBD

	suspected cases of CVD, Diabetes, Asthma, Disability, Cancer		
	Screening for cervix and breast cancer by defining strategy of testing cervix (HPV DNA, VIA) and carrying out the screening campaigns	NCDs division	TBD
3) Development of a reliable M&E system, coordination and fund raising	Structure a new M&E system based mainly based on HMIS	HMIS team	November – June 2015
	Operational plan for vital registration model	NISR	January – June 2015

## 6.2 Monitoring and evaluation framework

The table below report on the monitoring and evaluation framework for the National Strategic Plan. It has to be outlined that as soon as the new M&E system and the results of the WHO Step survey will be available, the M&E framework will be reviewed and adjusted accordingly.

Table 9: M&E framework

OUTCOME	National Priority	OUTPUT	Output Indicator	Source of data	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
Access/ Quality of NCD services improved	HSSP	NCDs management is decentralized	Number (or %) of DHs offering NCDs services according to defined package	Integrated supportive supervision	TBD					100%
		Community awareness for behavioural change	% of villages with atleast 2 CHW trained in chronic care	Reports CHD	0%					100%

## 6.3 Key financial gaps to be filled for the entire planning timeframe

In order to save more lives and reach our vision we still need to raise funds investment in equipment, CHWs, M&E, supervision and coordination.

The following list represents the needs currently unfunded that require funds mobilization:

1. Equipment
  - a. Basic priority equipment needed for DHs

- i. BP cuff (adult & pediatric), thermometer, weighing Scales, oximeter, urine pregnancy test, Access to FBC, CXR
      - ii. Ultrasound machine with cardiac probe. Ability to run urea/creatinine, potassium, & INR. ECG machine, single channel cardiac monitor, iSTAT analyzer, INRatio machine
      - iii. Glucometer, testing strips, Insulin syringes, HbA1c meter, monofilament, urine dipstick
      - iv. Peak Flow Meter, demonstration spacer
    - b. Funds for maintenance and contribution to supply chain management costs
- 2. Community Health
  - a. Train current 2 CHWs and identify additional 2 CHWs dedicated to chronic care and provide performance based compensation.
- 3. Monitoring and Evaluation
  - a. Risk factors assessment, vital registration., M&E training and supervision for DHs and HCs on the new HMIS format for NCDs, Data dissemination
- 4. Clinical supervision and mentorship
  - a. Systematic quarterly clinical supervision to DHs, HCs and CHWs
  - b. Clinical placement in center of excellence
- 5. Coordination and program management
  - a. Annual quantification of essential medicines led by NCDs division
  - b. Resource for NCDs division to coordinate Oral. Eye, Hears cluster
  - c. Contribution to the revolving fund eye health for specialized care.

## **7 CONCLUSIONS**

The target of decreasing the NCDs mortality by 80% for people under 40 by 2020 or “80x40x20”, require Rwanda to expand the current financing available for NCDs.

In order to accomplish this goal it is crucial to deliver a strong commitment to a vision where the entire Rwandan population is protected from premature morbidity and mortality related to NCDs. Moreover all the stakeholders involved in the fight against NCDs fight will be required to demonstrate the highest level of coordination, accountability and efficiency.

It is in this view that the primary objective of this National Strategic Plan is to build a solid monitoring and evaluation system that might track the trend of the NCDs burden of disease in Rwanda. As soon as the new monitoring system will be in place, the National Strategic Plan will be revised in order to deliver a plan completely driven by national data.

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## ANNEX 1: PRIORITIZATION TABLES FOR CLUSTERS

### Annex: Prioritization process cluster 1

Medical conditions	Priority for 2013 – 2015?	Why?						
		Current burden <sup>5</sup>	Future burden	Preventable?	Treatable?			
					Complexity	Availability	Cost	Efficacy
Hypertension	Yes	High		Yes	Simple	Available	Affordable	
Cardiomyopathies	Yes	High						
Stroke/TIA	Yes	High		Yes		Available		
Rheumatic heart disease	Yes	High		Yes				
Congenital heart disease	Yes	High						
Coronary Artery Disease	Yes	Low (but might be under diagnosed)	Tendency to increase.	Yes				
Asthma	Yes	High			Simple		Affordable	
Bronchiectasis	Yes	More prevalent than COPD			Difficult			
Diabetes Mellitus (type 1 and 2, gestational, malnutrition associated, retinopathy)	Yes	High. Retinopathy diabetes affects around 10% of all diabetics (30% in East Africa)	Tendency to increase.	Yes	Simple		Costly	Good outcome
Chronic kidney diseases (glomerulonephritis, Nephritic syndrome, Renal Failure)	Yes	High						
Thyroid Disease	Yes				Difficult at the district level		High investment costs (labs)	Good outcome
Other Cerebrovascular Diseases	No	Low						
Chronic obstructive pulmonary diseases (COPD)	No	Low. At PIH supported hospitals, it is less common than hypertension				Limited treatment options		
Dyslipidemia	No	Low						
Pericardial Disease	No	Low						

<sup>5</sup> As mentioned earlier in this document, data from HMIS and GBD are not displayed due to concerns over data quality.

Annex: Prioritization process cluster 2

Medical conditions	Priority for 2013 – 2015?	Why?						
		Current burden <sup>6</sup>	Future burden	Preventable?	Treatable?			
					Complexity	Availability	Cost	Efficacy
Nephroblastoma (Wilm's tumor)	Yes	Cases being seen in Rwanda. One of the commonest cancers in children. Very rare in adults.						Good outcome in children (reason why it was chosen as a priority three years ago)
Non-Hodgkin's Lymphoma (Large B-cell), and burkitts lymphoma	Yes	Common in children (mainly the burkitts lymphoma) and adults (mainly the large b-cell).						Good outcome (around 50% response rate)
Hodgkin's disease	Yes	Less frequent than non-Hodgkin. Usually affects people between 6-30 years old. Around 3 cases in CHUK in the last year.		No.				Good outcome: responds very well to chemotherapy and radiotherapy, more so than the non-Hodgkin's, although in the last 2 years there has been a significant number of relapses
Leukemia (CML)	Yes							Good outcome, with molecular targeted treatment.
Breast cancer	Yes	Common, often affecting people in their 20s.		Yes				Very good outcome (almost 100% response rate) if detected early
Kaposi's sarcoma	Yes	Numbers of cases have dropped because of HIV treatment (there is a link between HIV and Kaposi's sarcoma). In CHUK, there are some cases, but not many.						Good outcome if detected early
Prostate cancer	Yes	Very common in Rwanda. Most common cancer for males.						Very good outcome (slow growing cancer)
Colon and anus cancers	Yes	Anus cancer is often associated with HIV, and the number of cases is small when compared to the number of cases of colon and rectum cancers.						Very good outcome (more than 70% response rate) for colon and rectum cancers
Cervix cancer	Yes	Highly frequent. One of the most common causes of death among women.						

<sup>6</sup> As mentioned earlier in this document, data from HMIS and GBD are not displayed due to concerns over data quality.

Liver cancer	Yes							
Gastric cancer	Yes	Very common, mostly among the young population (below 30 years old). Usually, a high number of cases are associated with the bacteria helicobacter Piloni.						At later stages, outcome is poor (for example, recently there were four cases in late stages at the Military Hospital, and they didn't benefit from treatment)
Uterine and ovarian cancers	No							
Pancreas cancer	No	Low						Poor outcome
Acute Lymphoblastic Leukemia (all)	No							Good outcome in children
Brain and meninges cancer	No	Common in children						Poor outcome
Esophagus cancer	No							Very poor outcome
Multiple Myeloma (MM)	No	Low. Mostly affecting man above 65.					Expensive	Poor outcome
Kidney cancer	No	Low						
Eyes cancer Retinoblastoma/rhabdomyosarcoma Others	No	Mostly affecting children.						
Bones cancer (osteosarcoma)	No	Low. It mostly affects children.						Good outcome with chemotherapy
Skin cancers	No							Poor outcome
Lung cancer	No	Low, but maybe it is under diagnosed.	Yes					

Annex: Prioritization process cluster 3

Medical conditions	Priority for 2013 – 2015?	Why?						
		Current burden <sup>7</sup>	Future burden	Preventable?	Treatable?			
					Complexity	Availability	Cost	Efficacy
Transport injuries: road traffic injuries (including cycling)	Yes	Main cause of injury in CHUK, and the cause of around half of the deaths in that hospital. In CHUK, 55%-60% of injury deaths are caused by <b>head injury</b> . Probably a lot of these head injuries are caused by road traffic injuries. Data from traffic police indicates that 40% of people dying due to road traffic injuries are pedestrians. Bicycles are involved in 15% of all road accidents. Motorcycles are involved in 34% of all road accidents. In SAMU, during the last semester, motorcycles were involved in 58% of all road accidents. Motorcycles accidents account for a relatively small share of causes of deaths, and for a high share of causes of injuries. Road traffic accidents are one of the major causes of uni-ocular blindness. Maxilla facial traumas are common due to motorcycle accidents.		Yes				
Intentional injuries: interpersonal violence	Yes	Usually only severe cases are documented. Observations at the facility level suggest that interpersonal violence increases during harvesting season.		Yes				
Unintentional injuries: fire/burns (thermo, electrical, chemical)	Yes	Fourth major cause of injuries according to the Rwanda Injury Registry. Most burns are thermo burns, mostly from fires (for general population) and hot fluids (for children).		Yes				
Unintentional injuries: falls	Yes	Main cause of injury at CHUB, representing around 40% of deaths in that hospital. Most of the injuries associated with falls are work related.		Yes				
Intentional injuries: self harm		Most people commit suicide by hanging themselves. A smaller share does so by ingesting chemicals.		Yes				
Intentional injuries: others								
Unintentional injuries: drowning		Low burden, but might be under reported because victims of drowning don't usually reach RHs.		Yes				
Unintentional		Low burden, but might be under reported. Around 40 cases (among		Yes				

<sup>7</sup> As mentioned earlier in this document, data from HMIS and GBD are not displayed due to concerns over data quality.

injuries: animal contact		7,000) in the CHUK's injury registry.						
Unintentional injuries: poisoning				Yes				
Other NCDs: disabilities (congenital abnormalities, cleft lip and palate, etc.)								

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Annex: Prioritization process cluster 4

Medical conditions	Priority for 2013 – 2015?	Why?						
		Current burden <sup>8</sup>	Future burden	Preventable?	Treatable?			
					Complexity	Availability	Cost	Efficacy
Cataract	Yes	In 2006, in the Western province, cataracts were the cause of 65% of blindness and visual impairment (source: RAAB). In 2007, 285 cataract surgeries were made per million people. The target for 2013 was 1,500, but less than 500 were done. WHO recommends 2,000. Kenya does 730, and India 3,000.		No.			Cost-effective and covered by Mutuelle	Excellent outcome
Allergic conjunctivitis	Yes	Leading cause of consultation at HCs and DHs (out of 300000 cases 80% are allergic conjunctivitis). Affects mostly children.		No.				Good outcome with anti-allergic eye drops
Glaucoma	Yes	In 2006, in the Western province, glaucoma was the cause of 3% of blindness and visual impairment (source: RAAB). Glaucoma is the second cause of blindness countrywide. It affects mostly aged people, but over the last couple of years it has become more common in children due to misuse of steroid eye drops for allergy.				Treatment only available in Kigali and Kabgayi DH		Very good outcome if detected early
Refractive Error	Yes	In 2007, around 12% of the population probably suffered from refractive error. More than 80% of the cases were on people more than 40 years old. Recent training of HCs nurses in Primary Eye Care has begun to show the extent of the burden.		No.	Easy treatment			Very good outcome
Dental caries and abscess (periapical, periodontal, cellulitis, Ludwig angina)	Yes	At CHUK, 60% of outpatients have dental caries. It has recently become a large problem among children.		Yes.				
Gum and periodontal	Yes	It's prevalent in old people. Might be under reported due to aged people not going for consultations. If not treated		Yes.				Good outcome

<sup>8</sup> As mentioned earlier in this document, data from HMIS and GBD are not displayed due to concerns over data quality.

disease		appropriately, it has an impact on diabetes.						
Pharyngitis and tonsillitis	Yes							
Otitis Media	Yes	Main cause leading to deafness. Common in children.		Yes.				Good outcome
Childhood blindness								
Trachoma / Trichiasis	No	Low.						
Corneal scars	No	Low.		Yes				
Halitosis	No	High.						
Cysts	No	High, due to traumas not treated (for example, after motorcycle accidents).		Yes.				
Benign odontogenic tumors	No			No.	Easy treatment			Good outcome
Presbycusis	No	Prevalent in aged people. Equally prevalent in men and women. People with diabetes and hypothyroid disease are more at risk of having this medical condition.	Tendency to increase as life expectancy increases.					
Allergic rhinitis	No							
Sinusitis	No	High.		Yes.				Good outcome

**Table 10 - Prioritization of medical conditions on cluster 4**

## ANNEX 2: CROSS CUTTING GAPS IDENTIFIED DURING PLANNING WORKSHOPS

Table 11: Cross cutting gaps identified during the workshop

	<b>CVD, diabetes, chronic respiratory disorders</b>	<b>Cancer</b>	<b>Injuries and disabilities</b>	<b>Eye health</b>	<b>Oral and hearing health</b>
Infrastructure and equipment	Lack adequate lab diagnostic capacity  Lack critical equipment, like Blood Pressure machine	Lack of equipment	Lack of national center for management and rehabilitation of spinal cord injuries.	Only 50% of DHs have a functioning eye unit  Lack of equipment at DHs	Lack of equipment at DHs and HCs  Limited equipment for RHs and provincial hospitals (cannot provide all range of services)
Supply chain	Reagents stock outs  Lack medicines availability, particularly at HC  Some tests are expensive	Lack of drugs and supplies  Lack of reagents for lab diagnostic	Inconsistent supply for emergency care	Lack of consumables at DHs and RHs	Lack of consumables at health facility
Human Resources	Lack of motivation  Staff tend to avoid audit by reporting low number of cases of mortality  Lack of pathologist  Rotation staff on OPD	Insufficient quantity and quality of health professionals on diagnosis and treatment (CHWs, Nurses, Physicians, pathologists, radiologists, oncologists, ..)  Lack of lab technicians to perform lab diagnostic	First respondents' skills to be improved.  Insufficient quantity and quality of health professionals on diagnosis and treatment	Lack of quantity (ophthalmologists and ophthalmic technician) and quality of human resources of DHs and RHs. HCs nurses are already trained but limited in diagnosis capacity  Problem of retention of staff	Lack of quantity and quality of personnel (only 1 specialist dentist)  In the job market there is personnel available not absorbed into the public system (training program did not coordinate with MOH about post training hiring)
Community	Lack awareness about medical conditions, causing late diagnostic	Lack awareness about medical conditions, and about the fact that these medical conditions are	Lack awareness in basic preventive measure of road traffic accidents	Lack of awareness about eye conditions and service available	Not follow up back at the health facility after medication

	<p>Lack of trust in modern medicine due to low level of education and belief in self-healing</p> <p>Lack financial means to go to health facilities</p>	<p>treatable</p> <p>Lack of socio economic support for follow up (transport)</p>			<p>Awareness of oral hygiene</p>
Health Information	<p>Poor data collection about cases</p>		<p>Injuries registry only held at 2 RHs</p>		
Service Delivery	<p>Lack of medical follow up, especially on diabetes</p> <p>No central body to monitor the patients</p>	<p>Insufficient palliative care</p> <p>No counseling services for patients and families</p>	<p>Lack of rehabilitation support</p> <p>No standardization of trauma management guidelines</p> <p>Lack information about patients to come to the hospital with road traffic injury (Does it have insurance?)</p> <p>Most people without medical insurance are not treated in hospitals</p>		<p>People referred at central level at later stage</p>

### ANNEX 3: COSTING DETAILS

Row Labels	Year 1	Year 2
<b>1) Improved access and quality of care</b>	<b>13,304,943,756</b>	<b>14,351,601,376</b>
<b>Ensure quality of NCD services</b>	<b>2,454,006,965</b>	<b>2,531,731,145</b>
Clinical supervision and mentorship	1,179,853,159	1,330,125,942
Clinical Training	696,480,916	696,746,852
Continuing professional education (CPD)	830,600	830,600
Develop eye residency training curriculum	17,000,000	-
Pre service training	263,143,000	245,680,000
Procedures and guidelines	12,431,500	4,608,000
Procedures, guidelines, tools	284,267,790	253,739,750
Telemedicine	-	-
<b>Ensure readiness of NCD services</b>	<b>7,785,095,010</b>	<b>5,670,201,042</b>
Drugs availability	1,942,602,733	1,942,602,733
Laboratory	77,600,000	-
Medical Equipment	3,744,153,153	1,594,980,080
Medical supplies and consumables	1,699,287,519	1,767,774,073
Supply chain	321,451,605	364,844,157
<b>Availability of NCD service</b>	<b>3,065,841,782</b>	<b>6,149,669,189</b>
Establish optical shops at RHs/PHs	85,465,526	-
Integrated chronic care at HCs	315,133,200	525,222,000
NCDs management at DHs	1,255,469,489	2,692,170,295
Provincial services	254,451,411	306,618,570
Referral services	1,155,322,155	2,625,658,324
<b>2) Improved general knowledge about prevention of risk factors and early detection</b>	<b>755,112,012</b>	<b>3,437,511,365</b>
<b>Community awareness</b>	<b>595,243,012</b>	<b>3,103,142,365</b>
Chronic care service CHWs	180,050,775	2,495,275,674
Dental caries and abscess, gum and periodontal diseases	-	-
Develop eye health advocacy messages IEC and BCC	159,162,000	3,520,000

	71,890,375	71,890,375
Training CHWs	70,193,863	418,510,316
World days	113,946,000	113,946,000
<b>Health facilities awareness</b>	<b>28,440,000</b>	-
IEC and BCC	28,440,000	-
<b>Screening and Outreach program</b>	<b>131,429,000</b>	<b>334,369,000</b>
From PHs to DHs	2,960,000	2,960,000
Retinitis of Prematurit	100,096,000	112,608,000
Rheumatic heart disease	28,373,000	28,373,000
School eye health service	-	184,730,000
Screening	-	5,698,000
<b>2) Development of a reliable M&amp;E system, coordination and fund raising</b>	<b>1,758,454,404</b>	<b>1,785,473,100</b>
<b>Strengthening the Monitoring and Evaluation system for NCDs</b>	<b>819,446,628</b>	<b>843,740,764</b>
Annual costed NCDs programs M&E work plan	704,000	704,000
Data dissemination and use	212,212,000	212,212,000
Human capacity for NCDs programs M&E	169,073,128	185,334,264
NCDs programs evaluation and research	9,066,000	-
Partnerships to plan, coordinate, and manage NCDs programs	34,343,500	42,239,500
M&E system		
Routine NCDs programs monitoring	305,542,000	297,688,000
Supportive supervision and data auditing	2,960,000	2,960,000
Surveys and surveillance	85,546,000	102,603,000
<b>Develop partnership for research</b>	<b>41,627,256</b>	<b>44,127,256</b>
Develop research protocols	41,627,256	44,127,256
<b>Improve national response for prevention and control of NCD</b>	<b>217,442,168</b>	<b>217,442,168</b>
Hospitals operating costs	456,000	456,000
Professional organization operational costs	2,157,000	2,157,000
RBC/NCD Division operating costs	211,733,168	211,733,168
Umbrella organization operational cost	3,096,000	3,096,000
<b>Multisectoral coordination and fund mobilization</b>	<b>679,938,352</b>	<b>680,162,912</b>
Decentralized planning	41,625,440	41,850,000
Fund raising	615,265,752	615,265,752

Multisectoral TWG	7,199,160	7,199,160
Partnerships	1,161,000	1,161,000
Social impact mitigation	14,687,000	14,687,000
<b>Grand Total</b>	<b>15,818,510,173</b>	<b>19,574,585,841</b>

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