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Ministry of Health



Rwanda National Cancer Control Plan

2020-2024



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Acronyms and Abbreviations

AIDS	Acquired Immuno-Deficiency Syndrome
BCC	Behavioural Communication and Change
BCCOE	Butaro Cancer Centre of Excellence
BMI	Body Mass Index
CBHI	Community Based Health Insurance (Mutuelle de Santé)
CHUB	Butare University Teaching Hospital
CHUK	Kigali University Teaching Hospital
CKC	Cold Knife Conization
CSO	Civil Society Organization
CT	Computed Tomography
DAA	Direct Acting Antivirals
DNA	Deoxyribonucleic acid
FCTC	(WHO) Framework Convention on Tobacco Control
GDP	Gross Domestic Product
HBCP	Home Based Health Care Professionals
HBV	Hepatitis B virus
HCP	Healthcare Provider
HCV	Hepatitis C virus
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HPV	Human Papillomavirus
HR HPV	High-risk HPV
IARC	International Agency for Research on Cancer
IEC	Information, Education and Communication
KFH	King Faisal Hospital
LEEP	Loop Electrosurgical Excision Procedure
LINAC	Linear Accelerator
LLETZ	Large Loop Excision of the Transformation Zone
LMIC	Low- and Middle-Income Country
MOH	Ministry of Health
MRI	Magnetic Resonance Imaging
NCD	Non-communicable Diseases
NCCP	National Cancer Control Plan
NGO	Non-Governmental Organization
PBCR	Population Based Cancer Registry
PLHIV	People Living with HIV
RBC	Rwanda Biomedical Centre
RMH	Rwanda Military Hospital
TWG	Technical Working Group
USD	US Dollars
VIA	Visual Inspection with Acetic Acid
WHO	World Health Organization

Foreword

As the Sustainable Development Goal 3.8 for Universal Health Coverage conveys, the health and wellbeing of a population- a human right that should be provided to all- is paramount to the success of a nation. In Rwanda, where our health and wellbeing were once threatened deeply, His Excellency Paul Kagame leads with a vision, one that is rooted deeply in a commitment to the health, wellness, and betterment of all of our people.

As our health sector has brought infectious disease under control over the last decade and our country has continued to rapidly develop, our epidemiology shifted, bringing a new challenge to our health sector's forefront: Cancer. With complex, costly treatments, many countries globally are struggling to identify how to tackle the cancer burden of disease. Rwanda is not immune to these challenges; cancer brings a financial and human resource terrain that is rich in resource needs.

In Rwanda, we are committed to tackling our newly recognized cancer burden through a three-pronged approach of prevention, early detection, treatment and care. Using innovative, home-grown solutions, we are taking control of our bodies and responsibly for our future health and wellness through innovative programs, such as our community physical exercise twice a month, also known as "Car Free Day." We are using one of our country's greatest resources- ourselves, as a one nation- to prevent risk factors of cancer that can be averted.

We are also educating ourselves, as a population and as health care providers to better understand the signs and symptoms of cancer, as we know that early detection is crucial. Our health sector's existing multi-tier framework of decentralized care is primed for the integration of awareness campaigns, linkages to care, and early detection to link a person in need with cancer care services.

And with the engagement of our community, both longtime stakeholders and new partners, we are enhancing care. For the first time in the history of our country, we are now offering radiation therapy for patients with cancer through the Rwanda Cancer Centre. We are developing oncology training programs so that our health system can be equipped to meet our population's needs in cancer prevention and control.

This National Cancer Control Plan (NCCP) here within provides a roadmap for the next five years, offering our commitment to continuing to enhance prevention, early detection, treatment and care. Guided by our country's principle of equity, we will continue to decentralize services so that all in need can access care without delay. It is my hope that, in the coming five years, we may continue to strengthen our network of stakeholders, partnering together to enhance universal and sustained access to cancer care services for all those in need.

I have no doubt that collectively we can make a positive impact: Let us all join hands in halting and reversing the burden of cancer in Rwanda.


Dr. Daniel M. NGAMIYE
Minister of Health



Acknowledgment

The Rwanda Biomedical Centre (RBC) within the Ministry of Health extends its sincere gratitude to all those in the extensive network of collaborators who contributed to the development of this strategy. Without these steadfast partnerships, cancer prevention and control within Rwanda would not be as developed as it is today and the next steps in this important forward direction detailed in the National Cancer Control Plan, could not be envisioned.

The development of this National Cancer Control Plan (2019-2024) was led by the Cancer Diseases Unit within RBC's Non-Communicable Disease Division in close collaboration with the National Cancer Technical Working Group, which functions as the National Cancer Control Steering Committee. The Cancer Diseases Unit extends its gratitude to this network, which mainly includes RBC and Ministry of Health officials, in-country development and implementing partners, selected clinicians active in cancer prevention and control, civil society organizations and patient groups. Our gratitude is also extended to external partners namely International Atomic Energy Agency (IAEA), Union for International Cancer Control (UICC), and National Cancer Institute (NCI), International Cancer Control Partnership (ICCP) that contributed to the development and the review of this plan.

Finally, though certainly not least, a deep acknowledgment is given to the health care professionals throughout our country working within cancer prevention and control. Without these care providers and their dedication to patients and families and to enhancing the quality of our care delivery system, we could not sustain and develop services to save as many lives as possible.

The launch of this NCCP is the start of a rigorous process to prioritize cancer prevention and control intervention to reduce cancer burden for the present generation by securing a healthier working and prosperous nation tomorrow. We call upon all partners, stakeholders and health care workers to adopt and support the implementation of this plan to help achieve its goal of reducing cancer incidence, morbidity and mortality in Rwanda through access to population based primary prevention, early detection, quality diagnostic, treatment and palliative care services.

Dr. Sabin Nsanzimana
Director General
Rwanda Biomedical Centre



Executive summary

Background

Over the past decade, Rwanda has been internationally recognized for remarkable gains in health, from significantly improving life expectancy to decreasing maternal and child mortality and controlling infectious diseases. With the Vision 2050 agenda striving to further develop the health and wellbeing of the Rwandan people, the current national Health Sector Strategic Plan IV (HSSP) 2018 –2024 commits the health sector to continue to move toward Universal Health Coverage (UHC), seeking to equitably and sustainably ensure access to preventative, curative, and supportive care for all.

Through Rwanda’s comprehensive, multi-tier health care delivery system, infectious diseases now being increasingly controlled. But as the Rwandan population ages and Westernization begins to shift behaviors, the disease burden is shifting, bringing a new challenge of Non-Communicable Diseases including cancer to the health forefront.

The newly established national cancer registry, which covers patients in the capital city of Kigali as well as a number of facilities that provide cancer services, shows that new cases of cancer in Rwanda are being diagnosed in an increasing number. From 2007 to 2018 there has been an increase from 635 to 2,803 cases annually. Globocan/IARC estimates cancer incidence and mortality in Rwanda to be much higher though, with approximately 10,704 new cancer diagnoses (6,184 cases among females and 4,520 cases in men) in 2018. Such numbers suggest that there are cases yet to be detected, treated, and controlled in our population. It is for this reason that prevention strategies in partnership with early detection and linkage to care strategies are needed.

Given this increasing cancer burden in the country and many actors that are being involved, there is a need to have a national plan that will guide all cancer prevention and control interventions from different stakeholders in the country towards reducing the burden of cancer in Rwanda.

Objectives

The implementation of this NCCP 2020-2024, is intended to reduce cancer mortality and morbidity in the country. This goal will be achieved through the strengthening of cancer control in Rwanda in all of its dimensions: prevention of risk factors, early detection, access to quality diagnosis, treatment and care including palliative and the development and use of a comprehensive modern system of evaluation and monitoring on the basis of statistical data quality.

To reduce cancer-related morbidity and mortality in Rwanda, the country will focus on the following objectives over the next five years:

1. Reduce the incidence of preventable cancers
2. Increase the rate of early detection and screening of cancers
3. Improve access for cancer patients to quality cancer diagnosis and treatment services.

4. Provide access to quality pain management and palliative care services for cancer patients.
5. Strengthen cancer information system and research.
6. Strengthen Coordination, Partnership and Financing for Cancer Control

To achieve these above objectives, the following strategies will be used:

Reduce the Incidence of Preventable cancers

Cancer prevention is the most cost-effective and long-term intervention to control cancer. According to the WHO, 40% of cancers are preventable through avoiding exposure to known risk factors. During the next five years, we will focus on implementing WHO “best buys” in cancer and other NCDs prevention; namely, 1) Tobacco control, 2) Prevention of excessive alcohol consumption, 3) Physical inactivity, dietary factors, obesity and being overweight, 4) Vaccination against HPV infection. We will also focus on proper management of infectious diseases leading to cancer and reduction of exposure to known carcinogens.

Increase the rate of Early detection and Screening of cancers

Early detection of cancer is associated with better treatment outcomes. During the implementation of NCCP, the emphasis will be on the following: 1) Improving cervical cancer screening through introduction of HPV DNA testing; decentralization of treatment of pre-cancerous lesions at health centre level using thermal ablation devices as well as use of automated visual evaluation once approved, 2) Breast cancer early detection and screening through clinical breast exam at the primary health care level; breast ultrasound at the district hospital; and introduction of population based mammography at later stage of implementation of NCCP, 3) Initiation of colorectal cancer screening starting at the primary health care level and improving access to diagnostic sigmoidoscopy and colonoscopy at referral hospitals level, and 4) Early detection of paediatric and other cancers through sensitization of the community on signs and symptoms of cancers; training of healthcare providers at primary health level on early detection of cancers and timely referral; and improving the referral system for patients with cancer.

Improve access for cancer patients to quality cancer Diagnosis and Treatment services.

The goal is to reduce mortality from common curable cancers and to ensure that prioritised diagnosis and treatment services are provided in an integrated, equitable, and sustainable way. In the diagnosis and staging of cancer, during the next five years, the focus will be on the following: 1) Upgrading the existing pathology capacity through improving access to immunohistochemistry and the introduction of new molecular testing and flow cytometry for specific cancer therapies, 2) Capacity building of pathologists and technicians, 3) Implementation of an effective sample transportation system from district hospitals to pathology laboratories tied with a anatomic pathology laboratory information systems, 4) Improving access to modern medical imaging system, including a nuclear medicine unit that will be established, and 5) Capacity building of adequate radiologists and radiology technicians.

Regarding cancer treatment, the focus will be on the following: 1) Creating a comprehensive National Referral Cancer Centre (i.e, “Rwanda Cancer Centre”), 2) Establishment of

systemic therapy capacity at university teaching hospitals (e.g., CHUK, CHUB), 3) Upgrading the capacity for surgical oncology, 4) Capacity building of adequate number of human resources for cancer management, and 5) Improving access to newer cancer treatments like immunotherapies and biologics and assurance of financial access for patients.

Provide access to quality Pain Management and Palliative Care services for cancer patients.

Access to pain management and palliative care services is a priority of the country as many cancer patients are still diagnosed at an advanced stage. During the implementation of NCCP, the emphasis will be on the following: 1) Strengthening the integration of palliative care services into the existing health system, 2) Improving the local production of oral morphine solution, 3) Providing a social minimum package to palliative care patients, and 4) Strengthening palliative care at home.

Strengthen Cancer Information System and Research.

A cancer information system based on Population-based cancer registries plays a pivotal role in monitoring and evaluation of cancer prevention and control interventions. During the next five years, we will focus on the following interventions: 1) Strengthening the existing cancer registry, 2) Establishment of a National Cancer Registry covering the entire country through leveraging of information technology systems, and 3) Promotion of cancer research.

Strengthen Coordination, Partnership and Financing for Cancer Control

Overall, national coordination of the National Cancer Control Program is led by the Cancer Diseases Unit under the Non-Communicable Diseases Division within Rwanda Biomedical Centre (RBC). During the implementation of this NCCP, we will improve the coordination through the establishment of a strong, multidisciplinary cancer technical working group serving as a steering committee that will accompany the Cancer Diseases Unit in RBC in the implementation of the plan. The partnership with different national and international organizations active in cancer control will be strengthened. Public and Private Partnership in cancer control will be promoted as well as increased allocation of domestic funds to cancer control activities.

Completing the NCCP is a monitoring and evaluation (M&E) plan tied to a complete set of key performance indicators that will ensure that progress is documented, winning approaches are exploited to the fullest, and challenges are diagnosed and corrected early.

Ultimately, this National Cancer Control Plan was valued using most cost-effective approaches of implementation, the total amount needed for 5 years of implementation is 36,525,222,844 Rwf (38,856,620 USD) to be availed by the Government of Rwanda as well as various partners in Cancer Control in Rwanda.

While this NCCP is meant to provide guidance, clarity of purpose, and national alignment as we tackle the cancer epidemic, it does not imply that the strategy is frozen for the next five years. As a result, we expect that this NCCP will evolve during its five-year lifespan as new facts and evidence come to light and new contexts emerge.

1. Introduction

1.1. Global burden of cancer diseases

Worldwide, cancer is among the leading causes of morbidity and mortality. In 2018, there were approximately 18.1 million new cases and 9.5 million cancer-related deaths globally. Without substantial improvement in cancer control, it is predicted that this worldwide annual incidence will rise to 29.5 million new cancer cases by 2040.¹

Globally, among the 9.5 million new cases of cancer in males reported in 2018, the five most common sites were the following: lung (14.5%), prostate (13.5%), colorectal (10.9%), stomach (7.2%), and liver (6.3%). In females, among the 8.6 million new cases reported in 2018, the five most common sites were the following: breast (24.2%), colorectal (9.5%), lung (8.4%), cervix (6.6%), and thyroid (5.1%).¹ Across both sexes, combined, the five most common sites of cancers were the following: lung (11.6%), breast (11.6%), colorectal (10.2%), prostate (7.1%), and stomach (5.7%); together, cancers of these five sites constitute almost half (46.1%) of the overall global cancer burden.¹

Among children 0 - 14 years worldwide, an estimated 200,166 cases of cancer (114,611 in boys and 85,555 in girls) were diagnosed in 2018. The top five cancers for this population were leukaemia, nervous system cancers, non-Hodgkin lymphoma, kidney cancers, and Hodgkin lymphoma; cumulatively, these cancers represent 63% of all cancers in children.¹

Though cancer affects all of humankind, there are marked differences across local, national, and regional boundaries, particularly when considering specific tumour types rather than cancer as a whole. New cases of cancer are being detected in less developed settings around the world, where there is reduced ability to detect and treat cancer.² The expected annual rate of new cases of cancer is estimated to increase three times faster in low- and middle-income countries (LMICs) than in high-income countries.³ Twenty-five years ago, approximately half of all new cases of cancer globally occurred in LMICs; now, almost two-thirds of new cancer cases predicted for 2030 are likely to occur in these countries. These estimates are based on projections that only account for population growth and aging and assume no change in the risk pattern of cancer incidence; this burden of disease could further increase if risks are not modified or averted.

LMICs suffer a double burden, as tumours associated with increased “Westernisation” (mainly breast, colorectal, and prostate cancer) are increasingly being detected in addition to cancers related to poverty and infection (mainly cervical, liver, and stomach). This shift in cancer risk is particularly evident in countries undergoing rapid socioeconomic transition.

Since survival is much lower in these countries than in high-income countries, even when taking into account differences in stage at a rapid increase in new cases will lead to a similar rapid increase in deaths. Already one of the world's leading causes of death, the annual death toll from cancer increased by almost 40% from 1990 to 2010⁴ and this rate of increase is set to continue.

It is predicted that deaths from cancer will rise from the current level in 2018 of approximately 9.5 million lives a year¹ to more than 13.2 million by 2030.²

Yet, there is a way to combat this burden. With a wealth of available knowledge, all countries can, at some useful level, implement the four basic components of cancer control – **prevention, early detection, diagnosis and treatment, and palliative care** to avoid and cure many cancers, while enhancing quality of care and providing comfort through palliative care to those for whom a cure is not possible.

Cancer control aims to reduce the **incidence, morbidity, and mortality** of cancer and to improve the **quality of life** of cancer patients in a defined population. This control is achieved through the systematic implementation of evidence-based interventions for prevention, early detection, diagnosis, treatment, and palliative care. Comprehensive cancer control universally addresses the whole population, while seeking to respond to the needs of the different subgroups at risk.

In order to achieve cancer control program goals, countries need to have a sound policy and strategic plan in place to guide comprehensive interventions across different stakeholders involved in cancer care in the country.

1.2. The burden of cancer in Rwanda

In July 2018, the Ministry of Health through Rwanda Biomedical Centre established a national cancer registry to collect information on cancer cases presenting at health facilities as well as cancer deaths occurring in the community. Building on the previous work of several partners who had laid the groundwork for establishing a cancer tracking system in Rwanda, the 2018 registry was established according to the International Agency for Research on Cancer (IARC) guidelines for setting up population-based cancer registries. Data available in the current database show a concerning trend, with a significant increase of cases over the years, from 635 new cases in 2007 to 2,803 cases in 2018. A full cancer registry report is in preparation elsewhere.

According to Globocan/IARC estimates on cancer incidence and mortality in Rwanda, there were approximately 10,704 new cancer diagnoses (6,184 cases among females and 4,520 cases in men) in 2018. Among men, IARC estimates that prostate, liver, stomach, colorectal, and Kaposi sarcoma cancers are most common, whereas cervical breast, colorectal, stomach, and liver are found in high numbers in women. Globocan/IARC estimates 7,662 deaths in Rwanda were from cancer in 2018, with 4,306 among females and 3,356 among men. The age-standardized rate for cancer incidence per 100,000 people among men was 130.9 and 144.8 in women in 2018.¹ These estimates are higher than the registry's recorded number of new cases, suggesting that there is still significant work to do in early detection and diagnosis of cancer in the country to ensure each confirmed case is counted and linked to care and treatment.

1.3. Cancer control actions in Rwanda

Upholding the country's commitment to Universal Health Coverage and as part of a broad range of health-related activities at health facilities in line with the National Decentralization Policy, cancer control activities are currently being developed and carried out in Rwanda.

Prevention activities are focusing on raising awareness of the general population about cancer and other non-communicable disease (NCD) risk factors; on encouraging immunizations, including the importance of immunizing 12-year-old girls against human papillomavirus (HPV) and immunizing infants against hepatitis B; and on engaging the general population at primary health care level.

Early detection interventions focusing on cervical and breast cancers screening are mainly conducted at health centres and district hospitals. Recently, annual community check-up for the general population have been introduced at the health centre level, bringing comprehensive health services closer to the people and helping to identify cancer cases in addition to other NCDs at an early stage. The diagnosis of cancer is carried out at the level of tertiary and teaching hospitals and Butaro Cancer Centre of Excellence (BCCOE), where pathology laboratories and advanced medical imaging equipment have been built and enhanced to deliver trusted, quality care.

In the country, treatment of cancer is currently available in tertiary and teaching hospitals as well as BCCOE. Radiation therapy is now available in the country, allowing local affordable access to an increased number of patients for the first time in history. At these cancer care sites throughout the country, patients now benefit from affordable access to surgery, chemotherapy and radiotherapy.

Palliative care is an important component of cancer care in Rwanda as well, as many cases are still identified at advanced stages, and, thus, the focus of the treatment shifts to enhancing quality of life. Palliative care services are integrated into the existing health system, including teaching, referral, provincial and district hospitals as well as health centres. In addition to this, Rwanda has innovatively developed a new cadre of care providers through its Home Based Care Practitioners (HBCP) program, enabling palliative care to be decentralized beyond facilities and delivered in the community to those in need.

Surpassing the Abuja Declaration and committing well over 15% of its national budget on health, the Government of Rwanda is deeply committed to the universal health of its people. Though care and treatment for cancer, a leading and growing proportion of the national disease burden is costly, Rwanda prioritizes cancer control and funds most cancer control activities with the unwavering support of international development and implementing organizations for specific areas of cancer prevention and control.

1.4. Availability of cancer data

In order to build effective, efficient interventions to control cancer, a national comprehensive, real-time tracking system is needed in order to appreciate the disease burden. Alongside information on other illnesses that make up the nation's disease burden, cancer-related information from facilities is being reported nationally as aggregate numbers through the Ministry of Health's Health Management Information System (HMIS). In addition, the National Institute for Statistics of Rwanda, who manages vital records including the death registry, provides mortality statistics on cancer-related deaths. To supplement these systems in order to collect quality data about cancer incidence, prevalence, and mortality, the Rwanda Biomedical Centre/Cancer Diseases Unit also established the National Cancer Registry, as previously mentioned. The registry is currently active and collects detailed information about patients with cancer from hospitals as well as in the community throughout the country.

2. Situation Analysis

2.1. Cancer burden and risk factors in Rwanda

Data on the size and evolution of Rwanda's cancer burden in the population are essential to assess the current situation, set objectives for cancer control, and define priorities. Cancer data are essential in monitoring the progress of the implementation of a National Cancer Control Plan (NCCP), as well as providing an evaluation of the various cancer control activities.

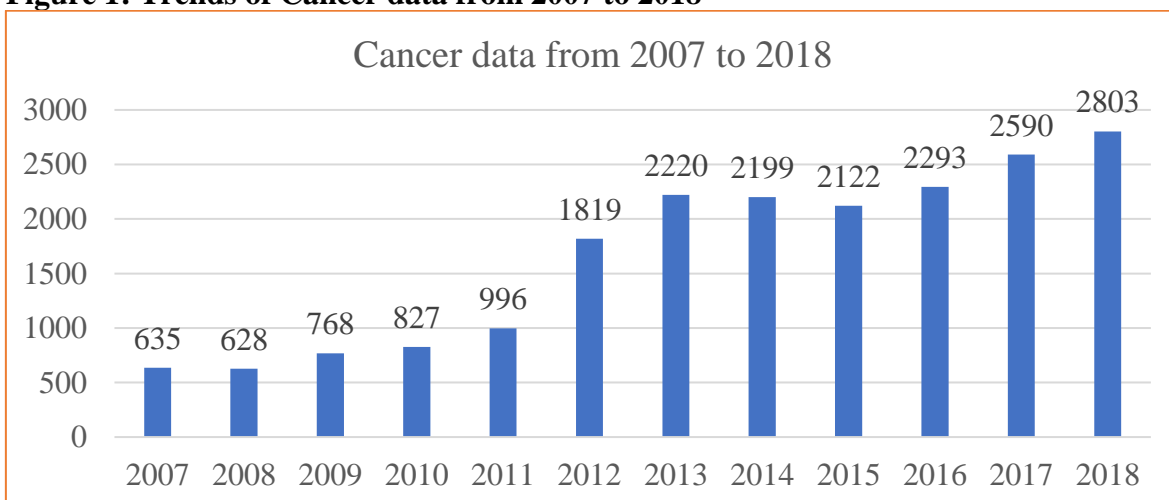
The above information can only be provided by a population-based cancer registry. However, estimates can show the potential disease burden and its distribution. According to the Globocan report 2018, supported by the WHO, approximately 10,704 new cancer cases and 7,662 cancer related deaths were estimated in Rwanda.¹

Table 1: Summary statistics on cancer in Rwanda (Globocan 2018)¹

	Male	Female	Both sexes
Population	6,130,650	6,370,514	12,501,164
Number of new cancer cases	4,520	6,184	10,704
Age-standardized incidence rate (World)	130.9	144.8	136.4
Risk of getting cancer before the age of 75 years (%)	12.67	14.45	13.5
Number of cancer deaths	3,356	4,306	7,662
Age-standardized mortality rate (World)	105.2	107.3	104.8
Risk of dying from cancer before the age of 75 years (%)	10.10	11.13	10.56
5-year prevalent cases, adult population	7,113	10,884	17,997
Top 5 most frequent cancers (ranked by number of new cases)	Prostate	Cervix	Cervix
	Liver	Breast	Breast
	Stomach	Colorectal	Colorectal
	Colorectal	Stomach	Stomach
	Kaposi sarcoma	Liver	Liver

Currently, Rwanda is strengthening its National Cancer Registry, which is built on previous registry information collected from teaching hospitals between 2007 and 2014, in order to provide reliable information on cancer burden in the country. Today, with Phase I of the registry's implementation completed to establish a Kigali City population-based Cancer Registry, the registry now collects data from all teaching hospitals (RMH, CHUB, CHUK, and KFH), Butaro Cancer Centre; all district hospitals in the city of Kigali; selected private clinics and laboratories in Kigali; and Rwinkwavu and Kabgayi hospitals. Below are preliminary data from the current data cancer registry database as of 2018.

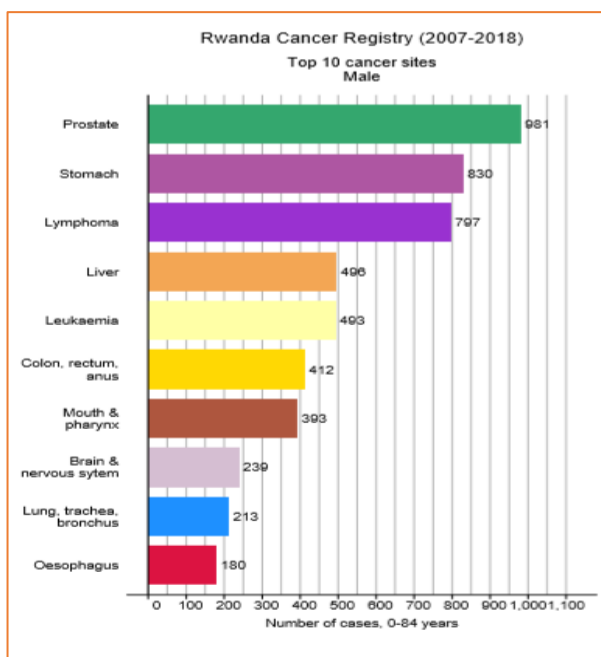
Figure 1: Trends of Cancer data from 2007 to 2018



The above preliminary data shows that that annual cancer cases in the city of Kigali and at select hospitals that deliver cancer care have been increasing, with a rise from 635 cases in 2007 to 2,800 cases in 2018.

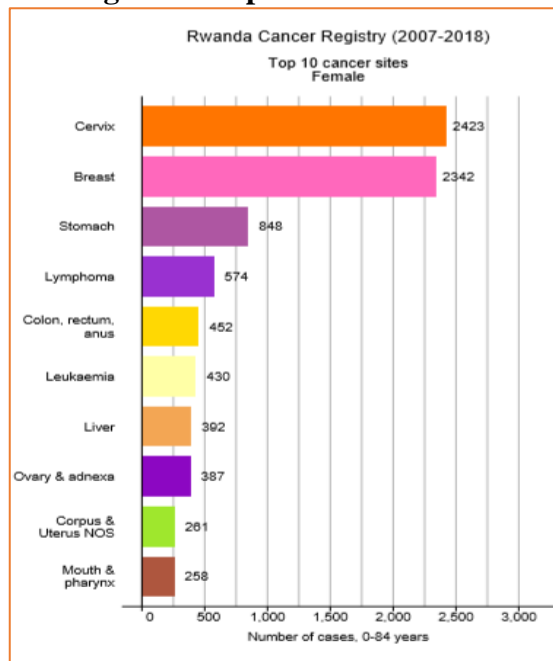
The following figures describe the different tumour sites per sex in the available data.

Figure 2: Top 10 cancers in Males



From 2007 to 2018, males were most frequently diagnosed with prostate, stomach, lymphoma, liver, and leukaemia cancers.

Figure 3: Top 10 Cancers in Females



In females, the most frequent cancers are cervix, breast, stomach, lymphoma, and colon-rectal cancers.

According to data from hospitals, most patients with cancer present at advanced stages, leaving little chance of being cured. A study done on breast cancer care at BCCOE revealed that 20% of patients presenting had stage I or II disease at diagnosis, 46% had locally advanced (stage III) disease, and 31% had metastatic disease.⁵ This delayed presentation and late diagnosis is likely due to both patient and system factors; patients may be delaying to seek care for a number of logistical and psychosocial reasons and the diagnosis and care delivery system may delay to make the diagnosis and initiate treatment. In a study in Rwanda in 2015, Pace et al. looked at delays in breast cancer presentation and diagnosis, finding a median total delay of 15 months, and median patient and system delays both of five months.⁶

This data on breast cancer clearly shows the need for increased effort in early detection, which can be tackled by building awareness through programmes and education for the general community, patients, and Healthcare Providers (HCPs) in Rwanda.

2.2. Risk factors for Cancers

A number of cancers are associated with risks from environmental, lifestyle, or behavioural exposures.⁷ Tobacco use, alcohol use, unhealthy diet, and physical inactivity are significant behavioural cancer risk factors that are contributing to the worldwide rise in cancer incidence; it is thought that more than 30% of cancer deaths could be prevented by modifying or avoiding key risk factors.⁷ According to WHO global estimates, approximately one third of cancer deaths are due to the five leading behavioural and dietary risks including the following: high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use, and alcohol abuse.⁷ Tobacco use is the most important risk factor for lung cancer, causing upwards of 22% of global cancer deaths⁷ and an estimated 85% of global lung cancer deaths.⁸

The Rwanda “Non-Communicable Diseases Risk Factors Report,” conducted from November 2012 to March 2013 on a representative sample of 7,240 males and females aged 15-64 years revealed a number of important national findings. Current tobacco smokers were 12.8%, while 85.8% had never smoked a cigarette in their life. Current alcohol drinkers (defined as any alcohol consumption in the past 30 days) were 41.2%, with an average of 2.6 drinks per occasion while 30.5% of men and 17.1% of women had binged on alcohol in the past 30 days. Overweight people was 17.1% in total with overweight (BMI \geq 25: 14.3%) or obese (BMI \geq 30: 2.8%) and the highest prevalence in women and in urban areas. Low fruit and vegetable intake was pervasive, with 99.1% of participants consuming less than five servings of fruit and/or vegetables per day. The frequency, duration, and intensity of physical activity in Rwanda was high, with the majority of physical activity being work-related; this is likely helping to protect Rwandans’ from NCDs.⁹

Certain chronic infections can also be risk factors for cancer, this has relevance in low and middle-income countries. Hepatitis B virus (HBV), hepatitis C virus (HCV), and certain types of human papillomavirus (HPV) increase the risk for liver, cervical, and head and neck cancer, respectively. Infection with HIV substantially increases the risk of certain types of cancer, such as cervical cancer and Kaposi sarcoma. Viral infections such as HBV/HCV and HPV are responsible for up to 20% of cancer deaths in low- and middle-income countries.⁷

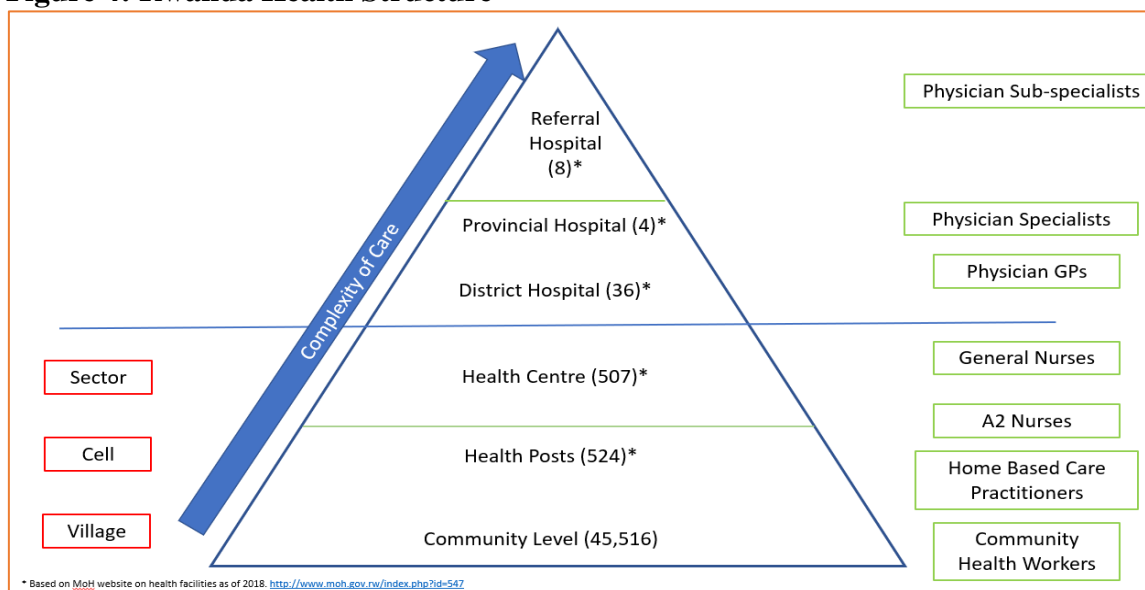
National surveys have found a number of these infectious agents causing cancers to be prevalent in Rwanda. Overall, human papillomavirus (HPV) prevalence was 34 % in women between 18 and 69 years, while the age-standardised prevalence for women with high-risk HPV infection was 22 %.¹⁰ A study done among HIV-positive patients seeking care in an urban HIV clinic in Rwanda found that the prevalence rates of active HBV infection and anti-HCV antibodies were high at 5.2% and 5.7%, respectively. Additionally, almost half of all patients (42.9%) had been exposed to HBV at some stage during their lifetime.¹¹ The prevalence of HIV is low due to targeted efforts to reduce and control HIV. Today, only 3% of the general population is estimated to have HIV, placing Rwanda at a significantly lower burden than many neighboring countries.¹²

2.3. Access, quality, and cost of services

In Rwanda, health prevention and services are delivered through a comprehensive, integrated, multi-tier model to ensure equitable access to care. Rwanda’s health system is comprised of both public and private facilities, with the Ministry of Health (MOH) in charge of setting up policies, and the Rwanda Biomedical Centre (RBC) tasked to coordinate the implementation of health programmes at the public sector’s central level. Geographic equity lies at the forefront of the system’s structure and national facility layout, with the population living within 5 km of the closest health centre.¹³ In terms of accessing care, a patient’s journey starts in the community through community health workers, who link the patient to care, or an individual’s decision to seek care at the local health post or health centre. Each level of health facility treats patients according to its package of services and each level of care refers patients who need advanced management.

To ensure quality of care and sustained, equitable access, the Ministry of Health defines and updates its health sector’s package of services according to standard-of-care, evidence-based treatments, new evidence, and available capacity. Approved services are covered by public and private health insurances, with the patient paying between 10 and 15% of the cost of services depending on socioeconomic status—the remaining amount is covered by insurances.

Figure 4: Rwanda Health Structure



Source: Ministry of Health, Republic of Rwanda, 2018

2.3.1. Cancer Prevention

Current cancer patterns in Rwanda indicate that a significant proportion of the future cancer burden may be prevented by planning and implementing prompt preventive actions as well as early detection and linkages to care. Future increases in population and aging are expected to contribute to further increases in the cancer burden unless well planned prevention, early detection, and quality treatment interventions are equitably scaled up across the country.

Of the more frequent cancers in Rwanda, Kaposi sarcoma, cervical, and oesophageal cancers are eminently preventable, whereas control of breast cancer and non-Hodgkin lymphoma predominantly relies on early detection and appropriate treatment. The current status of various cancer prevention initiatives, through the prevention and control of risk factors, is described in the following sections.

Tobacco Control

Currently, the Government of Rwanda, in collaboration with several multisector stakeholders, is implementing and enforcing the WHO/FCTC. This includes different tobacco laws and orders focused on increasing tobacco taxes; inciting business owners to comply with laws and regulations on tobacco control; reducing and possibly eliminating exposure to second-hand smoke; promoting smoking cessation and preventing smoking initiation; and preventing under-18 persons from any contact with tobacco products.

Alcohol Control

Locally-produced alcohol is affordable and accessible to a large majority of the Rwandan population. Despite high taxation on commercially produced alcoholic drinks, the population's large-scale consumption of locally-brewed alcohol poses several challenges for alcohol control in Rwanda. There is a need to increase awareness in the general population on the harmful use of alcohol, as there is currently no significant media advocacy targeted at raising community awareness against alcohol abuse.

Control of Hepatitis B & C viral infections

Control measures for Hepatitis B & C viral infections include universal HBV infant immunization and early detection and treatment of HCV and HBV chronic infections. Hepatitis B vaccination is part of the expanded programme of immunization in Rwanda, which was launched in 2002 and has successful coverage rates since. This is exemplified by WHO-UNICEF's recent reports that third-dose (HepB3) coverage among one-year-old infants in Rwanda was at an impressive 97% in 2018.¹⁴

Given the frequent co-infection of HBV and HCV in HIV-positive patients, HBV vaccination is also provided to people living with HIV (PLHIV) and health care personnel in Rwanda. Vaccines have also been availed in all health facilities so that the general population has access at a low cost. Negotiations with pharmaceutical companies have also increased access to Direct Acting Antivirals (DAAs) for HCV treatment and patients are now getting medications at a reduced rate with the support of some health insurances.

Prevention of human papillomavirus (HPV) infection and cervical cancer by vaccination

Cervical cancer is caused by persistent infection with oncogenic types of HPV. Cervical cancer can be prevented by HPV vaccination and by screening (with Pap smear, HPV DNA testing, or Visual Inspection with Acetic Acid [VIA]). In Rwanda, young girls began receiving HPV immunization started in 2011. After only two years of implementation, the national coverage in girls aged 12 years reached 93% and remains high today.¹⁵

Awareness about risk factors and early detection in the general population

At the population level, prevention strategies aiming at reducing the risk of cancer is being strengthened through various communication channels, including radio, television, newspapers, and social media. Cancer awareness sessions are also conducted during monthly community work (Umuganda), a time when people gather together in each village to give back to the community. In addition, the Ministry of Health is partnering with church and local leaders to convey awareness messages to help educate the population about the risk factors for cancer and the importance of early detection and treatment. Physical activity is also being promoted through mass sports activities in cities through an initiative called “Car Free Day,” which now happens twice a month. The Government’s commitment to the health of its people is evident, shown through additional high-level orders, such as the Prime Minister’s order for protected time outside of work for all civil servants every Friday afternoon for mandatory sports activities.

2.3.2. Early detection of cancers

Good treatment outcomes for cancers are associated with the detection of the disease at an early stage. In March 2014, Rwanda initiated an annual community check-up for NCDs by using a questionnaire containing major signs and symptoms of NCDs. This check-up is conducted with women aged 35 years and above and men aged 40 years and above, targeting the age groups within the population at highest risk for cancer.⁹ The questionnaire is based on self-reporting and is administered at all health centres throughout the country through voluntary consultation and as well as provider initiation. The questionnaire includes items related to cancer symptoms, with specific questions to identify breast, cervical, prostate, colorectal, and other external solid tumours. When one of the questions is positive for concern for cancer, the client is referred to upper level facilities to further evaluate, confirm the diagnosis, and initiate the treatment on time. Due to their high burdens, Rwanda has given priority to cervical and breast cancer early detection, both of which follow nationally established guidelines.

Screening for cervical cancer and treatment of cervical pre-cancerous lesions

Women between 30 and 49 years are invited through awareness campaigns to be screened at health centres and district hospitals using visual inspection with acetic acid (VIA). Treatment of precancerous lesions by cryotherapy or loop electrosurgical excision procedure (LEEP) (according to the lesion size) at the time of diagnosis is also performed. In case of invasive or advanced cancer, women are referred to the tertiary hospital for treatment. Biopsies are taken at secondary and tertiary levels of care. Currently, 29 hospitals (district, provincial, and referral) and 249 health centres in their catchment areas have cervical cancer screening services. Pap

smears are being also done at referral hospitals with pathology laboratory. Despite this successful development of services, coverage of screened women in Rwanda is still low; the system must be further decentralized and services must be strengthened in quality in order to link and engage women in care.

Early detection of breast cancer

As there is not yet a nationally organised mammography-based breast cancer screening programme in Rwanda, nurses and doctors at health centres and district hospitals perform clinical breast examination to women and refer suspected cases to teaching or tertiary hospitals for confirmation of the diagnosis. Diagnostic mammography facilities are available in tertiary and teaching hospitals.

2.3.3. Diagnosis of cancer

The infrastructure for diagnosis and staging of cancers is available in tertiary and teaching hospitals as well as BCCOE hospital. However, these services need to be upgraded.

The existing diagnostic capacity consists of pathology (cytology, histology), laboratory (haematology, biochemistry, tumour markers), endoscopy (digestive and bronchoscopy) and radiology (ultrasound, conventional X-rays, mammography, computed tomography [CT], and magnetic resonance imaging [MRI]).

Standard laboratory techniques are available across the country, including biochemistry and haematology. Tumour markers are performed in tertiary and teaching hospitals and BCCOE. Centres providing pathology services include CHUK, CHUB, KFH, RMH and BCCOE. Immunohistochemistry is available in CHUK, RMH, KFH and BCCOE. There are currently no advanced pathology services (diagnostic molecular pathology) in the country.

The University of Rwanda, through the Human Resource for Health programme, opened a Master's Degree in Medicine (MMed) Programme in pathology. Through this programme, an increased number of pathologists are available for the country; as of 2019, 16 pathologists have graduated and are now working in public hospitals in Rwanda.

There are 6 certified radiologists and an estimated 200 radiology technicians throughout Rwanda. There is access to basic imaging platform, including conventional x-ray, ultrasound, CT, MRI and endoscopy (endoscopy is indicated within imaging for ease of reference). Advanced radiology platforms (interventional radiology, image-based biopsy) are not widely available, and nuclear medicine in diagnosing of cancer is not yet available in Rwanda.

2.3.4. Treatment of Cancer

In Rwanda, cancer treatment is provided at tertiary level facilities. At present, five hospitals are delivering cancer care in varying capacities. These facilities include CHUK, CHUB, RMH, KFH, and BCCOE. These hospitals currently provide cancer treatment capacity consisting of surgery, chemotherapy and radiotherapy. Multidisciplinary tumour boards are available in most

tertiary hospitals to allow for cancer cases to be reviewed to ensure standard of care and quality. Multidisciplinary teams of HCPs at the tertiary level of care are tasked with evaluating the patient early in the treatment process and guiding subsequent treatment and follow-up as needed. The team members are responsible for implementing clinical management protocols in accordance with national guidelines.

All relevant HCPs should be represented in the team, including radiation oncologists, surgeons, medical oncologists, paediatric oncologists, pathologists, haematologists, radiologists, other relevant physician specialists, oncology nurses, and psychosocial and rehabilitation staff.¹⁶

Surgery is available and is practiced in many of the hospitals, especially in tertiary and teaching hospitals and BCCOE. Surgical specialists operate on different cancers depending on their expertise (General surgeons, Ear, Nose and Throat specialists/surgeons, Obstetrics and Gynaecology specialists, Urologists, etc.). However, few doctors in the country have had access to specialised training in surgical oncology.

Chemotherapy is available in two hospitals in the country: BCCOE and KFH. The BCCOE treats the majority of cancer patients in Rwanda with the support of “Partners In Health” (a US based NGO) also known as Inshuti Mu Buzima (IMB), where patients with cancer are able to receive chemotherapy free of charge. Approximately 1,200 new cancer patients are treated at BCCOE every year. KFH also provides chemotherapy to a small number of privately-insured patients as well as those paying out of pocket.

Thirty-one chemotherapeutic drugs are listed on the National Essential Medicines List. However, their procurement and use in public hospitals has not yet been initiated. National Cancer Guidelines have been written based on National Comprehensive Cancer Network (NCCN) harmonized guidelines for Africa. However, they are still in the approval process and not yet implemented in the country. Though Rwanda has been successful in accessing training for a number of oncologists (clinical/radiation, paediatric and surgical) in recent years, numbers of such specialized professionals are still low; additional oncology trained medical professionals are needed to meet the care delivery plans to control the country’s current burden of disease.

The first national radiotherapy centre in Rwanda was recently established, enabling access to standard of care treatment regimens for a number of types of cancers. With two linear accelerator machines, the radiotherapy centre at RMH began routinely administering treatment in 2019, increasing access to radiotherapy services for Rwandans.

2.3.5. Palliative care

As most patients with cancer in Rwanda present at advanced stage, palliative care is a high priority in the management of cancer in Rwanda. The national palliative care approach is implemented through a model of integration of palliative care services within the existing health care system throughout the country.

At present, palliative care dedicated desks have been established in teaching and tertiary

hospitals. Multidisciplinary teams composed of medical doctors, nurses, mental health technicians, psychologists, anaesthesiologists, and social workers manage from these desks, taking care of patients in need of palliative care. In all district hospitals, similar multidisciplinary teams have been trained and are now providing care to patients with cancer. In the framework of decentralising palliative services in order to bring services nearer to the population, two nurses have also now been trained in palliative care in each health centre. A community-based health worker “Home Based Care Practitioners” has been developed and is being piloted in 9 districts to provide palliative care services at home; teach the population about NCDs; and conduct a verbal autopsy for people who have died at home. Oral morphine solution made from powder locally produced by Labophar is now available in Rwanda and given free of charge to patients with cancer.

Palliative care NGOs and hospices run by faith-based organisations complement efforts of public facilities by providing palliative care to Rwandans within the community.

2.4. Financing and governance of cancer control

The financing of cancer control activities is integrated into the Ministry of Health and Rwanda Biomedical Centre budget, which is allocated by the Ministry of Finance. Several partners are also supporting different cancer interventions based on their expertise. The oversight of implementation of different cancer prevention and control interventions is done by the Ministry of Health through Rwanda Biomedical Centre.

2.4.1. Financing of cancer control

An important pillar of Rwanda’s health strategy is universal health coverage. To enable this universal health coverage, Rwanda began a national community-based health insurance (CBHI) scheme known as *mutuelles de santé* in the 2000s. As of September 2019, 80% of the population was enrolled in CBHI,¹⁷ with another 11% cumulatively covered by civil service, military, and private insurance plans. In addition to annual premiums, subscribers pay 10% co-payments for community health insurance and 15% for other insurances at the point of care for services received.

There is no earmarked budget for cancer in Rwanda. Cancer control financing follows the same principles as the entire health sector financing. In public facilities, the patient contributes 10-15% of the cost of the services depending on the insurance the patient is using. The only exception to this is at BCCOE, where chemotherapy is given free of charge through the long-standing support of the American NGO, Partners In Health.

Cancer care must be integrated into the larger health sector’s health financing system, for the system and for patients, in order to be equitably accessed and sustainable for all. Given the high cost of cancer diagnosis and treatment services, there is a need to put mechanisms in place for cancer care in Rwanda to ensure universal access to cancer care services.

2.4.2. Structure of governance for cancer control activities

At the national level, cancer control activities are coordinated by the Cancer Diseases Unit under the NCDs Division within the Rwanda Biomedical Centre, which is the implementing agency of the Ministry of Health. At administrative district level, cancer control activities are integrated into other health programmes.

The National Cancer Technical Working Group (TWG) functions as a National Cancer Control Steering Committee. This group is comprised mostly of clinicians and meets on a quarterly basis. Ad hoc meetings are also convened when needs arise. Though this TWG creates a foundation of national commitment and communication, there is a need to broaden it to include other stakeholders, such as partners from civil society, non-governmental organisations, and cross-sector relevant entities that operate within cancer control.

2.5. Barriers to access to cancer services

There is a significant difference between the estimated cancer incidence and mortality by WHO/IARC and the numbers reported by health facilities in Rwanda every year; the difference can likely be attributed to a number of varying factors that prevent people from accessing cancer care services in Rwanda. Some of these factors are described below:

- **Low level of knowledge about cancer signs and symptoms in the community:** Cancer awareness in the public is still low, many patients with cancer or suspected cancer still consult traditional healers. By the time they present to the facility, many of these patients have very advanced stages of disease because of this delay in seeking medical care. In addition, it is believed that many people may be dying in the community before reaching a health facility without ever being diagnosed with, and thus registered as having, cancer.
- **Geographic barrier:** Despite continued commitment to decentralization and strategic placement of services, hospitals that have the capacity to diagnose and treat cancer are still not equitably located throughout the country. Facilities providing cancer services are concentrated in Kigali, the capital city, and in the rural location of BCCOE in the northern countryside of the country, which does not allow easy geographic accessibility for the population. Several patients with cancer are lost to follow-up within the referral process from health centre to the referral hospital, likely influenced by this geography
- **Financial barrier:** The treatment of cancer is expensive, far above the current GDP per capita of USD \$740 of Rwandan people. Even at BCCOE, where chemotherapy is free, not all cancer types are treated, and they do not have the capacity to treat the entire population of patients in need. In addition, patients with cancer may still need to attend other centres for diagnosis/staging and/or treatment, which presently incurs a personal cost.
- **Lack of comprehensive services:** Though facilities have expanded, comprehensive cancer treatment services are still not delivered at every health facility.

3. Objectives of the National Cancer Control Plan (NCCP)

3.1. Goal

Reduce cancer-related morbidity and mortality in Rwanda.

3.2. Objectives

1. Reduce the incidence of preventable cancers
2. Increase the rate of early detection and screening of cancers
3. Improve access for cancer patients to quality cancer diagnosis and treatment services.
4. Provide access to quality pain management and palliative care services for cancer patients.
5. Strengthen cancer information system and research.
6. Strengthen Coordination, Partnership and Financing for Cancer Control

3.3. Guiding principles

The planning, implementation, monitoring and evaluation of the national strategy for cancer control and prevention are underpinned by the following principles:

- i. **Commitment:** Government leadership and commitment towards cancer control.
- ii. **Integration:** Decentralisation of service delivery and full integration into the existing health care system.
- iii. **Equitable access:** Ensuring of reliable and equitable access for all people, including the most vulnerable.
- iv. **Evidence-Based:** Implementation will be guided by available evidence to ensure that interventions are standard of care, high-quality, and cost effective.
- v. **Health systems:** Strengthening and utilisation of the health systems, including those within the community to improve service delivery.
- vi. **Partnership:** Strengthening partnerships at all levels, including involvement of CSOs, NGOs, local and international partners; and research institutions.
- vii. **Education/Patient Awareness:** Increase the knowledge and information available to both the general community and HCPs about reducing risk factors for cancer and the importance of screening and early detection.

4. Strategies for achieving the objectives

During the implementation of this plan, the focus moving forward will be on the following priority cancers:

- Breast cancer
- Cervical cancer
- Prostate cancer
- Head and neck cancers
- Haematopoietic cancers
- Gastrointestinal cancers, including liver cancer
- Childhood cancers
- Kaposi Sarcoma
- Gestational Trophoblastic Disease
- Lung cancer

The above cancers have been chosen according to their incidence in the country, national capacity to treat them, and the ability to prevent a number tackling their associated risk factors.

4.1. Reduce the incidence of preventable cancers

Cancer shares common risk factors with other NCDs, such as cardiovascular diseases, diabetes, chronic respiratory diseases, and alcohol dependence as well as additional related problems such as reproductive health, HBV, HIV/AIDS, occupational and environmental health. Prevention of cancers through the larger NCD risk factor prevention frameworks thus offers the greatest public health potential and the most cost-effective, long-term method of cancer control.¹⁸

Cancer primary prevention implies planning and implementation of strategies aimed at the reduction of cancer's underlying risk factors. The main risk factors are HPV infection, HBV & HCV and helicobacter pylori; tobacco use, excessive alcohol use, dietary factors including low fruit and vegetable intake, physical inactivity, overweight and obesity; and radiation. Apart from primary prevention, the cervical cancer screening and treatment of pre-cancerous lesions will help to reduce the incidence of invasive cervical cancer in women.^{7,18}

The reduction of cancer incidence will be achieved through controlling modifiable cancer related risk factors and improving access and coverage to cervical cancer screening.

4.1.1: Control of modifiable cancer related risk factors

The following strategies will contribute to prevention by aiming to reduce exposure to risk factors. By doing so this primary prevention aims to reduce the incidence of cancers as well as other non-communicable diseases.

4.1.1.1. Awareness of general population on modifiable risk factors exposing to cancer

The general population's awareness of cancer – from its risk factors, to its early symptoms, to its care and treatment- will be integrated in the newly developed framework to build general

awareness on NCDs risk factors. The cancer control programme will contribute to this by providing evidence-based information and by participating in the development and dissemination of NCDs related awareness messages and education.

Expected results

The knowledge, attitudes, and practices of general population about modifiable cancer risk factors are expected to improve.

Strategic actions

- Develop and integrate cancer related education and awareness messages in the package of services provided at all levels of health care provision.
- Engage young people in prevention and awareness activities
- Train primary healthcare providers on prevention of cancers (preventive methods, signs and symptoms) to improve early detection. various channels: mass media, public actions such as Umuganda, local leaders, churches etc.
- Prepare and disseminate awareness messages to the general population using different communication channels.
- Incorporate Information, Education and Communication (IEC) and Behavioral Communication and Change (BCC) for prevention of modifiable cancer risk of community programmes especially Community Health Workers.
- Mainstream cancer prevention strategies in the social cluster ministries activities and civil societies.
- Use of Information Technology (smart phones, ...) in disseminating cancer prevention messages

4.1.1.2. Prevention of infectious diseases leading to cancers.

Worldwide, infections are linked to about 15% to 20% of cancers. This percentage is even higher in developing countries.¹⁹ In Rwanda the common cancers associated with infectious agents are cervical cancer (HPV), Gastric cancer (Helicobacter Pylori), Kaposi sarcoma (HIV) and Liver cancer (HBV, HCV).²⁰ Preliminary data from the cancer registry, which collected data in referral hospitals in Rwanda between 2007 and 2018, showed that gastric cancer, cervical cancer, liver cancer, and Kaposi sarcoma represented 29% of all cancers (9%, 13%, 4% and 2% respectfully). Currently, the immunization rates of HPV in young girls and HBV in infants are very high; this immunization is coordinated by the Maternal and Child Health programme. HIV prevention and treatment and efforts to diagnose and treat Hep B&C viruses are under the HIV programme. The Cancer Diseases Unit at RBC programme will work closely with the above-mentioned programmes in the fight against associated infections, mainly by providing evidence-based information on the relationship between concerned infections and cancers and by participating in Technical Working Groups (TWG) and advocacy.

Expected results

- Optimisation of the rate of vaccination against HPV and HBV
- Reduction in health risk behaviours that expose one to infectious diseases leading to cancers
- Reduction of infection associated with cancers

Strategic actions

- Advocate for continued immunization of HPV in young girls of 12 years old and HBV in infants in order to maintain high coverage
- Advocate for high accessibility and coverage of immunization against HBV for the general population
- Participate in awareness activities to prevent the transmission of HPV, HBV, HCV and HIV viruses
- Diagnose and treat infectious diseases leading to cancers

4.1.1.3. Tobacco control

Tobacco use is a leading cause of cancer and of deaths from cancer. It is associated with various types of cancers, such as lung, oesophageal, laryngeal, oral, bladder, kidney, liver, stomach, pancreas, cervical and colorectal.²¹ According to the Rwandan “Non-communicable Diseases Risk Factors Report”, 19.2% of men and 7.1% of women were current tobacco smokers. Appropriate interventions should promote tobacco-smoking cessation and the prevention the exposure to harmful effects of tobacco.⁹ The Cancer Diseases Unit will closely work with other units in NCDs Division to carry out tobacco control interventions.

Expected results

Reduction in the prevalence of tobacco smoking.

Strategic actions

- Participate in enhancing the implementation of tobacco control legislation at all levels through multisectoral collaborations
- Participate in advocating for smoke-free environments in all indoor workplaces and public places
- Advocate for the incorporation of tobacco control into the school health programme, including in school curriculums
- Advocate for and increase public awareness of tobacco negative health effects
- Provide cessation and support services for smokers
- Advocate for further increase of tobacco taxes

4.1.1.4. Behaviour change for cancer prevention

Reduce unhealthy diet, physical inactivity, overweight and obesity

The prevalence of overweight, obesity, and physical inactivity is increasing worldwide, and the evidence base for a link between obesity and cancer is becoming clearer. Physical inactivity is a major contributor to the rise in rates of overweight and obesity in many parts of the world, and these risk factors independently increases the risk of a number of cancers, including cancers of the oesophagus, colon and rectum, breast in postmenopausal women, endometrium, and kidney.²² In Rwanda, the rate of people over the normal range of weight is 17.1%: overweight (14.3%) or obese (2.8%), with the highest prevalence in women and in urban areas. Diet may also be a factor, and fruit and vegetable intake is low nationally, with 99.1% rate of Rwandans eating less than five servings of fruit and/or vegetables per day.⁹ The Cancer Diseases Unit will work closely with other units in NCDs Division and other stakeholders to carry out different interventions towards reduction of unhealthy diet, physical inactivity and obesity.

Physical activity

Expected results

- Reduction in the prevalence of obesity and overweight by 5% by 2024.
- Increased level of physical activity in the general population

Strategic actions

- Participate in the development and implementation of national guidelines on physical activity.
- Participate in advocacy for physical environments that support safe active commuting and create space for recreational activities.
- Participate in the advocacy for physical activities in schools and workplaces.
- Scaling up existing physical activity initiatives, similar to Car Free Day, in rural areas.
- Participate in public awareness campaigns to educate on the benefits of physical activity for cancer prevention.

Nutrition

Expected results

- Increased consumption of vegetables and fruits by 20% by 2024.
- Increased knowledge of general population about nutrition.
- Improved behaviour of general population towards healthy diets.

Strategic actions

- Participate in the development and implementation of national dietary guidelines and nutrition policies.

- Participate in the promotion of farming of fruits and vegetables as well as the consumption of a variety of healthy foods (promote “Akarima k’igikoni,” meaning vegetables garden for all).
- Participate in public awareness on the benefits of healthy diets for cancer prevention.
- Participate in the advocacy for healthy diets in schools and workplaces.
- Participate in advocacy for prevention of marketing unhealthy foods (high-saturated fats and salty products) and drinks, such as sugary beverages.

4.1.1.5. Control of excessive consumption of alcohol

Alcohol use is a risk factor for many types of cancers, including cancer of the oral cavity, pharynx, larynx, oesophagus, liver, colorectal, and breast. Current alcohol drinkers (defined as any consumption in the past 30 days) in Rwanda are 41.2% (52.2% men and 31.5% women) with an average of 2.6 drinks per occasion. However, a concerning 30.5% of men and 17.1% of women had binged on alcohol in the past 30 days.⁹ To diminish this risk, the Cancer Diseases Unit will work closely with other units in NCDs Division and other stakeholders to carry out different interventions towards reduction of excessive consumption of alcohol.

Expected results

- Reduction of the prevalence of harmful use of alcohol by 10% by 2024.

Strategic actions

- Establishment of a National policy on alcohol consumption
- Participate in the development and dissemination of national policies guidelines on prevention and control of harmful use of alcohol.
- Participate in the enhancement of the implementation of the law on restriction of consumption of alcohol in children under 18 years old.
- Advocate for incorporation of awareness messages and information on the risks of alcohol consumption into the school health programme

4.1.1.6. Strategy 6: Control of environmental exposure to carcinogens

Environmental pollution of air, water, and soil with carcinogenic chemicals is estimated to account for the development of 1-4% of all cancers. Exposure to carcinogens also occurs via the contamination of food and water by chemicals, such as aflatoxins; such carcinogens are highly associated with liver cancers, dioxins, and asbestos. Occupational carcinogens are causally related to cancer of the lung, bladder, larynx, skin, oesophagus, and leukaemia. Ionizing radiation can cause almost any type of cancer particularly leukaemia, lung, thyroid and breast cancer. The Cancer Diseases Unit will work with stakeholders involved in the prevention of exposure to carcinogens through providing evidence-based information, participating in advocacy, and awareness events.

Expected results

- Reduction of exposure to environmental carcinogens arising from the environment, workplaces, and radiation.

Strategic actions

- Develop regulations on prevention of exposure to carcinogens.
- Engage media and the public through awareness campaigns.
- Participate in the development, dissemination and implementation of guidelines for the disposal and surveillance of toxic wastes such as industrial, nuclear and electronic wastes.
- Advocate for enforcement and strengthening of the legal framework to protect workers and general population from environmental carcinogens (minors etc.).
- Participate in the awareness for the reduction of the use of biomass and coal for heating and cooking at home and promote use of clean burning and efficient stoves.
- Advocate for promotion of protection of work place exposure through various avenues of communication.
- Advocate for establishment of regular screening of individuals exposed to occupation hazards that cause cancer.
- Provide information about sources and effects of all types of radiation.

4.2. Increase the rate of early detection and screening of cancers

Early detection of cancer greatly increases the chances of successful treatment and thus better outcomes. There are two major components of early detection of cancer: education to promote timely consultation for early diagnosis and screening.²⁵ Recognising possible warning signs of cancer and taking prompt action can lead to early diagnosis. Increased awareness of possible warning signs of cancer, among physicians, nurses, and other HCPs as well as among the general public can have a great impact on the disease. The goal is to reduce the incidence of advanced cancer diseases at diagnosis, reduce mortality, improve quality of life, and ensure that prioritised early detection services are provided in an integrated, equitable, and sustainable way.

At present, the cancers for which there is good evidence that screening can reduce mortality are breast, cervix, colorectal and, possibly, oral, and prostate cancers. In most low-resource countries, low-cost approaches to screening for breast and cervical cancer are the only screening activities likely to be considered.²⁵ As well as with breast and cervix cancer, there is good evidence that colorectal cancer screening can reduce mortality²⁵ and is therefore considered in Rwanda. Currently, the provision of cervical cancer screening and breast cancer early detection services are being integrated at the primary health care level. During the implementation of this NCCP, the provision of above mentioned services will be strengthened and scaled to all health facilities through creating women cancer screening clinics where both cervical cancer screening and breast cancer early detection services will be provided.

4.2.1 Screening of cervical cancer and treatment of pre-cancerous lesions

Cervical cancer is among the leading causes of cancer morbidity and mortality in Rwanda.¹ Cervical cancer is many times the result of untreated chronic HPV infection and can take between 10 to 20 or more years from the time of the HPV infection and the development of the invasive cancer, which gives an opportunity to screen women for cervical pre-cancerous lesions and provide treatment.²³ Available screening tests include a (HPV) test, visual inspection with acetic acid (VIA), and cytology (Pap test). Available treatments for pre-cancerous lesions include cryotherapy or thermal ablation, large loop excision of the transformation zone (LEEP/LLETZ), and cold knife conisation (CKC).²⁴ In Rwanda, the current strategy is to screen with VIA and treat pre-cancerous lesions with cryotherapy or thermal ablation.

Expected results

- HPV DNA based cervical cancer screening services are available in all health facilities
- At least 70% of eligible women are screened for cervical cancer by 2024
- At least 90% of women with cervical pre-cancerous lesions are treated by 2024

Strategic actions

- Awareness on prevention and screening of cervical cancer in the general population.
- Roll out of cervical cancer screening and treatment of pre-cancerous lesions in all health facilities.

- Introduction of HPV DNA testing for cervical cancer screening in health facilities.
- Capacity building of human resource for cervical cancer screening at all levels.
- Establish an effective referral mechanism for patients suspected of cervical cancer for timely confirmation of the diagnosis.
- Integrate cervical cancer screening into existing HIV and Maternal and Child Health services.
- Annual cervical cancer screening campaigns
- Electronic Medical Records system for Monitoring and evaluation of screening programs
- Introduce new technologies/innovations in cervical cancer screening when they are validated (e.g: Automated Visual Evaluation/Artificial Intelligence,)

4.2.2 Early detection of Breast cancer

Breast cancer and cervical cancer are the top two cancers diagnosed in women in Rwandan. Studies show that the majority of patients with breast cancer are diagnosed with advanced disease due to patient and health system delays, which negatively impact the treatment outcomes.^{5,6} Early detection strategies consist of population-based screening and building awareness about signs and symptoms to encourage presentation for care and timely consultation. Mammography is the recommended population-based screening tool for breast cancer but may not be cost effective in LMIC.^{26,27} The breast clinical examination is an alternative to mammography in resource-constrained regions and is recommended by WHO and other researchers.^{26,28} In Rwanda, there is not yet an organised breast cancer screening programme and the access to mammography is very limited. However, a number of health facilities now conduct breast clinical examination as part of the breast cancer early diagnosis strategy.

Expected results:

- Decrease Stage III/IV breast cancer from 77% to 25% by 2024

Strategic actions

- Awareness of behavioral change and sensitization on prevention of breast cancer in the general population using different communication channels.
- Establish a systematic clinical breast exam for women aged from 30 years at the health facility.
- Educate women on monthly breast self-examination.
- Increase access to breast ultrasound at district hospitals for suspicious breast mass.
- Increase access to mammography at referral hospitals.
- Capacity building for HCPs at all levels on breast cancer early diagnosis.
- Establish an effective referral mechanism for women suspected of breast cancer.
- Introduce the use of SRA innovative breast cancer screening devices at primary health care level.
- Introduce population based-mammography screening with Artificial Intelligence
- Introduce genetic testing and follow up in high risk population for breast cancer.
- Development of breast cancer screening guidelines

4.2.3. Early detection of childhood cancers

As in adults, cancers in children in Rwanda are often diagnosed at advanced stages. The most common childhood cancers are neuroblastoma, acute lymphoblastic leukaemia, rhabdomyosarcoma, and lymphomas. There are no known risk factors based prevention for cancers in children; awareness of signs and symptoms is key to improving early detection and linkages to treatment and care, thus improving the likelihood of a good survival rate when possible.

Expected results:

- Increased rate of childhood cancers detected at early stage.

Strategic actions

- Raise awareness and knowledge on the signs and symptoms of childhood cancer to encourage timely consultation for early detection.
- Train HCPs at all levels about the signs and symptoms of childhood cancers to encourage timely referral for confirmation of the diagnosis.
- Establish an effective referral mechanism for children suspected of cancer.

4.2.4 Early detection/screening of colorectal cancer

Colon and rectal cancers may be prevented through lifestyle changes as well as the early detection and removal of precancerous polyps and early stage cancers, which often take longer to develop before any symptoms appear²⁹. The aim of colorectal cancer screening is the detection of precancerous lesions (adenomas and serrated polyps) and early cancer lesions so that they can be treated early.

Expected results

- Increased rate of cancers diagnosed at early stages (I&II).

Strategic actions

- Public education to raise awareness and knowledge on the signs and symptoms of colorectal cancer to encourage timely consultation for early detection.
- Training of HCPs at all levels about signs and symptoms of colorectal cancer and timely referral for confirmation of the diagnosis.
- Introduction of Fecal Occult Blood Test and genetic testing in health facilities
- Increase accessibility to diagnostic colonoscopy and sigmoidoscopy in referral and teaching hospitals
- Development of colorectal cancer screening guidelines

4.2.5. Early detection of Prostate cancer

Screening for prostate cancer is indicated only in high-risk population; mass screening is not recommended. The focus will be put on public education about signs and symptoms of prostate cancer and the training of HCPs at health centres and district hospitals on the early detection of prostate cancer to encourage timely referral to diagnostic centres for suspected patients.

Expected results

- Increased rate of prostate cancers diagnosed at early stages (I&II).

Strategic actions

- Public education to raise awareness and knowledge on the signs and symptoms of prostate cancer to encourage timely consultation for early detection.
- Training of HCPs at all levels about signs and symptoms of prostate cancer and performing a good Digital Rectal Examination.
- Establish an effective referral mechanism for patients suspected of prostate cancer.
- Introduce genetic testing in high risk population
- Develop prostate cancer screening and early detection guidelines.

4.2.6. Early detection of other cancers

The aim is to diagnose cancer at early stages for better treatment outcomes. The focus will be put on public education about signs and symptoms of cancer and the training of HCPs at health centres and district hospitals on early detection of cancer as well as the timely referral to diagnostic centres for patients suspected of cancer.

Expected results

- Increased rate of cancers diagnosed at early stages (I&II).

Strategic actions

- Public education intended to raising awareness and knowledge on the signs and symptoms of priority cancers to encourage timely consultation for early detection.
- Training of HCPs at all levels about signs and symptoms of cancers and timely referral for confirmation of the diagnosis.
- Establish an effective referral mechanism for patients suspected of cancer.
- Develop guidelines for early detection of priority cancers.

4.3. Improve access for cancer patients to quality cancer diagnosis and treatment services.

Cancer treatment aims to cure the disease, prolong life, and improve the quality of remaining life after the diagnosis of cancer is confirmed by the appropriate available procedures. The most effective and efficient treatment is linked to early detection programmes and follows evidence-based standards of care. Effective diagnostic and treatment services use a multidisciplinary approach, which is integrated into the existing health system.

It has been established that patients with cancer tend to have improved outcomes when managed by a multi-disciplinary team of experts,¹⁶ and in specialised centres. A typical multi-disciplinary management team for a specific cancer should consist of the following: surgeon, clinical/radiation oncologist, medical oncologist/haematologist, radiologist, pathologist, oncology nurse, psychologist, social worker, dietician and pharmacist.¹⁶

During this timeframe of this NCCP, the establishment of effective referral mechanisms for cancer diagnosis and treatment and the capacity building of district hospitals and health centres in terms of cancer early detection and timely referral will be prioritized. Diagnostic and treatment services provided at tertiary and teaching hospitals and BCCOE hospitals will also be upgraded in terms of new equipment, human resources, and type of treatments provided.

Overall, the goal is to reduce mortality from common curable cancers and to ensure that prioritised diagnosis and treatment services are provided in an integrated, equitable, and sustainable way.

4.3.1. Cancer diagnosis and staging

The confirmation of cancer is done by pathological and haematological examinations on biopsies done by skilled professionals. After cancer is confirmed, medical imaging technologies are used to determine the stage of the disease; this guides treatment modalities. In Rwanda, pathological diagnosis and medical imaging technologies are still basic and in need of being further upgraded to meet quality standards for cancer diagnosis and staging.

Expected results

- Increased access of the population to high-quality cancer diagnosis services
- Increased access of the population to high-quality medical imaging technology for cancer staging.

4.3.1.1. Cancer pathological diagnosis

During the implementation of this NCCP, priority will be placed on upgrading existing pathology laboratories, introducing more accurate tests, training subspecialists, developing a laboratory network, and establishing a biopsy sample transportation system from district hospitals to pathology laboratories.

Strategic actions

- Establish an effective sample collection and transportation system from district and provincial hospitals to tertiary and teaching hospitals and BCCOE.
- Develop, adopt, and adapt guidelines and algorithms for pathology diagnostic workup of priority cancers in both children and adults for each level of care
- Train healthcare providers on guidelines and algorithms for pathology cancer diagnosis
- Upgrade pathology laboratory infrastructure to ensure the provision of updated and standards tests (IHC, Flow cytometry, PCR, etc.)
- Ensure adequate maintenance of laboratory equipment and continuous supply of consumables and reagents.
- Ensure accreditation and Quality Control of pathology laboratories.
- Establish external quality assurance program for all pathology laboratories in Rwanda
- Establish a telepathology system in all pathology laboratories.
- Standardize a reporting system and develop an inter-hospital information system (Pathology Laboratory Information System)
- Training adequate number of skilled histo-technologists and pathologists.

4.3.1.2. Cancer staging

Timely access to medical imaging techniques for cancer patients is still a challenge. During the implementation of this plan, priority will be placed on improving access to medical imaging technologies, training an adequate volume of human resources, and implementing adequate maintenance of equipment.

Strategic actions

- Upgrade medical imaging equipment and infrastructure for adequate staging of cancer diseases (including CT scan at BCCOE and MRIs at RMH and CHUK)
- Ensure adequate maintenance of medical imaging equipment and continuous supply of consumables.
- Establish a nuclear medicine unit at Rwanda Military Hospital.
- Develop and implement national guidelines for radiology diagnostic imaging and nuclear medicine imaging (aligned to IAEA guidelines on nuclear medicine)
- Develop, adopt, and adapt guidelines and algorithms for diagnostic imaging workup of priority cancers in both children and adults for each level of care
- Develop and manage national Quality Assurance (QA) guidelines (including safety) for various levels imaging services for cancer in collaboration with relevant regulatory bodies
- Improve referral system and access to available services e.g. advanced imaging modalities (CT scan and MRI).
- Ensure an adequate number of trained imaging technologists, skilled radiologists, interventional radiologists and nuclear medicine specialists.

4.3.2. Cancer treatment

Cancer treatment is highly specialised and requires the involvement of various disciplines. The main treatment options used alone or in combination are: surgery, radiotherapy, and systemic treatment (chemotherapy, hormonotherapy and biological or immunological therapy). These can be carried out only where there are adequate diagnostic and therapeutic facilities, staffed by trained medical professionals.

In Rwanda, the available treatment modalities are surgery, systemic therapy, and radiotherapy. During the timeframe of this NCCP, priority will be placed on upgrading the available services and expanding them in tertiary and teaching hospitals. Priority will also be placed on the creation of a comprehensive National Cancer Referral Centre in the City of Kigali.

Expected results

- Upgrade and expand existing cancer treatment services in the country.
- Increased access to safe and quality cancer treatment services

4.3.2.1. Medical Treatment of Cancer

In order to improve access to medical cancer treatments, the main actions within this NCCP will be the expansion of systemic therapy provision capacity in all teaching hospitals, the creation of a comprehensive cancer centre in the City of Kigali, and the improvement of financial access to cancer drugs and decentralization of oral treatment in provincial hospitals.

Strategic actions

- Establish oncology units at CHUB, and CHUK and provide essential chemotherapy drugs, hormone therapy, molecular targeted therapies and other supportive medicines to patients with cancer.
- Upgrade existing oncology unit at BCCOE
- Upgrade the Cancer Centre at RMH to be a comprehensive National Cancer Referral Centre.
- Ensure continuous central procurement of cancer drugs on the National Essential Medicine List.
- Advocate for inclusion of cancer systemic treatment and care on all health insurance schemes.
- Ensure access of the low-income population to available cancer treatments.
- Promote public and private partnerships in cancer treatment
- Establish psychosocial and nutritional support programmes for patients with cancer.
- Develop, disseminate, and regularly update national cancer guidelines and protocols
- Build the capacity of provincial and referral hospitals in follow up management of cancer patients and provision of oral treatment (hormonotherapy, etc.)
- Improve the referral pathway for patients with cancer.
- Establish functional tumour boards in all facilities to ensure multidisciplinary management of cancer

4.3.2.2. Surgical Treatment of Cancer

Surgery is essential in the management of solid tumour cancers, especially when diagnosed at an early stage. During the implementation of this NCCP, oncology surgical capacity will be upgraded by establishing new equipped theatres and training an adequate number of oncology surgeons.

Strategic actions

- Upgrade surgical oncology infrastructure (i.e theatres, beds, surgical equipment) at University Teaching Hospitals and BCCOE.
- Ensure continuous supply of oncology surgical consumables
- Upgrade Intensive Care Unit/services capacity at BCCOE

4.2.2.3. Radiation treatment of Cancer

During the implementation of this cancer control plan, access to radiotherapy services will be improved through availing brachytherapy capacity at Rwanda Cancer Centre (Rwanda Military Hospital).

Strategic actions

- Establish brachytherapy capacity at Rwanda Military Hospital
- Ensure an effective referral pathway for patients requiring radiotherapy
- Establish EMR system linking between all cancer Centres.

4.2.2.4. Capacity building for human resource for cancer management

In order to address the shortage of adequate and qualified human resources for cancer management, two strategies will be used:

- 1) Providing fellowships abroad to Rwandans to specialize in the management of priority cancers,
- 2) Partnership with the University of Rwanda in collaboration with foreign universities to initiate oncology fellowship programs in the country.

Strategic actions

- Train an adequate number of oncology health care professionals for cancer care including but not limited to: medical oncology, clinical/radiation oncology, medical physics, oncology nursing, oncology pharmacy, radiation safety, surgical oncology, gynaecology oncology, paediatric oncology, specialized pathology, and biomedical engineering.
- Develop CME courses in cancer management for in-service education of health care providers

4.4. Provide access to quality pain management and palliative care services for cancer patients

According to the World Health Organization, palliative care is an approach that focuses on improving the quality of life of patients and their families who are facing life-threatening illness. Palliative care seeks to prevent and relieve suffering through the early identification, thorough assessment, and treatment of pain and other physical, psychosocial or spiritual symptoms.³⁰

Palliative care includes prevention, early identification, comprehensive assessment and management of physical issues, including pain and other distressing symptoms, psychological distress, spiritual distress and social needs. In addition to the support for the patient, palliative care includes the provision of support to the family and the caregivers during the patient's illness, and in their own bereavement. Cultural values and beliefs of the patient and the family should always be respected.

Palliative care is urgently needed worldwide for people with cancer and other chronic diseases so that people do not suffer and die in pain. Palliative care is particularly needed in places where a high proportion of patients present in advanced stages of their illness and there is little chance of cure. Ideally, palliative care services should be provided from the time of diagnosis of life-threatening illness, adapting to the increasing needs of cancer patients and their families as the disease progresses into the terminal phase.³⁰ Effective palliative care services are integrated into the existing health system, ensuring access at all levels of care, especially community and home-based care.

During the implementation of this NCCP, access for patients with cancer to quality palliative care services will be improved. The cancer control program will work closely across other programs in NCDs Division in order to meet this goal.

Expected results

- Increased accessibility of patients with cancer to pain management and quality palliative care services.
- Integration of palliative care into existing health care system.

Strategic actions

- Review and update the national palliative care policy and guidelines.
- Improve public awareness of palliative care for patients with cancer at all levels of the community.
- Ensure adequate number of trained multidisciplinary health care providers in palliative care.
- Improve quality of life of cancer patients through the availability and accessibility of essential palliative care medicines and services.
- Provision of minimum social package to palliative care patients at all health facilities.
- Strengthen the integration of palliative care in health facilities (public and private).

- Integrate palliative care indicators in facility accreditation process.
- Enable a sustainable approach to achieve home-based palliative care.
- Develop networks, partnerships, and collaborations with local and international partners.

4.5. Strengthen cancer information system and research

There are three main types of cancer registries: hospital-based cancer registries, which collect cancer related information in a particular hospital; pathology-based cancer registries, which collect information on patients diagnosed with cancer in a pathology laboratory; and population-based cancer registries (PBCR), which collect data from the population from multiple sources (hospital, pathology, death registries, etc).

PBCR represents the gold standard for the collection and provision of information on cancer incidence in a defined population. PBCR's can provide an unbiased profile of the cancer burden in the population and how it is changing over time and can also have a unique role in planning and evaluating cancer control activities in the community.³¹

Since July 2018, cancer registration activities were restarted in Rwanda through the establishment of a population-based cancer registry for residents of Kigali city as well as patients within all cancer diagnostic and treatment centres. Over the next five years, there will be strengthening of population-based cancer registry in the City of Kigali and these facilities. This registry will be expanded to other provinces over time, with the overarching aim of establishing a National Cancer Registry that will cover the entire country.

In the coming NCCP timeframe, the cancer registry will be digitized, which will allow the registry to receive and track automated information from hospitals. In addition to the registry, improving the quality of data reported through HMIS will also be prioritized during this NCCP.

With the availability of higher quality, real time data, cancer-related research will be strengthened in Rwanda. This will inform cancer control planning and guide the development and implementation of evidence-based interventions. Collaborative research with local and international partners will be promoted.

Expected results

- Kigali Population Based Cancer Registry is strengthened
- A National Cancer Registry is established
- Cancer-related multidisciplinary research is promoted.

Strategic actions

- Strengthen the Kigali Population Based Cancer Registry
- Establish hospital-based cancer registries in all referral and teaching hospitals and BCCOE and link to cross-facility and national registries
- Integrate cancer registry into the existing health surveillance system.

- Establish a National Cancer Registry.
- Laboratory information system for pathology that can create direct reports for Cancer Registry
- Disseminate of cancer data to inform policy decision making.
- Create channels for dissemination of research on cancer e.g. annual cancer symposium
- Build capacity of health professionals in oncology grant writing and manuscript writing
- Ensure the availability of adequate resources for cancer registration.
- Develop a cancer research agenda and ensure adequate capacity for cancer research.
- Strengthen partnerships with cancer registry networks and research institutions (e.g. African Cancer Registry Network and International Agency for Research on Cancer)

4.6. Strengthen Coordination, Partnership and Financing for Cancer Control

The aim is to ensure enhanced coordination, effective partnerships and sustainable financing for cancer control. Coordination of cancer prevention and control activities ensures prudent use of available resources. This focuses efforts of all stakeholders towards a common goal for smooth running of programs and limits overlaps and redundancies.

Meaningful partnerships are needed to advance cancer control agenda in our countries will limited resources. Bringing partners together provide opportunity to share resources, identify gaps in resources, and plan activities to fill those gaps.

Adequate financing of cancer prevention in low- and middle-income countries remain a huge challenge as these countries have many competing priorities and yet infectious diseases are still a major health budget consumer. To achieve a sustainable cancer response, there is a need to increase domestic funding and also effective use of limited financial report from different partners as well as promoting the private sector investment into cancer prevention and control activities.

4.6.1. Cancer control coordination

During the implementation of this NCCP, the Cancer Diseases Unit under Non-Communicable Diseases Division in Rwanda Biomedical Centre/Ministry of Health will be responsible of overseeing all cancer control interventions done in the community, in different health facilities as well as by different partners.

Strategic actions.

- Strengthening the Cancer Diseases Unit in Rwanda Biomedical Centre (budget and human resources allocation)
- Advanced capacity building of Cancer Diseases Unit staff in cancer prevention and control
- Establishment of a strong multi stakeholder cancer technical working group/steering committee to work closely with Cancer Diseases Unit

To achieve a sustainable response, the implementation will be done in close collaboration with other ministries namely the Ministry of Agriculture, Ministry of Education, Ministry of Local Government, Ministry of Labour, Ministry of Trade & Industry, Ministry of Sports & Culture and Ministry of Finance. Additionally, development partners, the private sector, insurance

companies, Civil Society Organisations, professional associations, patient groups, and the media will also play a significant role in the implementation of this cancer control plan.

4.6.2. Partnerships in cancer control

Existing partnerships will be strengthened and new meaningful collaborations with different national, regional and international organizations will be created. In addition, we will create collaborations with other national cancer control programs in the East Africa Countries, in Africa and outside Africa to learn from each other as well as carrying out joint projects.

Strategic actions

- Strengthen existing collaborations/partnerships with different cancer control organizations
- Create new partnerships with different cancer control organizations
- Hold annual cancer symposium to share updates in cancer control in the country
- Apply for membership to relevant international cancer control institutions.

4.6.3. Financing of cancer control

In order to achieve a sustainable cancer control response, an increased and sustained budget allocation is required. Prudent investment and effective management of scarce resources is important to achieve more with fewer resources, value for money principle will guide resource utilization throughout the implementation of this plan. The private sector will be encouraged to invest in cancer control interventions through Public Private Partnership (PPP) financing model.

Strategic actions

- Increase domestic financing of cancer prevention and control interventions.
- Promote public private partnership in cancer control
- Integration of cancer prevention and control services into existing health system to avoid parallel programs and duplications
- Create innovative financing models for cancer control interventions
- Advocate for universal health coverage for cancer services through health insurance schemes.

5. Expected Results

The implementation of this NCCP is intended to reduce cancer mortality and morbidity in the country. This objective will be achieved through the strengthening of cancer control in Rwanda in all of its dimensions: prevention of risk factors, early detection, access to quality diagnosis, treatment and care including palliative, the development and use of a comprehensive modern system of evaluation and monitoring on the basis of statistical data quality.

Expected outcomes of the implementation of the NCCP by 2024 are:

- 1) Reduced incidence of preventable cancers
- 2) Improved rate of early detection and screening of cancers
- 3) Improved access for cancer patients to quality cancer diagnosis and treatment services.
- 4) Improved in access to quality pain management and palliative care services for cancer patients.
- 5) Strengthened national cancer information system and research.
- 6) Strengthened national coordination, partnership and financing of cancer control.

To achieve the expected results, it is essential to ensure an increase domestic financing of cancer control, lasting commitment from, and cooperation with, international development partners, both in providing technical and financial support during the implementation of this plan.

5.1. Indicators to monitor and evaluate the NCCP

Monitoring the implementation and evaluation of the NCCP will be conducted through the following indicators at both the local and national levels, where possible:

- Mortality rate from cancer diseases.
- Mortality rate from specific cancer sites.
- Incidence of preventable cancers under the NCCP.
- Proportion of women with cervical cancer detected at stage I, II, III, and IV.
- Proportion of patients with cancer detected at stage I, II, III, and IV.
- Percentage of women detected with breast cancer at stage I, II, III, and IV.
- Proportion of patients accessing quality cancer diagnosis services.
- Target turnaround time for pathology diagnosis of less than 5 days
- Availability of essential medicines and laboratory reagents for cancer treatment.
- Proportion of new patients with new cancer diagnoses receiving treatment (surgery, radiotherapy, chemotherapy) according to national guidelines.
- Availability of trained human resources compared to the needs.
- Percentage of patients with cancer receiving palliative services compared to those in need.
- Functional status of Automated Information System "Cancer Registry"
- Number of publications of scientific research results published and/or presented at national and international scientific events.

As this is the first National Cancer Control Plan and the data from the cancer registry are not yet complete to be able to calculate cancer incidence, morbidity and mortality, many outcome indicators don't have precise baselines and targets in terms of numbers or rates. The first two years of implementation, will serve to generate baseline information and during midterm review

in 2021, we will review the indicators to ascertain baselines and set the targets where accurate information is available.

6. NCCP cost estimate

The overall cost estimate for implementing the NCCP for the period 2020-2024 was made based on identified priorities and activities. Costing share was made on the basis of prices and tariffs available in 2019. The estimated cost of the Action Plan for the period 2020-2024 is 36,525,222,844 Rwf (38,856,620 USD); this is set for each year, depending on the source of funding and in accordance with activities.

Note that this cost mainly for setting up services, it does not include the cost for diagnosis and treatment (drugs, radiotherapy, surgery, consumables, diagnostic tests, ...) as they are supposed to be paid by the patient using existing health financing mechanisms. The only considered tests and consumables are for cervical cancer screening. In addition, salaries of staff working in different centres as well as running costs for the centres were not considered in this costing. The total cost might change as we get more detailed information on some items.

The amount in the tables below are in US dollars with exchange rate of 940.

6.1. Cost per program area

For this NCCP, seven programmatic areas have been considered for the costing. Early detection and screening of cancers has the biggest share of the budget with 45% of the total cost, followed by diagnosis and staging with 26% and treatment with 20% of the total budget for five years.

Table 2: Cost per program area

Program area	2020	2021	2022	2023	2024	Total	%
Prevention	254,390	700,106	255,927	258,446	255,927	1,724,796	4.4%
Early detection and screening of cancers	2,337,788	3,152,070	3,324,321	4,744,261	3,838,523	17,492,708	45.0%
Diagnosis and staging	296,976	1,880,689	2,289,622	5,621,616	31,406	10,120,310	26.0%
Treatment	1,967,890	3,761,297	964,463	774,259	241,791	7,709,701	19.8%
Palliative care	100,246	135,813	156,558	125,388	90,512	608,516	1.6%
Information system and research	155,738	204,390	234,863	194,717	241,557	1,031,266	2.7%
Coordination, Partnership and Financing for Cancer Control	38,971	32,588	32,588	32,588	32,588	169,324	0.4%
Grand Total	5,151,999	9,866,954	7,258,342	11,751,275	4,732,304	38,856,620	100%

6.2. Budget per cost category

The table below summarizes the budget by category of cost; these categories have been selected based on the nature of activities and the later have been allocated on where the fall most.

The top five cost categories are equipment that will consume 40% of the budget, construction of different infrastructure taking 17%, pharmaceutical products with 16% of the budget, Capacity building with 7.4% and awareness taking 4.2% of the budget.

Table 3: Budget by cost category

Cost category	2020	2021	2022	2023	2024	Total	%
Equipment	698,625	4,207,854	2,120,332	6,767,101	1,690,691	15,484,603	39.9%
Constuction cost	1,574,468	1,796,513	1,615,662	1,583,747	-	6,570,389	16.9%
Medicines and Pharmaceutical products	1,248,957	1,248,957	1,248,957	1,248,957	1,248,957	6,244,787	16.1%
Training	427,604	898,580	785,787	542,209	220,960	2,875,140	7.4%
Awareness	213,227	632,275	263,333	268,121	265,601	1,642,556	4.2%
Screening Campaign	322,002	322,002	322,002	322,002	322,002	1,610,011	4.1%
Mentorship	162,536	202,928	259,038	273,430	209,089	1,107,020	2.8%
Human resource	36,383	157,872	154,894	258,298	327,234	934,681	2.4%
Consumables	156,915	156,915	156,915	156,915	156,915	784,574	2.0%
ICT equiment and software	104,902	29,255	176,738	140,957	19,823	471,676	1.2%
Meeting	71,114	87,254	73,295	81,513	84,997	398,175	1.0%
Running cost	-	15,234	15,234	90,553	140,766	357,532	0.9%
Workshop	88,949	57,470	61,080	12,397	40,194	260,090	0.7%
Consultancy fees	41,242	48,771	-	-	-	90,013	0.2%
Membership	5,074	5,074	5,074	5,074	5,074	25,372	0.1%
Grand Total	5,151,999	9,866,954	7,258,342	11,751,275	4,732,304	38,856,620	100%

In summary, this budgeting has been done to estimate the needed resources to establish different cancer prevention and control services in the country and it will be mobilized by the Government of Rwanda in collaboration with different partners. The budget is subject to change as new information on some items is available as well as during the implementation of the plan.

7. Risks in implementation

In the present NCCP, various constraints and mitigation measures have been identified:

1) Limited financial resources: This will require strong advocacy to encourage decisions makers to allocate substantial funds for cancer control. Efforts will also be put into building strong partnerships with different international development partners and the private sector, including health insurances.

2) Shortage of qualified medical personnel for cancer care: The effects of this risk will be mitigated through establishing in-country training programmes for all health care professionals involved in cancer care. There will also be an emphasis on building partnerships with higher learning institutions and renowned cancer centres abroad. The country will also put in place attractive incentives to retain skilled professionals in service.

3) High prevalence of behavioural risk factors: Risk factors (alcohol, smoking, unhealthy diet, insufficient physical activity, environmental factors) will be addressed through the development and implementation of intersectoral collaboration mechanisms with central public authorities and local governments, as well as other national and international stakeholders in cancer control.

8. Procedures for monitoring, evaluating and reporting

The monitoring of the NCCP's implementation will be carried out by the Cancer Diseases Unit in Rwanda Biomedical Centre with support from the Technical Working Group (TWG) on Cancer Control composed of experts from different areas of cancer control.

Monitoring procedures will include the collection, interpretation, and analysis of the indicators detailed earlier in the NCCP. Implementation monitoring reports will be prepared annually by the Cancer Control Unit, endorsed in the TWG meeting, and submitted to the Director General of Rwanda Biomedical Centre, who in turn will officially submit to the Ministry of Health and then disseminated to all stakeholders.

At the end of 2021, a mid-term review of the NCCP implementation will be conducted. The evaluation procedure will be coordinated by the Ministry of Health and will be conducted together with the Technical Working Group on cancer and partners. Based on the results from the mid-term review the objectives and actions for the years 2022-2024 will be readjusted accordingly. Final evaluation of the NCCP will be done at the end of 2024.

9. Implementation framework

9.1. Cancer Prevention

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
Reduce the incidence of preventable cancers	Awareness of general population on modifiable risk factors exposing to cancer	Develop and disseminate standard cancer related education and awareness messages for health facility use	20%	100%	x	x	x	x	x	RBC	MOH, Other Ministries, Partners and CSOs	% of Health facilities (Hosp and HCs) with cancer education and awareness integrated in the package of services.
		Prepare and disseminate awareness messages to the general population using various communication channels	1) 0 2) 0 3) 4 4) 1	1) 30 2) 30 3) 100 4) 5		x	x	x	x	RBC	MOH, Other Ministries, Partners and CSOs	1. # of Directors of health trained 2. # of Church leaders trained 3. # of Radio and TV spots aired 4. # of World Cancer Days celebrated
		Include cancer awareness and prevention in the package of services for community health workers	5	30	x					RBC	MOH, Other Ministries, Partners and CSOs	# of Administrative districts with CHWs trained on cancer prevention
		Mainstream cancer prevention strategies in the social cluster ministries activities and civil society organizations.	6	30		x				RBC	MOH, Other Ministries, Partners and CSOs	# of CSOs and Ministries implementing cancer prevention activities
		Engage young people in prevention and awareness activities (Schools, Youth Clubs)	0	1		x				MINED UC	MOH, Other Ministries, Partners and CSOs	Cancer prevention module incorporated in the School Health Program/Training manual
		Train primary healthcare providers on prevention of cancers (preventive methods, signs and symptoms) to improve early detection.	0%	50%		x	x	x	x	RBC	MOH, Other Ministries, Partners and CSOs	% of health care providers (Hospital and Health Center) successfully completed online course on cancer prevention.
		Use of Information Technology (smart phones, ...) in disseminating cancer prevention messages	0	1		x				Partners	MOH, RBC, Other Ministries and CSOs	# of mobile application on cancer prevention developed

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)	
	Prevention and treatment of infectious diseases leading to cancers.	Advocate for continued immunization of HPV in young girls of 12 years old and HPV in infants towards maintaining the high coverage	0	10	x	x	x	x	x	RBC	MoH and Partners	# of planning meetings done with MCCH program	
		Advocate for high accessibility and coverage of immunization against HBV for the general population.	0	10	x	x	x	x	x	RBC	MoH and Partners	# of planning meetings done with HIV program	
		Treat infectious diseases leading to cancer, focus on Helicobacter Pylori	0	42		x					RBC	MoH and Partners	# of Health Care providers trained on protocols for management of peptic ulcers
		Treat infectious diseases leading to cancer, focus on HIV, Hep B&C, HPV	TBD	TBD	x	x	x	x	x		RBC	MoH and Partners	1. % of patients received HIV treatment 2. % of Hep B&C patients received the treatment
	Tobacco control	Participate in the enhancement of the implementation of legislation on tobacco control at all levels through multisectoral collaborations	1) 1 2) 0	1) 5 2) 10	x	x	x	x	x		RBC	WHO, CSOs, MoH, Partners and Other Ministries	1) # of meetings with stakeholders organized 2) # of Radio and TV sport produced and aired
		Incorporate tobacco control into school health programme	0	1				x			MINED UC	MoH, CSOs, Partners and Other Ministries	# of tobacco prevention messages integrated into school health program
		Provide cessation and support services for smokers	2	5	x	x	x	x	x		RBC	MoH, CSOs, Partners and Other Ministries	# of health facilities providing tobacco cessation services
		Advocate for further increase of tobacco taxes	0	1						x		RBC	MoH, CSOs, Partners and Other Ministries

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
	Behavior change for cancer prevention: Reduce unhealthy diet, physical inactivity, overweight and obesity	Participate in the development and implementation of NCDs national dietary guidelines and nutrition policies	1) 0 2) 0	1) 546 2) 20	x	x	x	x	x	RBC	WHO, MoH, Other Ministries, Partners, CSOs	1) # number of health care providers trained on the NCDs dietary guideline 2) # of radio and TV spots on NCDs dietary guidelines produced and aired
		Advocate for physical environments that support safe active commuting and create space for recreational activities	0	1		x				MOH	RBC, WHO, Other Ministries, Partners, CSOs	# of physical activity policy and guidelines developed
		Participate in the advocacy for healthy diets in schools and work places.	0	1				x		RBC	MoH, Other Ministries, Partners, CSOs	# of job aid and fact sheet developed on diet and cancer
		Participate in the advocacy for physical activities in schools and work places.	0	1		x				RBC	MoH, Other Ministries, Partners, CSOs	# of job aid and fact sheet developed on physical activity and cancer
		Scaling up existing physical activity initiatives like car-free day in all districts.	7	30	x	x	x	x	x	RBC	MoH, Other Ministries, Partners, CSOs	# of districts with functional car free day events
		Awareness on marketing of unhealthy foods (high saturated fats and salty products) and drinks like non-alcoholic and sugary beverages.	0	1		x	x	x	x	RBC	MoH, Other Ministries, Partners, CSOs	# of fact sheet developed and disseminated on unhealthy diet
	Control of excessive consumption of alcohol	Establishment of the national policy on alcohol consumption	0	1				x		MoH	WHO, MoH, Other Ministries, Partners, CSOs	# of national policy on alcohol consumption developed
		Incorporate awareness messages and information on the risks of alcohol consumption into the school health programme.	0	1				x		MINED UC	RBC, MoH, Partners, Other Ministries,	A section on alcohol awareness incorporated into School Health Programme
	Control of environmental exposure	Advocate for establishment of regular screening of individuals exposed to occupation hazards that cause cancer.	0	5	x	x	x	x	x	MIFOTRA	RBC, MoH	# of working advocacy sessions

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
	to carcinogens	Provide information about sources and effects of all types of radiation.	0	1						RURA	MoH, RBC, MIFOTRA	# of fact sheet developed
		Engage media and the public through awareness campaigns	0	10		x	x	x	x	RBC	MoH, MIFOTRA	# of radio and TV spots on carcinogens produced and aired

9.2. Cancer Early Detection

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)	
Improve the rate of early detection of cancers (stages I and II)	Screening of cervical cancer and treatment of pre-cancerous lesions	Roll out of cervical cancer screening and treatment of pre-cancerous lesions in all health facilities: Hospitals and Health Centers (equipment, consumables)	1) 12 2) 106 3) 83 4) 36 5) 12 6) 5 7) 150	1) 45 2) 500 3) 550 4) 550 5) 45 6) 45 7) 550						MOH	RBC. Partners and CSOs	1) # of hospitals with colposcopy machines 2) # of Health centers with adequate number of speculum (20/HF) 3) # of Health facilities with 2 head lumps 4) # of Health facilities with thermal ablation machines 5) # of hospitals with LEEP machine 6) # of hospitals with adequate number of cervical biopsy kits (5 kits/hospital) 7) # health facilities with standard gynecologic beds	
		Introduction of HPV DNA testing for cervical cancer screening in health facilities	1) 0 2) 0	1) 170 2) 1,500,000							MoH	RBC, CHAI, PIH, Other Partners and CSOs	1) # of POC HPV DNA machines available 2) # of women screened using HPV DNA test
		Capacity building of human resource on cervical cancer screening at all levels.	83	596							RBC	CHAI, PIH and other Partners	# of health facilities with adequate number of trained staff on cervical cancer screening
		Establish an effective referral mechanism for cervical cancer	0	1							RBC	CHAI, PIH and other Partners	Availability of SOPs for cervical cancer screening program

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
		suspected patients for timely confirmation of the diagnosis.										
		Integrate cervical cancer screening into existing HIV and Maternal and Child Health services.	83	550	x	x	x	x	x	RBC	CHAI, PIH and other Partners	# of health facilities with cervical cancer well integrated into HIV and MCCH programs
		Electronic Medical Records system for Monitoring and evaluation of screening programs	0	550	x	x	x	x	x	RBC	CHAI, PIH and other Partners	# of health facilities using cervical cancer screening module into OpenMRS
		Introduce new validated technologies/innovations in cervical cancer screening	0	1		x	x	x	x	RBC	CHAI, PIH and other Partners	Availability of artificial intelligence application used in cervical cancer screening
	Early detection of breast cancer	Establish a systematic clinical breast exam for women aged from 30 years at the health facilities	83	596	x	x	x	x	x	RBC	MoH, Partners, CSOs	# of health facilities trained on clinical breast exam
		Educate women on monthly breast self-examination.	Captured in Prevention		x	x	x	x	x	RBC	MoH, Partners, CSOs	Captured in Prevention
		Increase access to breast ultrasound at district hospitals for suspicious breast mass	1) 20 2) 1	1) 45 2) 45		x	x	x		RBC	MoH, Partners, CSOs	1) # of Hospitals with functional breast ultrasound machines 2) # of Hospitals with staff trained on breast ultrasound.
		Increase access to mammography at referral hospitals	0	7		x				MoH	RBC, Partners	# of hospitals with PACS for mammography machine
		Capacity building for HCPs at all levels on breast cancer early diagnosis	83	550	x	x	x	x	x	RBC	MoH, Partners	# of health facilities trained on breast cancer early detection
		Introduce population based-mammography screening (mobile)	0	5				x	x	MoH	RBC, Partners	# of mobile mammography machines and accessories available and functional
		Introduce genetic testing and follow up in high risk population for breast cancer	0	2						MoH	RBC, Partners	1) Availability of breast cancer genetic testing guidelines and protocols 2) Availability of the laboratory capacity of genetic mutations panel testing
						x	x	x	x	x		

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
		Establish an effective referral mechanism for women suspected of breast cancer.	0	1	x	x	x	x	x	RBC	MoH, Partners	Availability of a functional referral mechanism for breast cancer early detection program
	Early detection of childhood cancers	Raise awareness and knowledge on the signs and symptoms of childhood cancer	1	5	x	x	x	x	x	RBC	MoH and Partners	# of awareness campaigns organized
		Training of HCPs at all levels about signs and symptoms of childhood cancers and timely referral for confirmation of the diagnosis	0	42		x	x			RBC	MoH and Partners	# of MD trained on early detection of childhood cancers
		Establish an effective referral mechanism for children suspected of cancer	0	1		x	x	x	x	RBC	MoH and Partners	Availability of a functional referral mechanism for children suspected of cancers
		Public education to raise awareness and knowledge on the signs and symptoms of colorectal cancer	0	5	x	x	x	x	x	RBC	MoH and Partners	# of awareness campaigns organized
	Early detection of colorectal cancer	Training of HCPs at all levels about signs and symptoms of colorectal cancer and timely referral for confirmation of the diagnosis.	0	550		x	x	x		RBC	MoH and Partners	# of health facility with providers trained on colon rectal cancer early detection (2/hospital, 1/health center)
		Introduction of Fecal Occult Blood Test in health facilities	TBD	TBD				x	x	MoH	RBC and Partners	TBD
		Increase accessibility to colonoscopy and sigmoidoscopy in referral and teaching hospitals	2	5		x	x	x	x	MOH	RBC and Partners	# of hospitals doing sigmoidoscopy and colonoscopy
		Development of colorectal cancer screening guidelines	0	1			x			RBC	MoH and Partners	Availability of colon rectal cancer screening guideline
		Public education to raise awareness and knowledge on the signs and symptoms of prostate cancer	0	5	x	x	x	x	x	RBC	MoH and Partners	# of awareness campaigns organized
	Early detection of prostate cancer	Training of HCPs at all levels about signs and symptoms of prostate cancer and timely referral for confirmation of the diagnosis.	TBD	550		x	x	x		RBC	MoH and Partners	# of health facility with providers trained on prostate cancer early detection (2/hospital, 1/health center)

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
		Establish an effective referral mechanism for patients suspected of prostate cancer.	0	1	x	x	x	x	x	RBC	MoH and Partners	Availability of a functional referral mechanism for prostate cancer early detection program
		Avail PSA testing at district level for informed testing	5	42	x	x	x	x	x	RBC	MoH and Partners	# of hospitals performing PSA for prostate cancer early detection
	Early detection of other cancers	Public education intended to raising awareness and knowledge on the signs and symptoms of priority cancers	0	5	x	x	x	x	x	RBC	MoH and Partners	# of awareness campaigns organized
		Training of HCPs at all levels about signs and symptoms of cancers and timely referral for confirmation of the diagnosis.	TBD	550		x				RBC	MoH and Partners	Availability of online course on cancer early detection used by health care providers
		Establish an effective referral mechanism for patients suspected of cancer.	0	1	x	x	x	x	x	RBC	MoH and Partners	Availability of a functional referral mechanism for cancer early detection program

9.3. Cancer Diagnosis and Staging

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
Increased access of the population to the quality cancer diagnosis and staging services	Pathology diagnosis	Establish an effective sample collection and transportation system from district and provincial hospitals to tertiary and teaching hospitals and BCCOE.	0	1	x	x	x	x	x	RBC	MoH and Partners	Availability of a functional sample transportation system for cancer biopsies.
		Develop, adopt and adapt guidelines and algorithms for pathology diagnostic workup of priority cancers in both children and adults for each level of care	0	1		x				RBC	MoH and Partners	Availability of guidelines and algorithms for pathology diagnostic workup of priority cancers
		Training of healthcare providers on guidelines and algorithms for pathology cancer diagnosis	0	25		x				RBC	MoH and Partners	# of people trained on guidelines and algorithms for pathology diagnostic work up for cancers
		Training adequate number of skilled histo-technologists and pathologists.	1)2 2)1	1)10 2)8		x	x	x	x	HRH Secretariat	MOH, RBC, MINEDUC, Hospitals and Partners	1) # of Histotechnologists who completed 6-month training 2) # of pathologists who completed a sub specialization training in histopathology.
		Upgrade pathology laboratory infrastructure by ensuring the provision of updated and standards tests (IHC, Flow cytometry, PCR, ...)	1)0 2) 2	1)2 2) 4				x		MoH	RBC and Partners	1) # of Hospitals with Flow Cytometry machine for cancer diagnosis 2) # of hospitals with automated IHC machines.
		Upgrade pathology laboratory infrastructure by ensuring the provision of updated and standards tests (IHC, Flow cytometry, PCR, ...)	0	1				x	x	MOH	RBC and Partners	Availability of PCR, Genetic testing capacity for cancers at the National Reference Laboratory.
		Establishment of tele pathology system in all pathology laboratories.	1	3			x	x	x	MOH	RBC and ASCP	Availability of tele pathology system at 3 hospitals

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)	
		Standardize reporting system and develop an inter-hospital information system (Pathology Laboratory Information System)	0	1						MOH	RBC and ASCP	Availability of a standardized APLIS used in hospitals.	
		Ensure accreditation and ongoing quality control of pathology laboratories.	0	1	x	x	x	x	x	RBC	MoH and Partners	Availability of a National Quality Control program for pathology laboratories	
		Establish external quality assurance program for all pathology laboratories in Rwanda	0	1							RBC	MoH and Partners	Availability of a functional External Quality Control system for histopathology
	Cancer staging		Ensure an adequate number of trained imaging technologists, skilled radiologists and interventional radiologists and nuclear medicine specialists	TBD	TBD	x	x	x	x	x	MINEDUC	RBC and MOH	# trained imaging technologists, skilled radiologists and interventional radiologists and nuclear medicine specialists
			Upgrade medical imaging equipment and infrastructure for adequate staging of cancer diseases (CT scan at BCCOE, MRIs at RMH and CHUK).	1)0 2)0	1)1 2)2						PIH	RBC and MOH	1) Availability of CT Scan at Butaro Cancer Centre 2) Availability of MRI at RMH and CHUK
			Establish a nuclear medicine unit in Rwanda.	0	1	x	x	x	x	x	MoH	RBC, IAEA and Other Partners	Availability of a functional nuclear medicine Centre in the Country
			Develop, adopt and adapt guidelines and algorithms for diagnostic imaging workup of priority cancers in both children and adults for each level of care	0	1							RBC	MoH and Partners
						x	x	x	x				

9.4. Cancer Treatment

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
Improve access for cancer patients to quality cancer diagnosis and treatment services	Cancer treatment - medical treatment	Establish oncology units in CHUB and CHUK	0	2		x	x	x	x	MOH	RBC and Partners	Availability of Oncology Units with infusion centers at CHUK and CHUB
		Build the capacity of provincial and referral hospitals in follow up of cancer patients and provision of oral treatment (hormonotherapy...)	0	7		x				RBC	MOH, Hospitals and Partners	# of provincial and referral hospitals providing oral cancer treatment
		Upgrade existing Oncology Unit at BCCOE	0	1	x	x				PIH	MoH and Partners	The Oncology Unit at BCCOE is upgraded
	Cancer treatment - surgical treatment	Upgrade Intensive Care Unit/services capacity at BCCOE	0	1		x				PIH	MoH and Partners	The surgical oncology capacity of BCCOE is upgraded
		Upgrade the surgical capacity at teaching hospitals: CHUK and CHUB	0	1		x	x					The surgical oncology capacity at CHUK and CHUB is upgraded
	Cancer treatment - medical, surgical and radiotherapy treatment	Upgrade the Cancer Center at RMH to be a comprehensive National Cancer Referral Centre	0	1	x	x	x	x	x	IAEA	MOH, RBC and Partners	Availability of Chemotherapy and improved Surgical capacity at the Cancer Centre/RMH
		Ensure access of the low-income population to available cancer treatments	0	1			x			MOH	Minecofin, RSSB RBC and Partners	Availability of a national policy on cancer access program
		Promote public and private partnerships in cancer treatment	0	1		x				MOH	RDB, RBC, Partners	Availability of investment case in cancer prevention and control in Rwanda
		Establish psychosocial and nutritional support programmes for patients with cancer.	0	1		x	x	x	x	MOH	RBC and Partners	Availability of a functional psychosocial and nutritional support for cancer patients
		Develop, disseminate and regular update national cancer guidelines and protocols	0	1	x		x			RBC	MOH, Hospitals and Partners	Availability of updated National Cancer Treatment Guidelines
	Establish a technical working group composed of experts from all areas of cancer services to identify major areas	0	1			x	x	x	x	RBC	MOH, Hospitals and Partners	Availability of a functional Cancer Technical Working Group

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
		of cancer services, which require attention.										
		Improve the referral pathway for patients with cancer.	0	1	x	x	x	x	x	RBC	MOH, Hospitals and Partners	Availability of a functional referral system for cancer patients
		Establish functional tumor boards in cancer centres to ensure multidisciplinary management of cancer	3	6	x	x	x	x	x	Hospital	RBC, MoH	Availability of functional tumor boards in cancer centers (5) and a National Cancer tumor board
		Establish a EMR system/digital solution linking all cancer centers.	0	1		x	x			MoH	RBC and Partners	A functional digital solution linking cancer centre is available
	Cancer treatment - radiotherapy	Establish brachytherapy capacity at Rwanda Military Hospital	0	1		x	x			MoH	RMH, PIH. MoH and Partners	The brachytherapy unit is available at RMH
	Cancer treatment - Capacity building	Train adequate number of oncology health care professionals for cancer care_ Curriculum development	0	1		x	x			HRH Secretariat	UR, MOH, RBC and Partners	Tailored oncology section is integrated in training curricula for all health professionals
		Train adequate number of oncology health care professionals for cancer care_ Radiotherapy training	1)3 2)0 3)2 4)0	1)7 2)4 3)10 4)2		x	x	x	x	HRH Secretariat	UR, MOH, RBC and Partners	1) # of radiation/Clinical oncologist trained 2) # of medical physicists trained 3) # of radiotherapy technicians trained 4) # of biomedical engineers trained
		Train adequate number of oncology health care professionals for cancer care_ Medical Oncology training	2	10	x	x	x	x		HRH Secretariat	UR, MOH, RBC and Partners	# of medical oncologists trained
		Train adequate number of oncology health care professionals for cancer care_ Pediatric oncology training	1	5	x	x	x	x		HRH Secretariat	UR, MOH, RBC and Partners	# of pediatric oncologists trained

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
		Train adequate number of oncology health care professionals for cancer care_ Gyneoncology training	0	4	x	x	x	x		HRH Secretariat	UR, MOH, RBC and Partners	# of Gyne-oncologists trained
		Train adequate number of oncology health care professionals for cancer care_ Surgical oncology training	0	10	x	x	x	x		HRH Secretariat	UR, MOH, RBC and Partners	# of surgical oncologists trained
		Train adequate number of oncology health care professionals for cancer care_ Nursing Oncology	7	19	x	x	x	x	x	HRH Secretariat	UR, MOH, RBC and Partners	# of nurse oncology trained
		Train adequate number of oncology health care professionals for cancer care_ Oncopharmacy training	1	3	x	x				HRH Secretariat	UR, MOH, RBC and Partners	# of Onco-pharmacists trained

9. 5. Palliative Care

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
Provide access to quality pain management and palliative care services for cancer patients.	Access to quality pain management and palliative care services for cancer patients	Review and update the national palliative care policy and guidelines	0	1		x				RBC	MoH, Partners and CSOs	Availability of updated Palliative care guidelines and Policy
		Improve public awareness of Palliative Care for patients with cancer at all levels of the community	1) 0 2) 0 3) 0	1) 4 2) 30 3) 40	x	x	x	x	x	RBC	MoH, Partners and CSOs	1) # of awareness messages on PC developed and disseminated 2) # of journalists trained on palliative care 3) # of religious leaders trained on palliative care
		Improve quality of life of cancer patients through the availability and accessibility of essential palliative care medicines and services	TBD	0	x	x	x	x	x	RBC	MoH, Partners and CSOs	# of episodes of central stock out of morphine syrup at the central level/year
		Improve quality of life of cancer patients through the availability and accessibility of essential palliative care medicines and services	0	1		x				RBC	MoH, Partners and CSOs	Oral morphine production plant renovated
		Strengthening of integration of palliative care in health facilities (public and private)	125	550		X	x			RBC	MoH, Partners and CSOs	# of health centers with nurses trained in palliative care
		Develop networks, partnerships and collaboration with local and international partners.	0	4		x	x	x	x	RBC	MoH, Partners and CSOs	# of international palliative care conferences organized
		Establish a sustainable approach to achieving home based palliative care.	0	60000		x	x	x	x	RBC	MoH, Partners and CSOs	# of community health workers trained on palliative care
		Ensure adequate number of trained health care providers in palliative care_ pre service training	0	1	x					RBC	MoH, Partners and CSOs	Palliative care curriculum integrated into medical and nursing education

9.6. Cancer information system and research.

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
Strengthen cancer information system and research.	Cancer information system and research	Strengthen population based cancer registries covering Kigali City and hospital registry in all referral & teaching hospitals and BCCOE.	1	1						RBC	MoH and Partners	The cancer registry covering all hospitals in the City of Kigali and all teaching hospitals
		Integrate cancer registry into existing health surveillance system	0	1	x	x	x	x	x	RBC	MoH and Partners	The cancer registry data reported through DHIS2
		Establish a National Cancer Registry	0	1		x	x	x	x	RBC	MoH and Partners	The National Cancer Registry covering all hospitals is established
		Dissemination of cancer data to inform policy decision making	1	5	x	x	x	x	x	RBC	MoH and Partners	# of annual cancer data dissemination meetings conducted
		Develop a cancer research agenda and ensure adequate capacity for cancer research	1) 0 2) 2	1) 1 2) 5	x	x	x	x	x	Partners	RBC, MoH and Partners	1) Availability of cancer research agenda 2) # of new grants on cancer research successfully mobilized
		Strengthen partnerships with cancer registry networks and research institutions (e.g. African Cancer Registry Network and International Agency for Research on Cancer	1) 0 2) 2	1) 3 2) 5	x	x	x	x	x	Partners	RBC, MoH and Partners	1) # of memberships to international cancer registry organizations 2) # of manuscripts published into peer reviewed journals

9.7. Coordination, Partnership and Financing for Cancer Control

Objective	Strategy	Strategic action	Baseline (2019)	Target (2024)	Y 1	Y 2	Y 3	Y 4	Y 5	Primary responsible	Partners/collaborators	Performance indicator (Output)
Strengthen Coordination, Partnership and Financing for Cancer Control	Cancer control coordination	Establishment of a strong multi stakeholder cancer technical working group/steering committee to work closely with Cancer Diseases Unit	0	1	x					MoH	RBC	Availability of a functional cancer technical working group
	Cancer control partnerships	Create and Strengthen existing collaborations/partnerships with different cancer control organizations	3	7	x	x	x	x	x	Partners	RBC and MOH	# of new grants for prevention and cancer control mobilized
	Cancer control financing	Promote public private partnership in cancer control	0	2	x	x	x	x	x	Partners	RBC and MOH	# of public private partnership projects in cancer control implemented

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