Myanmar National Comprehensive Cancer Control Plan 2017-2021

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Contents

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NCCP Drafting Team:

Dr. Myo Khin, Retired Acting Director General

Dr. Le Le Win, Retired Deputy Director

Dr. San Shwe, Retired Director

Dr. Khin May Oo, Retired Director

Message from H.E. Dr. Myint Htwe, the Union Minister for Health and Sports

In Myanmar, as in most developing countries, the burden of non-communicable diseases is increasing rapidly while infectious diseases continue to pose major challenges. The most significant of non-communicable diseases are diabetes, cardiovascular related diseases and cancers. Furthermore, most cancer cases are detected at late stages when chances of survival are limited and cancer is becoming one of the leading causes of death in Myanmar today. Thus, it is totally relevant for Myanmar to develop a medium-term national cancer control plan covering the time period from 2017 to 2021 as one of the priority activities of the Ministry of Health and Sports. Considering the increasing burden, opportunities for scaling up and the progress made so far, the goal has been set to promote screening, improve early diagnosis, provision of treatment opportunities and access to palliative care by 30% from the 2017 level by 2021.

The Myanmar National Comprehensive Cancer Control Program (MNCCCP) has been formulated by the Ministry of Health and Sports through close collaboration with the WHO HQ, SEARO and WHO Country Office, Myanmar. MNCCCP was initiated by the drafting team based on the consultative process with various stakeholders. The drafting team also incorporates the approach paper for developing NCCP for Myanmar prepared by WHO and also the preliminary findings and recommendations by the imPACT review mission (2015). The draft plan was further improved after several rounds of discussions and by incorporating valuable suggestions and recommendations

by responsible persons from the Ministry of Health and Sports..

The MNCCCP has been formulated to address the cancer problem at the National level with the main objectives of reducing the incidence of cancer through prevention of preventable cancers, prolong survival of cancer patients by early detection and effective treatment and ensuring the best quality of life possible for cancer patients through provision of high quality health-care services including palliative care for the terminal patients. The plan explicitly sets out the objectives that need to be placed in order to bring about desired developments and improvements and also highlights the importance of establishing a Multidisciplinary team for Cancer Management.

I am confident that the MNCCCP with move forward with great momentum and provide equitable health care for cancer to the people of Myanmar.

H.E. Dr. Myint Htwe

Union Minister for Health and Sports

Executive Summary

Cancer is a leading cause of disease worldwide. It has been estimated that 14.1 million cancer cases occurred in 2012 among which 7.4 million cases were in men and 6.7 million in women. This number is expected to increase significantly over the coming years to 24 million with expected 13 million annual deaths worldwide in 2030. More than 70% of all cancer deaths occur in low and middle income countries in which available resources for early detection, diagnosis, treatment and palliative care are limited or non-existent. This is tragic in an era when the development level clearly demonstrates that over one third of cancers can be prevented and one third can be cured if detected early and standard therapies are available, and also unnecessary pain and suffering can be reduced for most cancer cases.

Myanmar is situated in Southeast Asia and is a country among the Association of South East Asia Nations (ASEAN). The burden of cancer has been shown to be increasing in the ASEAN region, due to population ageing and growth and the adoption of cancer-associated lifestyle behaviors such as more sedentary lifestyle, eating more red meat and fat, consumption of more alcohol, more environmental pollution, and continued use of tobacco. In the Region, there were estimated to be over 750,000 new cases of cancer, and incidence of cancer is expected to rise to 1.3 million per year by 2030. Survival rates for most cancers are poor and quality of life is greatly impaired.

GLOBOCAN in 2012 estimated that over 63 thousand cases of cancer occur annually in Myanmar, yielding an age-standardized rate of 140.5 cases per 100,000 persons. In 2014, Non-communicable diseases (NCDs) are estimated to account for 59% of total deaths among which cancer is responsible for 11% of all deaths. The most common cancers in men are lung, liver, stomach, oesophagus and colorectum, while in women, cancers of the breast, cervix uteri, lung, stomach and colorectum dominates. Lung, breast, cervix, stomach and liver cancers top the combined list of male and female subjects.

Myanmar has a draft NCD Action Plan which is aligned with the National Health Plan 2011-2016, but a stand-alone Cancer Control Plan is lacking. Considering the increasing burden, opportunities for scaling up and the progress made so far, it is relevant for Myanmar to develop a national cancer control plan from 2016 to 2020. It has been recommended that the Myanmar National Cancer Control Plan (MNCCP) should be formulated with the goal to improve diagnosis, completion of treatment and access to palliative care by 30% from the 2015 levels by 2021.

For the drafting of the Comprehensive Costed Cancer Control Plan for Myanmar, the following components were considered. It consisted of being a Master Plan, Long-range goals or objectives, Strategic in nature, Timeline for 5 years (2017-2021), strong focus on Public Health Sector and up-grading of the five Teaching Hospitals for cancer treatment and palliation. The drafting team designed the structure of the Comprehensive Costed Cancer Control Plan based on the indicators obtained from the Nation-wide Survey on Non-communicable Diseases which was carried out in 2014. The team also reviewed the Preliminary Findings and Recommendations of the imPACT Review Mission (2015) which consisted of personnel from the World Health Organization, The International Atomic Energy Agency (IAEA) and the International Agency for Research on Cancer.

The findings of the Nation-wide Service Availability and Readiness Assessment (SARA) Myanmar 2015 were also taken into consideration. SARA was conducted on 166 randomly selected public health facilities and 35 private hospitals. The Annotated Bibliography of Research Findings on Cancer in Myanmar Volumes 1 and 2, published by the Department of Medical Research in June 2016 were also used for reference. The team also reviewed several National Cancer Control Plans of other countries with the objective of identifying key strategies. The team also took into account the need of the plan to be integrated within the entire framework of chronic disease prevention. A wide participation and cooperation by all public and private sectors was also made possible and it is expected that the plan will also improve the health and welfare of the individual cancer patients and their families. The plan will seek to improve and find ways to rectify the cancer problem at the national level and will span a time frame of five years

from 2017 to 2021.

The purpose of this document is to give strategic direction in order to attain the goal of reducing the incidence and impact of cancer in Myanmar by 2021. The objectives of the Myanmar National Comprehensive Cancer Control Plan is to reduce incidence, prolong survival and ensure the best quality of life possible for cancer patients by prevention of preventable cancers and the provision of high-quality and equitable cancer services to all cancer patients. The detailed objectives of the plan are as follows:

Objectives

1. Reduce the incidence and mortality of cancer by 30% through primary prevention
2. Improve early detection of cancer by 30%
3. Improve effective diagnosis and treatment of cancer by 30% through cost effective interventions
4. Improve the quality of life of cancer patients by 30% through pain relief, rehabilitation and palliative care
5. Document (50 %) of all cancer cases and establish a cancer registry for surveillance and research
6. Downgrade cancer incidence by evidence-based interventions
7. Increase the quantity and quality of cancer work force

The strategies to achieve the objectives include the following:

Strategies

1. **Primary Prevention**

- Tobacco use (to reduce percentage of smokers to 15% by 2020, to reduce liquid tobacco use to 20% by 2021)
- Promotion of physical activity (to reduce percentage of persons with insufficient physical activity defined as <150 minutes of moderate intensity activity per week, or equivalent to 10% by 2021)
- Nutrition (to promote use of healthy food in 80% of the population by 2021)
- Obesity (to reduce percentage of overweight persons (BMI $\geq$ 25kg/m^2) to 20% by 2021)
- Alcohol (to reduce those who are current drinkers to 10% in 2021)

- Biological carcinogens (to promote expansion of Immunization Program)
- Environmental Contaminants (to promote awareness on environmental carcinogens and to monitor carcinogens in the environment)

2. **Early detection of cancer**

- Oral Cancer (to promote awareness on the importance of early detection of oral cancer and to conduct screening campaigns)
- Breast cancer (to promote awareness on the importance of early detection of breast cancer and to organize campaigns)
- Cervical Cancer (to promote awareness on the importance of early detection of cervical cancer and to conduct hospital programs or screening campaigns to increase the percentage of women aged 30-49 years who had ever had a screening test for cervical cancer to 25% of the population)
- Early treatment of infections (to promote awareness on the availability of treatment for HCV and H. pylori infections and to increase the percentage (25%) of those with HCV / H. pylori getting treatment)

3. **Improve effective diagnosis and treatment of cancer** (to improve quality of pathology and immunology services, to expand or upgrade facilities for cancer treatment, and to increase and to upgrade cancer work force)

4. **Improve the quality of life of cancer patients** (to expand pain clinics, and ii) improve the quality of palliative care given to cancer patients)

5. **Documentation of cancer patients** (to establish cancer registry system in major hospitals, to introduce population-based cancer registry and to provide technical support and training)

6. **Surveillance and Research** (to determine and evaluate effective methods of preventing cancer, to promote research on basic, clinical, and epidemiological aspects of cancer, and to promote ethics in the cancer drug trials)

7. **Radiation Safety** (to establish radiation safety units in all facilities using radioisotopes and radioactive sources, to upgrade equipment for radiation safety, and to development human resources in radiation safety)

Expected Outcomes

When these strategies are implemented, it is expected that these outcomes would be achieved:

1. Improved cancer awareness among Myanmar people
2. National Systematic Cancer Screening services
3. Improved cancer treatment outcomes by having higher survival rate
4. Functional palliative care services at all levels
5. Functional population based cancer registry
6. Improved human resource capacity for cancer control at all levels

Monitoring and Evaluation

Outcomes of the MNCCP can be evaluated in terms of midterm and terminal evaluation. Annual evaluation will also be carried out and workshops for reviewing strategies and to recommend future activities that need to be further reviewed and updated according to the changing situation and needs. A Cancer Task Force will be set up to oversee the progress of the implementation of the plan.

Chapter 1: Introduction

1.1 Background

1.1.1. Global Situation

Cancer is a leading cause of disease worldwide. It has been cited as the leading cause of mortality globally, accounting for 13% (or 7.4 million) of all deaths annually with 70% of these occurring in low and middle income countries (WHO, 2010). In 2012, there were an estimated 14.1 million new cases of cancer and 8.2 million deaths from cancer worldwide.[1] It is also projected that mortality from cancer will increase significantly over the coming years with expected 13 million annual deaths worldwide in 2030. The trend is even more striking in Asia where the number of deaths per year in 2002 of 3.5 million is expected to increase to 8.1 million by 2020.[2] Although incidence rates remain highest in more developed regions, mortality is relatively much higher in less developed countries due to a lack of early detection and access to treatment facilities.[3]

The exact etiology of cancer is not known but multiple causal agents have been documented. Cancer is caused by physical carcinogens, such as ultraviolet and ionizing radiation; chemical carcinogens, such as asbestos, components of tobacco smoke, aflatoxin (a food contaminant) and arsenic (a drinking water contaminant); and biological carcinogens, such as infections from certain viruses, bacteria or parasites. Cancer causing viral infections such as HBV/HCV and HPV are responsible for up to 20% of cancer deaths in low and middle-income countries.[4]

Ageing is another fundamental factor for the development of cancer. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age. More than 30% of cancer deaths could be prevented by modifying or avoiding key risk factors, including: tobacco use, being overweight or obese, unhealthy diet with low fruit and vegetable intake, lack of physical activity, alcohol use, sexually transmitted HPV-infection, infection by HBV, ionizing and non-ionizing radiation, urban air pollution and indoor smoke from household use of solid fuels.[5]

In 2012, the most common cancers worldwide (for both sexes) were lung cancer (13% of all cancers diagnosed) followed by breast cancer (12%),

colorectal cancer (10%) prostate cancer (8%), stomach cancer (7%), liver cancer (6%) and cervical cancer [4%]. Among men, the 5 most common sites of cancer diagnosed in 2012 were lung, prostate, colorectum, stomach, and liver cancer. Among women the 5 most common sites diagnosed were breast, colorectum, lung, cervix, and stomach cancer.[5] In 2012, the most common causes of cancer death worldwide (for both sexes) were lung cancer (19% of all cancer deaths) followed by liver cancer (9%), stomach cancer (9%), colorectal cancer (9%), breast cancer (6%), cancer of the esophagus (5%) and pancreas cancer (4%).[6]

1.1.2. Asia and ASEAN Situation

Among the 5 most common cancers among males in Asia, lung cancer tops the list followed by stomach, liver, colorectum and oesophagus. Breast cancer tops the list among females followed by malignancies of cervix, lung, stomach and colorectum. Similar pattern is observed in ASEAN countries. ASEAN region contains more than half a billion people, almost 9% of the world population, spread over highly economically diverse countries. The burden of cancer is increasing in the ASEAN region, due to population ageing and growth and the adoption of cancer-associated lifestyle behaviors such as more sedentary lifestyle, eating more red meat and fat, consumption of more alcohol, more environmental pollution, and continued use of tobacco.[7] A recent burden of cancer study in the Association of Southeast Asian Nations (ASEAN) estimated there were over 700,000 new cases of cancer and 500,000 cancer deaths in the year 2008, leading to approximately 7.5 million disability-adjusted life years lost in one year. [8] This burden will rise with the expected increase in number of new cases in Asia over the next decade.[9] (Survival rates for most cancers are poor and quality of life is greatly impaired.[10] In addition, cancer can have a profound economic effect on individuals and their households and can quickly result in catastrophic payments for a household; i.e. spending a disproportionate amount of household income on cancer treatment. A recent study highlights the fact that among ASEAN countries, 75% of cancer patients from LMIC (Lower Middle Income Country) countries such as Myanmar, Laos and Cambodia experiences death or financial catastrophe within one year.[11]

Also in all participating ASEAN countries, 28% of affected families resorted to taking personal loans and 20% had to sell their assets. Moreover, 5% of the families who were living above their national poverty line were pushed into poverty. Also one-year risk of medical impoverishment attributed solely to direct medical costs was found to be 25%. The study also highlighted that investment in early detection may be most effective strategy to address the negative impact of cancer, primary prevention should not be.[12]

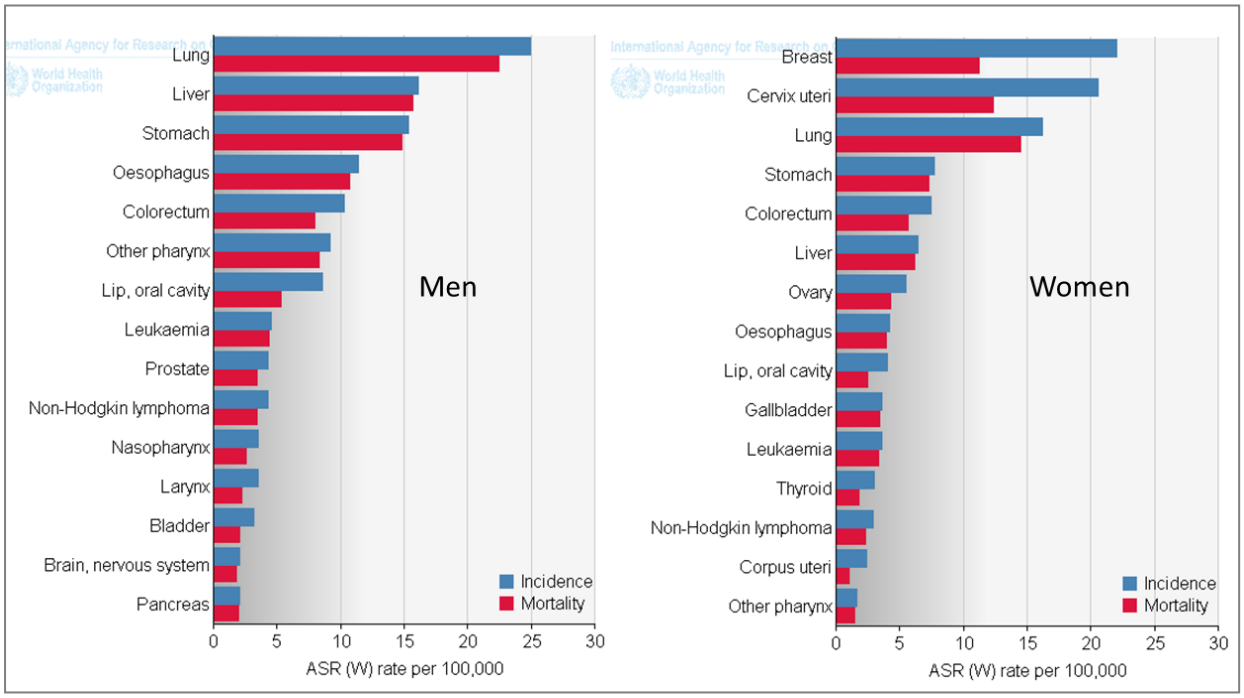
1.1.3. Problem of Cancer in Myanmar

In May 2008, 58th World Health Assembly (WHA) adopted a resolution calling on Member States to intensify action against cancer by developing and reinforcing cancer control programs aimed at reducing cancer incidence and mortality among others. In response to the WHA resolution, WHO, in 2008, published guidelines for effective cancer control programs in six modules: Planning; Prevention; Early detection; Diagnosis and treatment; Palliative care; and Policy and advocacy. The strategy called for cancer control programs to be established in a comprehensive and systematic framework and integrated within national health plans.

A recent study estimated there were over 66,000 new cases of cancer (115.1/100,000 population) and 45,000 cancer deaths (94.5/100,000 population) in the year 2008 in Myanmar. The estimated cancer incidence rate for males and females were 153.1/100,000 population and 115.3/100,000 population, respectively. The estimate mortality rates were 89.5/100,000 population for males and 94.5/100,000 population for females.[13]

Myanmar is currently facing a double burden of communicable and non-communicable diseases (NCDs).[14] In 2014, NCDs are estimated to account for 59% of total deaths. Specifically, cancer is responsible for 11% of all deaths or an estimated 50,000 deaths due to cancer.[15] The most common cancers in men are lung, liver, stomach, oesophagus and colorectum, while it is cancers of the breast, cervix uteri, lung, stomach and colorectum in women.[16] (Fig. 1)

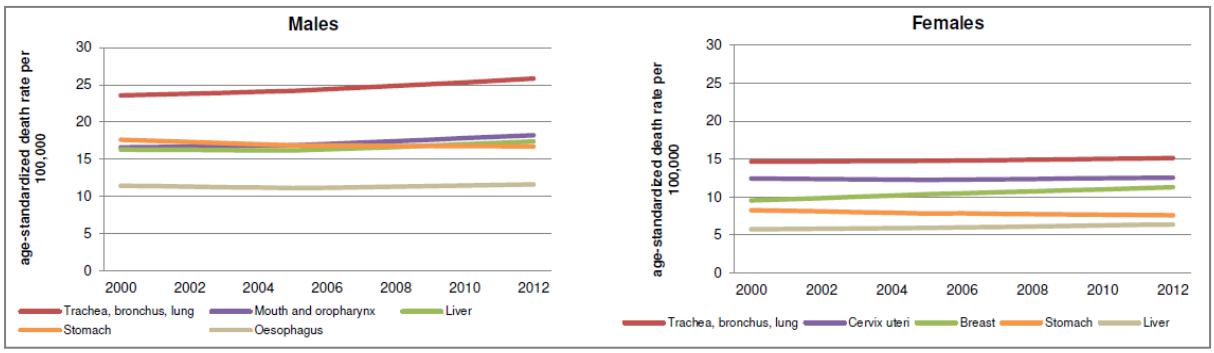
Figure 1. Most common cancers in Myanmar*, GLOBOCAN 2012



* *No national data; Estimates were based on the rates from neighbouring countries or registries in the same area*

Age-standardized mortality from cancers does not show any decline from 2000 to 2012 and is even increasing in some cancers in males as shown in Figure 2.

Figure 2. Age-standardized cancer mortality trend, 2000-2012



Tobacco use, alcohol use, unhealthy diet and physical inactivity are the main cancer risk factors, which also lead to some physiologic/metabolic risk factors. In the recent National Survey on Diabetes and Risk Factors for NCDs in Myanmar 2014[17], it shows that these risk factors are in alarming rates, which if not addressed, will continue to rise and consequently, the cancer incidence will also rise.

Table 1. Prevalence of risk factors by sex, 2014

Description	Both sexes	Males	Females
Percentage who currently smoke tobacco	26.1%	43.8%	8.4%
Percentage who currently drink (drank alcohol in the past 30 days)	19.8%	38.1%	1.5%
Percentage who ate less than 5 servings of fruit and/or vegetables on average per day	86.6%	85.2%	87.9%
Percentage with insufficient physical activity (defined as < 150 minutes of moderate-intensity activity per week, or equivalent)	15.7%	12.5%	18.8%
Percentage who are overweight (BMI ≥ 25 kg/m^2)	22.4%	14.1%	30.8%
Percentage with raised blood pressure (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP)	26.4%	24.7%	28.0%
Percentage with raised total cholesterol (≥ 5.0 mmol/L or ≥ 190 mg/dL or currently on medication for raised cholesterol)	36.7%	30.9%	42.5%
Percentage with three or more of the risk factors*, aged 25-64 years	19.6%	18.3%	20.9%

** Smoking, < 5 servings of fruits/vegetable, insufficient physical inactivity, overweight, raised BP*

Tobacco use is predominantly high with 43.8% of males and 8.4% of females who currently smoke tobacco. This is also consistent with the most common cancers in the country as lung cancer is the leading cancer in men and 3rd in women. The proportion of the population with 3 or more of the risk factors (1 in 5 adults aged 25-64 years) also increases the risk of having cancer.

For a Lower Middle Income Country like Myanmar, to achieve by 2025, WHO's global target of a 25% reduction in deaths from cancer and other non-

communicable diseases in people aged 30–69 years (generally referred to as 25 × 25)[16]. In conclusion, not only more effective prevention (to reduce incidence) but also more effective health systems (to improve survival and to prevent catastrophic situation) will be needed.

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Chapter 2: Current situation of cancer control in Myanmar

2.1. The country

Myanmar is home to about 54 million people and is comprised of over 130 ethnic groups. The major ethnic groups are Kachin, Kayah, Kayin, Chin, Bamar, Mon, Rakhine and Shan. Approximately 70 percent of the population resides in rural areas and the rest are urban dwellers.[1]

Located in South-East Asia, The Republic of the Union of Myanmar is bordered on the east and north-east by the Laos People's Democratic Republic and the Kingdom of Thailand, on the north and north-east by the People's Republic of China, on the north-west by the Republic of India and on the west by the People's Republic of Bangladesh. The 1760 miles of coast line is bounded on the west by the Bay of Bengal and on the south by the Andaman Sea. Myanmar covers an area of 676, 578 square kilometers of the Indo-China Peninsular. The country is divided administratively into Nay Pyi Taw Union Territory and 14 States and Regions. It consists of 70 Districts, 330 Townships, 84 Sub-townships, 398 Towns, 3063 Wards, 13, 618 Village tracts and 64, 134 Villages.[1]

Myanmar also demonstrated notable progress in reducing child and maternal mortality. Its under-five mortality rate declined from 109 deaths per 1,000 live births in 1990 to 51 in 2013. Maternal mortality rate also declined from 580 per 100,000 live births in 1990 to 200 per 100,000 live births in 2013.[2] The life expectancy increases significantly over the past years, from a life expectancy of 55 years in 1980 to 66 years in 2013.[3]

Despite this progress, cases of non-communicable diseases including cancer are on the rise. The government also acknowledged that the country faces three diseases burdens: (1) burden from communicable diseases (such as TB, Malaria, HIV/AIDS, (2) women's and children's health, and (3) burden from the rise in non-communicable diseases, including cancer. [4] The National Health Plan (2011-2016) of Myanmar stated that one of the main functions of its health system is to ensure people's equitable access to quality health services. This statement is an embodiment of the principles of Universal Health Coverage (UHC), the goal of which is to provide all people access to key

interventions; promotive, preventive, curative, and rehabilitative health interventions at an affordable cost thereby achieving equity in access.

2.2. Policy, Strategy and Action Plan

Myanmar does not have a definite separate policy for cancer. However, cancer control program has been regarded as a priority program for the Ministry of Health. It has been identified as a component of WHO/MOHS collaborative biennial work plan since 1994. The four key components: prevention, early detection, diagnosis and treatment, and palliative care were most often included.

Myanmar also has a draft NCD Action Plan which is aligned with the National Health Plan 2011-2016 and which also includes cancer control. Myanmar has a National cancer control program manager, but lacks the National Cancer Control Plan (NCCP), cancer control steering committee, and a dedicated budget for comprehensive cancer control.

Myanmar has a National Health Plan (2011-2016) and is now preparing to formulate the New National Health Plan for the next five years. Although it is in the process of formulation, it plans to incorporate the draft multi-sectoral NCD strategic plan which will cover early detection, treatment and care for cancer in the New National Health Plan. However, a stand-alone cancer policy does not exist. Specific policies, strategy or action plan on risk factors such as harmful use of alcohol and tobacco and tobacco products exists. Policies, strategy and action plans on other risk factors such as unhealthy diet and physical activity have not yet been taken up further.

2.3. Background information of common cancers and their causes

Myanmar does not have a National screening program targeting the general population on cancers of the breast, cervix, colon and prostate. Measures have been taken for the formulation and effective implementation of the legislation on health protection from tobacco products. Efforts for public awareness about harmful effects of tobacco are intensified through specific campaigns and distribution of informational material. Oral screening of tobacco users for early diagnosis of oral cancer in communities are in progress through NGOs but

not on a systematic approach.

Informative materials are produced and distributed in order to increase women awareness about the advantages of early detection of breast cancer. Although, mammograms have been installed in 3 major cities in Lower and Upper Myanmar, utilization is still limited. Interventions for the early detection of breast cancer are being implemented through NGOs on a limited basis. Information, education and training of health groups on clinical breast examination through seminars and workshops are also in progress. Breast and cervical cancer screening in Myanmar is sporadic (opportunistic) and limited to selected tertiary centers and to some communities. Early detection of cervical cancer at hospital settings has been established and efforts to establish lower cost programs for early detection of this pathology are underway. Out-reach programs to communities are in progress with the help of NGOs. In a recent Nation-wide Service Availability and Readiness Assessment Survey (SARA), guidelines for cervical cancer prevention and control were reported to be available in 25% of the general, state and district hospitals and private hospitals. A little over half of the public (50% to 60%) and 25% of private hospitals had at least one staff trained in cervical cancer prevention and control. Speculum, a basic requirement for the procedure, was reported to be available in most hospitals but acetic acid was available in at 20% of the township-level hospitals.[5]

For infants, the coverage of Hepatitis B vaccination is 72%.[6] High coverage rate of HBV vaccination (85%) is evident and there is a need to increase accessibility to children in remote areas. There is no existing national HPV vaccination program although Myanmar being eligible for GAVI alliance support could apply for funding of demonstration project on HPV vaccination.

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2.3.1. Oral Cancer

The prevalence of oral cancer is particularly high among men, the eighth most common cancer worldwide. Incidence rates for oral cancer vary in men from 1 to 10 cases per 100 000 population in many countries. In India, the age standardized incidence rate of oral cancer is 12.6 per 100 000 population[1]. Oral cancer is twice as common in men as in women. This difference may be related to the use of alcohol and tobacco, a major oral cancer risk factor seen commonly in men than women [2] . In south-central Asia, cancer of the oral cavity ranks among the three most common types of cancer. Early detection of oral cancer using visual inspection of the mouth is being considered in countries where incidence is high, such as Bangladesh, India, Pakistan, and Sri Lanka [3]. Oropharyngeal cancer is more common in developing than developed countries [4, 5].

In South-Central Asia, 80 per cent of head and neck cancers are found in the oral cavity and oropharynx and it accounts for up to 40% of all malignancies [6]. Oral squamous cell carcinoma comprises over 90 per cent of the malignancies beginning as inflammatory erythroleukoplakia [7]. Cancers of the lip are more common among people who work outdoors or others with prolonged exposure to sunlight [1].

Alcohol use is a risk factor for many cancer types including cancer of the oral cavity, pharynx, larynx, oesophagus, liver, colorectum and breast. Risk of cancer increases with the amount of alcohol consumed. The risk from heavy drinking for several cancer types (e.g. oral cavity, pharynx, larynx and oesophagus) is substantially increased if the person is also a heavy smoker. About 70% of people diagnosed with oral cancer are heavy drinkers. This risk is higher for people who use both alcohol and tobacco. For people who smoke

and drink heavily, the risk of oral cancer may be as high as 100% more than the risk for people who do not smoke or drink[2].

About 80% of people with oral cavity and oropharyngeal cancers use tobacco in the form of cigarettes, chewing tobacco or snuff. The risk of developing oral cancer depends on the duration and frequency of tobacco use. Smoking can lead to cancer in the mouth or throat, and oral tobacco products are associated with cancer in the cheeks, gums, and inner surface of the lips [2].

Betel quid chewing has been common in South and Southeast Asia, Asia Pacific Region including Myanmar for a long time[8]. In communities throughout Southeast Asia, oral cancer including oral squamous cell carcinoma has been predominantly related to traditional areca nut use [9]. Betel quid chewing (smokeless tobacco) is a known risk factor for oral leukoplakia, oral submucous fibrosis, and oral squamous cell carcinoma.

Many people in Southeast Asia, South Asia, and others parts of the world chew betel quid, a leaf from the betel plant wrapped around areca nut and lime. Chewing gutka, a combination of betel quid and tobacco, is also common. Both of these substances are associated with an increased oral cancer. The evidence that smokeless tobacco causes oral cancer was confirmed recently by the International Agency for Research on Cancer (IARC) [10].

Among the risk factors, some inherited genetic mutations, which cause different syndromes in the body, carry a high risk of oral and oropharyngeal cancer. These include Fanconi anemia a blood condition is caused by inherited abnormalities in several genes. The risk of oral cancer among people with Fanconi anemia is up to 500 times higher than among the general population. Dyskeratosis congenital, a genetically linked syndrome can also cause aplastic anemia, and carries a very high risk of mouth and throat cancer occurring at an early age[2] .

Human papillomavirus (HPV) HPV is also a risk factor for oral and oropharyngeal cancers. About 25 percent of patients with these cancers are infected with the same HPVs are seen in cervical cancer. In particular, there is a strong link between HPV-16 and oropharyngeal cancer. HPV appears to be a

more serious risk factor for oropharyngeal cancer than for oral cavity cancers[2]. HPV types 6 and 11 cause 90% of all genital warts and also give rise to recurrent respiratory papillomatosis [11].

People with a severe case of Lichen planus which usually causes an itchy rash but sometimes appears as white lines or spots in the mouth and throat, may have a higher risk of oral cancer. Lichen planus usually affects middle-aged people [2].

In Myanmar, findings from an oral cancer survey conducted in 2006 to 2007 at the Mandalay General hospital elicited that the oral cancer incidence in 2007 was 2.1 per 100 000 population (based on total population of 56.52 million in Myanmar). The incidence was 2.9 per 100 000 in males and 1.4 per 100 000 females. Among the Myanmar people, oral cancers were two times more frequent in males than in females, and most common in the 45–54 year age group. Among the oral cancers, the tongue (39.0%) was the most common site followed by the palate (35.7%), floor of the mouth (8.2%), buccal mucosa (6.2%), gingival (5.6%), and lip (5.2%). Among the patients with oral squamous cell carcinoma including verrucous carcinoma, 36.0% were betel quid chewers, 50.5% were tobacco chewers and 46 %were smokers. 15.3% did not use tobacco or betel [12]. In Myanmar, 30% of the adult population was using smokeless tobacco in 2009 and the majority of these smokeless tobacco users used it in a form of betel quid [13].

Betel quid chewing is a habit of at least 10% of the world population (600 million), and it is also the fourth most common stimulatory substance used after tobacco, alcohol, and caffeine [14]. Betel quid is made of three main ingredients: areca nuts, betel leaves, and lime (calcium hydroxide) paste. There are additional ingredients, such as tobacco, cardamom, coconut, saffron, which are different from area to area or from person to person[15].

Findings from a study on interview and oral examination of 542 persons aged 18 year and above in Dagon (East) township in 2013, revealed that the overall prevalence of current betel quid chewing was 52% with prevalence in men much higher than that in women (72% vs. 39%).

Crude odds ratios showed that betel chewers were 6 times more likely to have oral potentially malignant lesions than non-chewers and that risk rises to 27 times with addition of smokeless tobacco to betel quid. Drinkers were nearly 3 times more likely to have oral potentially malignant lesions than non-drinkers.[16.]

Although there is no existing National Oral Cancer Screening Programme in the country, the Oral Medicine and Oral Pathology Group had initiated the Oral Cancer Awareness Program on Oral Cancer Awareness Month, April 2013 by screening tobacco and betel quid consumers at suburban and rural areas of Yangon Division [9.]

At present, oral cancer screening and educational talks to raise the awareness of oral cancer in the community, is being undertaken by non-governmental organizations such as the Myanmar Dental Association (DMA) and Shwe Yaung Hnin Si Cancer Foundation.

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2.3.2. Cervical cancer

Cervical cancer is one of the gravest threats to the health of women in low income countries[1]. It is caused by infections with human papillomaviruses (HPV), the most common sexually transmitted infection in humans[2].Cervical cancer is the second most common cancer in women living in less developed regions with an estimated 445 000 new cases in 2012 (84% of the new cases worldwide). In 2012, approximately 270 000 women died from cervical

cancer; more than 85% of these deaths occurring in low- and middle-income countries[1].

Human papillomavirus (HPV) is a group of more than 200 related viruses. More than 40 HPV types can spread through direct sexual contact by vaginal, anal and oral sex. Sexually-transmitted HPV types are further divided into two categories: Low-risk HPVs can cause skin warts around the genitals, anus, mouth and throat. HPV types 6 and 11 cause 90% of all genital warts and also give rise to recurrent respiratory papillomatosis. High risk HPV can cause cancer and HPV types 16 and 18 are responsible for most HPV-caused cancers. High-risk HPV types cause approximately 5 percent of cancers of all cancers worldwide [3].

HPV vaccination prevents infection with virus types which cause 70% of cervical cancers, as well as vulvar, vaginal, penile, anal and oropharyngeal cancers and genital warts. It is most effective if administered before sexual exposure, ideally between age 9 and 13 years [4].

The US FDA has approved 3 vaccines (Gardasil®, Gardasil®9 and Cervarix) which protect against both HPV 16 and 18, which are known to cause at least 70% of cervical cancers. These vaccines provide strong protection against new HPV, but they are not effective in treating established HPV infections or diseases caused by HPV[3].

Cervical cancer screening is recommended for every woman from aged 30 to 49. When screening detects pre-cancerous lesions, these can easily be treated and cancer avoided. Screening can also detect cancer at an early stage and treatment has a high potential for cure.There are 3 different types of screening tests are currently available:i) conventional (Pap) test and liquid-based cytology(LBC) ii) visual inspection with Acetic Acid (VIA) and HPV testing for high-risk HPV types[5].

Cervical cancer is the second most diagnosed cancer and the third leading cause of cancer deaths in females in the ASEAN, accounting for 11% of the total new cancer cases and 9% of the total cancer deaths among females in

2008. Cervical cancer incidence rates were very high in Cambodia (27.2 per 100, 000), Myanmar (26.4), Thailand (24.5) and Laos (22.1)[6].

In Myanmar, cervical cancer ranks as the second most common form of cancer among women, and it is also the second most common type of cancer among women between 15 and 44 years of age. The Yangon Cancer Registry (2006) reported that crude incidence rate of cancer cervix for the greater Yangon population was 24.95% to 25.90% and it was the number one leading cause of morbidity and mortality among female cancer patients[7]. According to the 2010 WHO Cancers Summary Report, Myanmar has a population of 17.92 million women aged 15 years and older who are at risk of developing cervical cancer. Current estimates indicate that every year, 6434 women are diagnosed with cervical cancer and 3536 die from the disease.

In 2011, cancer cervix contributed 58.84% of gynaecological cancer admissions in Central Women's Hospital (CWH, Yangon), 47.58% in (CWH, Mandalay) and 49.12% in Women and Children Hospital, Taunggyi[8]. Analysis of site-specific cancers among the 274 Myanmar elderly subjects who participated in the ASEAN Cost in Oncology Study (ACTION Study) revealed that cervical cancer was the commonest cancer among the elderly female subjects[9].

As cervical cancer is one of the leading causes of all cancer related deaths in women between40 to 60 years age group, focus on screening and early diagnosis followed by treatment for cervical cancer is included as one of the activities needed to be strengthened in order to achieve the Millennium Development Goals 4 and 5 regarding maternal newborn and child health in Myanmar[10].

Various studies carried out in the country had elicited the HPV genotypes 16, 18, 31, 52 were prevalent in the subjects with cervical cancer[11, 12]. Although findings from different studies had revealed the high prevalence of premalignant conditions among the asymptomatic women[13, 14]highlighting the urgent need of a National Screening Program for Cervical Cancer, there is no existing National Screening Program for Cervical cancer in Myanmar. Currently, there are a number of Cervical cancer screening clinics at the Department of Medical Research and the Central Women Hospital and those run by non-

governmental organizations such as the Myanmar Maternal and Child Welfare Association (MMCWA) and Shwe Yaung Hnin Si Cancer Foundation.

A National Coordination Meeting on Cervical Cancer Prevention and Control Programs in Myanmar was held on 15th to 16th January 2015 at Nay Pyi Taw with the goals to review, classify and discuss the strengths and limitations of current programs and begin to develop a strategic framework for a national cervical cancer prevention and control program, followed by discussions and recommendations on primary, secondary, and tertiary prevention as well as short term and intermediate and long term cross-cutting strategies and research[15].

The WHO recommended set of actions includes interventions across the life course which should be multidisciplinary, including components from community education, social mobilization, vaccination, screening, treatment and palliative care. WHO recommends that the primary prevention of cervical cancer should start with HPV vaccination of girls aged 9-13 years, before they become sexually active and women who are sexually active should be screened for abnormal cervical cells and pre-cancerous lesions, starting from 30 years of age. Among the recommended preventive interventions for boys and girls are education about safe sexual practices, including delayed start of sexual activity; promotion and provision of condoms for those already engaged in sexual activity; warnings about tobacco use, which often starts during adolescence, and which is an important risk factor for cervical and other cancers; and male circumcision[16].

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2.3.3 Liver Cancer

Hepatitis B infection

Hepatitis B is caused by the hepatitis B virus and is a major global health problem for it can cause chronic infection, cirrhosis and liver cancer. Globally, 2,000 million people (one third of the world's population) have been infected with HBV, out of which more than 300 million are chronically infected carriers. In highly endemic areas, hepatitis B is most commonly spread from mother to child at birth (perinatal transmission), or through horizontal transmission (exposure to infected blood) during the first 5 years of life. The development of chronic infection is very common in infants infected from their mothers or before the age of 5 years [1].

HBV infection in the Asia-Pacific region is among the highest in the world, and chronic HBV infection in most of the countries of the Asia-Pacific region is high (>10% prevalence) [2]. Approximately 100 million hepatitis B virus carriers, more than 5.6% of the total population, live in countries of the South-East Asia Region. More than 300,000 people are estimated to die each year due to the chronic consequences of hepatitis B, particularly cirrhosis and liver cancer.[3]

Hepatitis B is also spread by percutaneous or mucosal exposure to infected blood and various body fluids, as well as through saliva, menstrual, vaginal, and seminal fluids. Sexual transmission of hepatitis B may occur particularly in unvaccinated men who have sex with men and heterosexual persons with multiple sex partners or contact with sex workers. Infection in adulthood leads to chronic hepatitis in less than 5% of cases. Transmission of the virus may also occur through the reuse of needles and syringes either in health-care settings or among persons who inject drugs. Infection can also occur during medical, surgical and dental procedures, tattooing, or through the use of razors and similar objects that are contaminated with infected blood.

It is estimated that 80–90% of infants infected during the first year of life and 30–50% of children infected before the age of 6 years develop chronic infections. In adults <5% of healthy persons who are infected as adults will develop chronic infection; and 20–30% of adults who are chronically infected will develop cirrhosis and/or liver cancer [1].

A vaccine against hepatitis B has been available since 1982. The vaccine is 95% effective in preventing infection and the development of chronic disease and liver cancer due to hepatitis B.. The hepatitis B vaccine is the mainstay of hepatitis B prevention. WHO recommends that all infants receive the hepatitis B vaccine within 24 hours of birth. The birth dose should be followed by 2 or 3 doses to complete the primary series. As of 2013, 183 Member States vaccinate infants against hepatitis B as part of their vaccination schedules and 93 Member States have introduced the hepatitis B birth dose vaccine.

The WHO recommends that all children and adolescents younger than 18 years-old who are not previously vaccinated should receive the vaccine if they live in countries with low or intermediate endemicity. The following high risk persons including people who frequently require blood or blood products, dialysis patients, recipients of solid organ transplantations; prisoners, Injecting drug users, household and sexual contacts of people with chronic HBV infection; people with multiple sexual partners; health-care workers and others who may be exposed to blood and blood products through their work; and travellers who have not completed their hepatitis B vaccination series, should be offered the vaccine before leaving for endemic areas. In March 2015, WHO

launched its first Guidelines for the prevention, care and treatment of persons living with chronic hepatitis B infection.

WHO recommends the use of oral treatments - tenofovir or entecavir, for chronic hepatitis B infection because these are the most potent drugs to suppress hepatitis B virus. They rarely lead to drug resistance as compared with other drugs, are simple to take (1 pill a day), and have few side effects. However, most people who start hepatitis B treatment must continue it for life as the treatment does not cure hepatitis B infection, but only suppress the replication of the virus.

Hepatitis B virus (HBV) infection is endemic in Myanmar and is a major health problem in the country. Studies had elicited that the HBV is highly prevalent in Myanmar with 10-12% Hepatitis B Surface Antigen (HBsAg) carrier rate [4] is mainly due to vertical transmission from infectious mother to the babies. The transmission rate increased from 24% to 61.1% if the mother is Hepatitis B e Antigen (HBeAg) positive. In the children 1-4 years of age, the HBsAg positivity rate was 5.1% [5].

Findings from a cross-sectional study conducted on 5547 subjects within the age range of 15 to 80 years, both genders, from 18 townships, from 7 States, 7 Regions and Naypyitaw Union Territory from May to November 2015 elicited the prevalence of HB infection ranged from 3.3% in Magway Region to 12.3% in Yangon Region[6].

In Myanmar, the main strategies for the control of viral hepatitis included screening of blood for HBsAg at all blood banks in the country and vaccination of all newborns with hepatitis B vaccine under the Expanded Programme on Immunization (EPI) [7].

Hepatitis B vaccine was incorporated into the Expanded Programme on Immunization (EPI) in 2003 with the assistance of the Global Alliance on Vaccine Initiative (GAVI). By 2004, all newborn babies are immunized with 3 doses of recombinant hepatitis B vaccine at the age of 2, 4 and 6 months [8] in all states and regions of the country. However, hepatitis B vaccine birth dose is given only to the infants delivered at hospitals.

Hepatitis C infection

Hepatitis C is found worldwide. The most affected regions are Africa and Central and East Asia. The global prevalence of HCV is estimated to be 2% (approximately 180 million people worldwide) and varies considerably among different regions [9]. Hepatitis C virus (HCV) causes both acute and chronic infection. Acute HCV infection is usually asymptomatic, and 15–45% of infected persons clear the virus within 6 months of infection without any treatment. The remaining 55–85% of persons will develop chronic HCV infection with the risk of cirrhosis of the liver in 15–30% within 20 years [10].

The hepatitis C virus is most commonly transmitted through: injecting drug use and sharing of injection equipment; reuse or inadequate sterilization of medical equipment, especially syringes and needles; transfusion of unscreened blood and blood products; sexual contact and transmitted from an infected mother to her baby. Hepatitis C is not spread through breast milk, food or water or by casual contact such as hugging, kissing and sharing food or drinks with an infected person.

HCV infection is diagnosed by screening for anti-HCV antibodies with a serological test and if positive, a nucleic acid test for HCV RNA is needed to confirm chronic HCV infection. As 15–45% of people infected with HCV spontaneously clear the infection by a strong immune response without the need for treatment, although no longer infected, they will still test positive for anti-HCV antibodies. After a person has been diagnosed with chronic hepatitis C infection, they should have an assessment of liver damage (fibrosis and cirrhosis) and genotype of the hepatitis C strain. There are 6 genotypes of the HCV and they respond differently to treatment.

Populations at increased risk of HCV infection are similar to hepatitis B and include people who inject drugs, recipients of infected blood products or invasive procedures in health-care facilities with inadequate infection control practices, children born to HCV infected mothers, sexual partners who are HCV-infected, people with HIV infection, prisoners, people who use intranasal drugs, people who have had tattoos or piercings.

Until recently, hepatitis C treatment was based on interferon therapy and ribavirin, which required weekly injections for 48 weeks and caused frequent adverse reactions but cured approximately half of treated patients. Recently, new antiviral drugs called direct antiviral agents (DAA) have been developed which are more effective, safer and better-tolerated than the previous therapies. Therapy with DAAs can cure most persons with HCV infection and treatment is shorter (usually 12 weeks) and safer. However, the initial prices of DAAs are very high and access is difficult even in high-income countries. In April 2014, WHO launched the Guidelines for the screening, care and treatment of persons with hepatitis C [10].

The problem of HCV infection in Myanmar is well recognized and anti-HCV was detected in 2.5% of apparently healthy individuals, 24.9% of patients with liver diseases[11] and in 35% of hepatocellular carcinoma (HCC) cases[12]. Screening of anti-HCV in blood donors was initiated in 2000 with the assistance of the Japan International Cooperation Agency (JICA) [13] and subsequent screening of 154,161 blood donors from May 2000 to April 2004 revealed that the prevalence of HCV infection among Myanmar blood donors was 2.6% [14]. Findings from a recent nationwide- sero-survey conducted on 5547 subjects within the age range of 15 to 80 years, both genders, from 18 townships in 7 States, 7 Regions and Naypyitaw Union Territory from May to November 2015 elicited that the HCV prevalence, range from 0.3% in Bago-East Region and Chin State to 10.3% in Mon State [6].

Liver Cancer

Liver cancer is the fifth most common cancer in men worldwide (523,000 cases per year, 7.9% of all cancers) and the seventh in women (226,000 cases per year, 6.5% of all cancers). Most of the burden of liver cancer is in developing countries, where almost 85% of the cases occur [9]. It is the second leading cause of cancer death in men and the sixth leading cause among women. Liver cancer is one of the most fatal cancers, even in developed countries the five-year relative survival rates is less than 15% [15].

Liver cancer is strongly associated with chronic infection of HBV or HCV. Both HBV and HCV are transmitted by intimate person-to-person contact or direct

contact with infectious blood or blood-derived body fluids through contaminated injections, sexual contact with an infected partner, birth to an infected mother, or contact with contaminated surfaces. In developing countries, 59% of liver cancers are attributable to HBV and 33% are attributable to HCV. In developed countries, 23% of liver cancers are attributable to HBV, while 20% are attributed to HCV[15].

Duration of chronic HBV infections contribute to a greater risk for HCC in areas where HBV infection is common. The risk of developing HCC is increased in patients with higher levels of HBV replication, determined by tests for HBeAg and levels of HBV DNA. HBV genotypes seem to affect clinical outcomes. In studies performed in Asia, there was a greater association between genotype C infection and severe liver disease, cirrhosis, and HCC than genotype B; in Western Europe and North America, individuals with genotype D had a greater incidence of severe liver disease or HCC than those with genotype A[9] .

HCV increases the risk for HCC by inducing fibrosis which is eventually followed by cirrhosis. There are 6 HCV genotypes and several subtypes which respond differently to treatment. Findings from a meta-analysis of 21 studies that calculated age-adjusted risk estimates reported that patients infected with HCV genotype 1b had an almost 2-fold greater risk of developing HCC than patients with other HCV genotypes [9] .

Among the primary liver cancers occurring worldwide, hepatocellular carcinoma (HCC) represent the major histological type and accounts for 70% to 85% of cases[17]. Another type of liver cancer (cholangiocarcinoma) is rare in most parts of the world, but have high incidence rates in Thailand and other parts of Asia due to the high prevalence of liver fluke infection [15] caused by a parasitic worm *Fasciola hepatica*. Humans are infected when they eat plants that have the parasite attached to the leaves of plants such as the watercress. Humans may be infected when they drink contaminated water [18] .

In the developing countries, other risk factor for liver cancer is consumption of food contaminated with aflatoxin B1 (a toxin produced by *Aspergillus flavus,* a fungus that infests grains, peanuts, soybeans, and corn that have been stored in warm, moist conditions) and parasitic infections such as schistosomiasis and

liver flukes. Aflatoxin B1 is a powerful hepatocarcinogen and is classified as a carcinogen by the International Agency for Research on Cancer [19].

As a vaccine is not available for Hepatitis C, the prevention strategies include screening of blood, organ, tissue, and semen donors for antibodies to HCV and imposing adequate infection control practices in all medical, surgical, and dental procedures. Effective preventive strategies also include limiting alcohol as cirrhosis due to heavy alcohol consumption increases the risk for liver cancer. To reduce liver cancer in some areas of the world, is to reduce consumption of foods contaminated with aflatoxins.

Preventive strategies for liver cancer include prevention of hepatitis B and C infection, as well as avoidance of excessive alcohol consumption and implementation of policies to reduce aflatoxin contamination of the food supply [15]. In addition, screening of all donated blood and blood components used for transfusion, safe injection practices, eliminating unnecessary and unsafe injections, following safer sex practices, minimizing the number of partners and using barrier protective measures (condoms), also protect against hepatitis B transmission [1].

In Myanmar, the primary prevention of hepatitis is screening of donated bood and immunization of newborns with 3 doses of HB vaccine. Screening of donor blood for HBsAg had been implemented at the Central National Blood Bank, Yangon since 1989 [20] and screening of HCV was initiated in Yangon, Mandalay and Magway in 2000 [13].

Immunization of newborns with Hepatitis B vaccine has been implemented since 2004 after the incorporation of HB vaccine into the Expanded Programme on Immunization 2003[8] . All newborns recieved 3 doses of vaccine at the age of 2, 4 and 6 months [8] in all states and regions of the country. However, hepatitis B vaccine birth dose is given only to the infants delivered at hospitals

The Ministry of Health and Sports is implementing the National Hepatitis Programme and has already drawn up the National Strategic Plans and the National Treatment guidelines for hepatitis B and hepatitis C. In the National

Strategic Plans, birth dose HB vaccine will be given to the newborns delivered at all tertiary hospitals and eventually to all district and township hospitals in the country [21].

The Myanmar Liver Foundation, a non-governmental organization in collaboration with other civil societies and local NGOs, is providing the community with hepatitis B immunization with the yeast-derived hepatitis B vaccines provided by the Ministry of Health and Sports. In addition to the educational talks on hepatitis awareness and counseling of HBsAg positive persons, more than 1.9 million doses of HB vaccine had been administered to the high-risk groups such as the thalassemia patients and institutionalized persons, as well as the local population across the country[21].

The Food and Drug Administration (FDA) conducted a Workshop on Safety of Edible oil in Naypyitaw in May 2016, highlighting aflatoxin B1 as a carcinogen [22]. A presentation on Aflatoxin and hepatocellular carcinoma was included in the agenda of the workshop and discussions were made on reduction of aflatoxin B1 content in the edible oil produced in the country and to establish a permissible level of aflatoxin content.

To prevent and control viral hepatitis the WHO is working in the following areas:

- raising awareness, promoting partnerships and mobilizing resources;
- formulating evidence-based policy and data for action;
- preventing transmission; and
- executing screening, care and treatment.

The World Hepatitis Day is celebrated on 28 July every year to increase awareness and understanding of viral hepatitis.

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2.3.4. Breast Cancer

Breast cancer is the most commonly diagnosed cancer among women. According to the latest WHO data published in May 2014 Breast Cancer Deaths in Myanmar reached 2,791 or 0.70% of total deaths. The age adjusted Death Rate is 11.08 per 100,000 of population ranks Myanmar number 130 in the world. [1] Besides, breast cancer ranks first among ten commonest cancers during 2001 to 2007 (Cancer Registry, YGH) and it ranged from 17.39% to 18.83% of all cancers and from 28.53% to 30.08% of all women cancers[2]. Despite these large numbers, the death rates from breast cancer have been steadily falling since 1990[1]. The decrease in mortality is partly due to early

detection methods, advanced diagnostic techniques, and improved treatment. The three major ways to screen for early diagnosis breast cancer are breast self examination (BSE), clinical breast examination (CBE), and mammography. Since no one method is 100% effective, it is suggested that all three be used regularly. The American Cancer Society has published guidelines for screening for women with a normal risk for breast cancer [3,4,5].

Globally, most commonly used screening programs were breast self-examination (BSE), clinical breast examination (CBE), and mammography. Mammography is the most effective community-based screening method in the early detection of breast cancer. It is acceptable for women to choose not to do BSE or to do BSE regularly (monthly) or irregularly. Beginning in their early 20s, women should be told about the benefits and limitations of BSE. Whether or not a woman ever performs BSE, the importance of prompt reporting of any new breast symptoms to a health professional should be emphasized. Women who choose to do BSE should receive instruction and have their technique reviewed on the occasion of a periodic health examination. For women in their 20s and 30s, it is recommended that CBE be part of a periodic health examination, preferably at least every three years. Asymptomatic women aged 40 and over should continue to receive a CBE as part of a periodic health examination, preferably annually. And annual mammography should begin at age 40[2].

In Myanmar, there is limited information about women's awareness and perception on BSE or mammogram. If early detection of breast cancer by appropriate screening method is available in hospitals, breast cancer would be diagnosed at a treatable stage. Community-based awareness campaigns on breast cancer have been undertaken nationwide by Non Governmental Organizations such as Shwe Yaung Hnin Si (SYHS) Cancer Foundation. Demonstration of breast examination using a breast model was conducted among nursing students and women in the community. Peer to peer education for early diagnosis was also done by the members of the foundation. Therefore, there has been increased awareness on breast cancer early detection among women. Furthermore, the Oncology Society, Myanmar Medical Association and Shwe Yaung Hnin Si Cancer foundation jointly

organized the First Joint Cancer Forum Myanmar 2015 in Yangon. The aim of the forum is to enhance professional awareness on early detection and timely and effective treatment of cancer so as to improve the outcome of cancer patients in Myanmar [7].

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2.3.5. Stomach Cancer

Stomach cancer was the fourth most common malignancy in the world in 2008, with an estimated 989,600 new cases. Approximately 72% of new cases are in developing countries. Generally, stomach cancer rates are about twice as high in men as in women. Stomach cancer is the third leading cause of cancer death in men and the fifth leading cause in women. About 738,000 people worldwide died from stomach cancer in 2008 [1].

Gastric cancer has a multi-factorial etiology, with genetic elements, dietary factors, and *Helicobacter pylori,* all playing a role in its development. Worldwide, it is the most common malignancy of the gastrointestinal tract,

and remains second only to lung cancer in cancer caused mortality[2]. More than 50% of new stomach cancer cases can be attributed to *H. pylori* infection [3].

Helicobacter pylori is a gram negative bacteria that colonizes in the stomach. The most likely route of spread is from person to person through fecal-oral or oral-oral routes. Possible environmental sources include water contaminated with human waste. To survive in the harsh, acidic environment of the stomach, *H. pylori* secretes urease enzyme, which converts urea to ammonia. The production of ammonia around *H. pylori* neutralizes the acidity of the stomach, making it more hospitable for the bacterium. In addition, the helical shape of *H. pylori* allows it to burrow into the mucus layer, which is less acidic than the inside space, or lumen, of the stomach. *H. pylori* can also attach to the cells that line the inner surface of the stomach[4]. Bacterial genes responsible for virulence include *vacA* and *cagA, iceA* and *babA2 genes and* have association with occurrence of gastrointestinal diseases. There are 2 types of clinical *H. pylori* isolates: *cagA* gene-positive strains and *cagA* gene-negative strains. The *cagA* (cytotoxin associated gene A) gene of *H. pylori* is the main virulence factor that leads to the development of gastric adenocarcinoma through the derangement of cellular architecture. Severe ulceration of the stomach and duodenum is caused by *cagA* positive strains; Strains with the *vacA* genotype *s1 / m1* are more commonly associated with gastric cancer

Normally, the lining of the stomach lacks lymphoid tissue, but development of lymphoid tissue is often stimulated in response to colonization of the lining by *H. pylori* [5]. However, nearly all patients with gastric mucosa-associated lymphoid tissue (MALT) lymphoma show signs of *H. pylori* infection, and the risk of developing this tumor is more than six times higher in infected people than in uninfected people [6, 7].

Dietary risk factors for stomach cancer include diets rich in smoked foods, salted meat or fish, and pickled vegetables. Smoking also increases risk of stomach cancer, particularly for cancers of the upper portion of the stomach closest to the esophagus. Smokers have a 50% to 60% increased risk for stomach cancer compared to nonsmokers [8].

The primary prevention strategy for stomach cancer is to reduce known dietary risks by avoiding foods preserved by salting, pickling, or smoking. Improvement of hygienic conditions may also reduce the risk of *H. pylori* infection. National stomach cancer screening programs are only available in Japan and Korea, where the disease burden is the highest [1].

The standard *H. pylori* eradication regimens include the Triple therapy combining a proton pump inhibitor with two antibiotics, e.g. clarithromycin, metronidazole or amoxicillin. Although this treatment is successful in 70-90% of cases, treatment failure can be resulted from the presence of antimicrobial–resistant strains of *H. pylori*. The prevalence of clarithromycin, metronidazole, and amoxicillin resistances varies between countries and is highest for metronidazole [9]. The main treatments for stomach cancer are surgery, chemotherapy, and radiation therapy. Often the best approach uses two or more of these treatment method.[1].

In Myanmar, studies on *Helicobacter pylori* had been conducted since late 1990s. Findings from a study of *H. pylori* positivity in chronic gastritis and peptic ulcer patients conducted in 2000 had revealed that 20% of cases were *H. pylori* positive [10]. A study to determine the role of *Helicobacter pylori* infection in patients with gastroduodenal diseases revealed that among the *H. pylori* positive patients 54%, 35% and 46% of the patients had duodenal ulcer, gastric ulcer and gastritis respectively.[11]A similar study carried out in 2005 had shown that 30% were positive for *H. pylori by* culture method[12]. In Myanmar, the overall seroprevalence of *H. pylori* is 69% and found to be increased significantly increased with age [13].

A study on antibiotic susceptibility pattern among Helicobacter pylori isolates from chronic dyspepsia patients revealed that *Helicobacter pylori* were isolated from 15% of biopsy specimens (comprising 20% of gastritis, 10% of gastric ulcer and 10% of duodenal ulcer) and that 63.6% of the isolates were resistant to clarithromycin and 100% resistant to metronidazole, but all isolates were sensitive to amoxicillin and levofloxacin[14] and in another study on the distribution of *Helicobacter pylori* virulence genes among gastric cancer and non- cancer dyspeptic patients had elicited that the cagA, vacAs1, vacAs1a, vacAs1c, *vacAm1, vacAm2, iceA1, iceA2,* and *babA2* genes in *H. pylori* of

gastric cancer and non-cancer patients were 100%, 100%, 100%, 0%, 100%, 0%,42%, 33%, 100% and 89%, 83%, 67%, 17%, 83%, 17%, 44%, 33% and 11% , respectively. There was significant relationship between *babA2* gene and gastric cancer (P=0.000), however, the other types of virulence genes of *H.pylori* had no statistically significant association with the clinical outcomes ($p > 0.05$)[15].

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2.3.6. Nutrition and Obesity

Nutrition

Like other developing countries, Myanmar is a country in nutrition transition and faces the double burden of both under-weight and over-weight. A nationwide study on the nutritional status of Myanmar adults in 2003 indicated that 20.5 percent of men and 21.7 percent of women have a low body mass index. Under-nutrition in women is an important contributing factor to low birth weight. The same study found that 7.2 percent of men and 14.5 percent of women were overweight (BMI>25), and 1.4 percent of men and 3.7

percent of women were obese (BMI>30). Overweight and obesity prevalence were higher amongst urban populations compared with those in rural areas, and among skilled laborers and dependent individuals, compared to unskilled laborers. These findings show the emerging issue of over-nutrition, and its probable association with increasing urbanization, life style changes and changing consumption patterns. Diabetes, associated with overweight and obesity, is a growing public health problem in Myanmar[1].

The National Nutrition Centre (NNC) of the Department of Health has implemented Nutrition program area under National Health Plan covers two broad areas namely: Nutrition and Household Food Security. The ultimate aim of the nutrition program is Attainment of nutritional well-being of all citizens as part of the overall social-economic development by means of health and nutrition activities together with the cooperative efforts by the food production sector. To ensure that all citizens enjoy the nutritional state conducive to longevity and health by means of improving nutrient intake and household food security, NNC is addressing the five major nutritional problems with following specific objectives throughout the country: 1) To improve household food security 2) To promote nutritional status of the population by educating and practicing balanced diet 3) To prevent and manage under-nutrition, over-nutrition and diet-related chronic diseases. 4) To observe periodically nutritional status under nutritional surveillance system and 5) To strengthen the nutritional infrastructure. Myanmar has identified five nutrient deficiency states as its major nutritional problems such as Protein Energy Malnutrition (PEM) and four micronutrient deficiencies, namely, Iodine Deficiency Disorders (IDD), Vitamin A Deficiency (VAD), Iron Deficiency Anaemia (IDA) and Vitamin B1 Deficiency (VBD). Most of the nutrition interventions are implemented in all townships throughout the country[2].

According to the Multiple Indicator Cluster Surveys (MICS), prevalence of under-weight among under-five children in 2010 was 28.0%; while the Millennium Development Goal for the under-weight prevalence is 19.3% by 2015. Prevalence of stunting was 28.2% in 2010, and that of wasting was 7.7 % in 2010. The National Nutritional Centre has been implementing following programs and activities like Growth Monitoring and Promotion (GMP)for

children under five years and providing instruments such as new Growth & Development Monitoring Charts, Baby Weighting Scale, Infant Scale, Salter Scale and Bathroom Scale for each and every midwife., Community Nutrition Centre (CNC) for moderately malnourished children in urban areas, Hospital Nutrition Unit (HNU) for severely malnourished children and Community-based Nutrition comprising GMP, CNC and Village Food Bank (VFB)for malnourished children in rural areas to control the Protein Energy Malnutrition (PEM). In addition to these, Strategy on Infant and Young Child Feeding in Myanmar was developed in 2003 and revised. Co-ordination meeting for review and revise of 5 year strategy for Infant and Young Child Feeding (2011-2016) was conducted in 2011 and has been endorsed. For capacity building training workshops for pediatricians on management of severely malnourished children were conducted in 2004, 2007, 2010, 2011 and 2012. Integrated Management of Acute Malnutrition (IMAM) guideline including Facility-based and Community-based Management was revised in 2013 and finalized in 2014. Module and Manual for community based Infant and Young Child Feeding (YCF) workshops was conducted and finalized in 2014[2].

Scaling up Nutrition (SUN) has been implemented in Myanmar to increase recognition of the right for food and good nutrition. In 2010, the SUN was launched as a global movement and a call to collective response to under nutrition. The SUN has become catalytic in galvanizing increased political attention to the importance of nutrition, and 50 countries have joined the movement so far. As a firm supporter and integral part of the SUN, WFP actively engages at the country level to ensure that its activities and support are in line with the country-led SUN strategy. In February 2014, the Ministry of Health, in partnership with FAO, UNICEF, WFP and WHO, officially launched SUN in Myanmar [3].

Obesity

Obesity is a risk factor for both these conditions, and for other non-communicable diseases, which account for approximately 40% of all deaths in Myanmar. Prevention of obesity is the key to the reduction of non-communicable disease morbidity and mortality, but Myanmar lacked reliable data for female body composition. Body fatness in this group therefore needed

to be assessed. The country's community-based nutrition program in rural areas includes growth monitoring and promotion for children under 5, community nutrition centers for moderately malnourished children, and village food banks for malnourished children. Hospital nutrition units for severely malnourished children also exist, as do community nutrition centers in urban areas (Ministry of Health and Sports). However, the majority of the Myanmar population—72% in a study from 2007— receives primary health services through the private sector.

National Nutrition Centre examined the body mass index (BMI) of 3828 fathers and 5504 mothers of under-five children in the year 2000. It was found that 4.5% of mothers and 7.5% of fathers were over-weight (BMI 25 - 29.9), while 0.7% of fathers and 1.8% of mothers were obese (BMI ≥ 30). A more recent study done in 2009 (STEPS, 2009) revealed that among 7429 aged of 15 – 64, 25.4% were found to be overweight or obese, more female were overweight (30.3%, BMI > 25 kg/m2) and obese (8.4%, BMI > 30 kg/m2) than males[2].

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2.3.7. Physical activity

Physical activity is a key determinant of energy expenditure, and thus is fundamental to energy balance and weight control. Physical activity reduces risk for cardiovascular diseases and diabetes and has substantial benefits for many conditions, not only those associated with obesity. The beneficial effects of physical activity on the metabolic syndrome are mediated by mechanisms beyond controlling excess body weight. For example, physical activity reduces blood pressure, improves the level of high density lipoprotein cholesterol, improves control of blood glucose in overweight people, even without

significant weight loss, and reduces the risk for colon cancer and breast cancer among women. For physical activity, it is recommended that individuals engaged in adequate levels throughout their lives. Different types and amounts of physical activity are required for different health outcomes: at least 30 minutes of regular, moderate-intensity physical activity on most days reduces the risk of cardiovascular disease and diabetes, colon cancer and breast cancer. Muscle strengthening and balance training can reduce falls and increase functional status among older adults. More activity may be required for weight control[1]. Therefore it is a need to create an enabling environment for promoting adoption of healthy behaviors related to diet and physical activity by developing an appropriate policy framework and introducing suitable regulatory mechanisms and legislation[2].

It was observed that around 16% of the respondents of the National Survey on Diabetes and Risk Factors for NCDs in Myanmar 2014 did not meet the WHO recommended level of physical activity ($\geq$ 150 minutes of moderate-intensity activity per week, or equivalent) (12.5% for males and 18.8% for females). The mean duration of total physical activity per day was 259 minutes (298 for males and 220 for females). Work-related activity, transport activity and recreation-related activity comprised 63%, 32% and 5% of the total physical activity among the all respondents. On an average, work-related activity, transport activity and recreation-related activity comprised 65%, 29% and 6% of the total physical among male respondents, and 60%, 36% and 4% of the total activity among female respondents [3].

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2.3.8. Alcohol

The harmful use of alcohol is one of the world's leading health risks. It is a causal factor in more than 60 major types of diseases and injuries and results in approximately 2.5 million deaths each year. If we take into consideration the beneficial impact of low risk alcohol use on morbidity and mortality in some diseases and in some population groups, the total number of deaths attributable to alcohol consumption was estimated to be 2.25million in 2004 [1.]

Alcoholic beverages are widely consumed throughout the world. While most of the adult population drinks at low-risk levels most of the time or abstains together, the broad range of alcohol consumption patterns, from daily heavy drinking to occasional hazardous drinking, creates significant public health and safety problems in nearly all countries. Alcohol consumption has been identified as carcinogenic for the following cancer categories: cancers of the colo-rectum, female breast, larynx, liver, oesophagus, oral cavity, and pharynx [2]. The higher the consumption of alcohol, the greater the risk for these cancers, even the consumption of two drinks per day causes an increased risk for some cancers, such as breast cancer[3].

It was reported in the findings of the National Survey on Diabetes and Risk Factors for NCDs in Myanmar 2014 that among the study population 19.8% were current drinkers (in the past 30 days). More male respondents, 38.1% were current drinkers. Only a small percentage of females (1.5%) were current drinkers. However, nearly 42% of the male respondents and 95.8% of the female respondents were life-time abstainers. Among the past year drinkers, 23.9% of the study population consumed alcohol on a daily basis (24.4% males and 14.9% females). Current drinkers consumed 5.2 drinks on one occasion in the past 30 days. The average number of standard drinks per drinking occasion among male drinkers was 5.3, whereas that among female drinkers was 3.2[4].

One of the most effective restrictions on the availability of alcohol is the restriction of sales and consumption by people below a legal drinking age restrictions may apply to alcohol purchased and consumed in the same place (on-premise) or alcohol purchased for consumption elsewhere (off-premise). For reducing consumption of alcohol at the population level is through

increasing alcohol prices, usually accomplished by raising alcohol taxes[1]. In Myanmar policy and strategies have been launched for reducing alcohol consumption but reinforcement of law is required for effective restriction.

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2.4. Management of cancer cases in Myanmar

There are four main cancer treatment centers in Myanmar. The oldest center was established in 1958 at the Yangon (then Rangoon) General Hospital initially under a medical ward and later as a separate radiotherapy ward in 1963. The Department of Radiotherapy in Sao San Htun Hospital, Taunggyi was established since the opening of the Sao San Htun Hospital in 1962. Recently, a radiotherapy department was opened at the Nay Pyi Taw 1000 bedded hospital. There is also one private centre which offers radiotherapy services in Yangon. Although public centers provide free service, lengthy waiting periods discourage patients and divert to other methods of management. Recently, improved provision of radiotherapy (largely linear accelerator technology) services in the four tertiary cancer centers is observed, but they are still insufficient to cater the high volume of cancer patients. Also long delays (up to 6 months) with access to brachytherapy after external beam radiotherapyare also common. HDR brachytherapy in MGH started very recently and HDR brachytherapy in Nay Pyi Taw and Taunggyi is not available.

The Yangon Cancer Registry was also initiated since 1974 and yearly reports were published up to 1986. There were no publications during 1986 to 1994. The registry resumed publication after 1994. Hospital-based cancer registries exists in the four main cities (Yangon, Nay Pyi Taw, Taunggyi, and Mandalay), but are paper-based and not integrated into the national system. There is no population based cancer registry in Myanmar that collects information on individuals with cancer. Pilot work for data entry system in Nay Pyi Taw is in progress.

Good overall nuclear medicine services are present at the Yangon General Hospital (YGH), Mandalay General Hospital (MGH) and Naypyitaw General Hospital (NGH) but irregular supply of radioisotopes leads to sub-optimal utilization of equipment PET-CT and cyclotron facility is being installed at YGH.

Myanmar has good diagnostic facilities at the major general hospitals. Pathology services and cancer surgery are available in tertiary centers, mainly at teaching hospitals. There are private laboratories for diagnosis of cancer in the country. However, quality assurance / quality control (QA/QC) of diagnostic facilities are limited.

Evidence-based national guideline on the management (diagnosis and treatment) of cancer is available and is fully implemented. The last update was in 2012. For the management of cancer, cancer centers or cancer departments at tertiary level are generally available or affordable. Subsidized chemotherapy, on the other hand, is generally not available or affordable. Laminar flow hood for chemotherapy preparation does not exist in any of the tertiary cancer centers.

Regarding manpower, local medical universities produce medical oncologists and radiation oncologists. There are also oncologists trained abroad. There is shortage of radiation physicists, technicians and oncology nurses. Only a very small number of medical technologists and engineers are available. Although cancer surgeons, physicians and oncologists are treating cancer patients in health facilities, multi-disciplinary approach is limited. A multi-disciplinary team for cancer management, involving radiation oncologist, surgeon, pathologist, radiologist and palliative care professionals are lacking.

The Yangon General Hospital has in-patient and out-patient palliative care services which started in 2014, but the palliative care services in Mandalay, Nay Pyi Taw and Taunggyi, is still lacking. Palliative care, both in primary health care and community or home-based care is generally not available.

Situation of existing equipment for cancer management at five teaching hospitals is shown in Table 2.

Table 2. Existing Equipment (working condition and/or ready to install) by type of hospital in 2015

Nay Pyi Taw General Hospital	YGH (Radiation Oncology Dept.)	Mandalay General Hospital	Taung gyi General Hospital	Magway Teaching Hospital
Linear accelerator (Elekta)	Cobalt 60 Machine Theratron Elite Cobalt (I) Theratron Phoenix Cobalt (II)	ELEKTA,PRECISE	LA with MLC Clinac-ix – 1	Lab facilities for tumor markers and Receptor status like ER, PR, Her – 2 neu
CT – simulator (SOMATOM Sensation open)	VARIAN, CLINAC iX Varian Clinac iX (I) Varian Clinac iX (II)	VARIAN , CLINAC iX	CT simulator	Echocardiogram for pre-chemo assessment
Brachytherapy (Flexitron) – not installed yet	High Dose Rate (HDR) Brachytherapy with Iridium 192 Source	HDR BRACHYHERAPY, MULTISOURCE	Cobalt 60 with MLC Equinox (15000 Ci)	Bone scan
c- arm – not installed yet	CT - Simulator CT Simulator (Siemens) I Simulator (Phillips) II	CT – simulator (SIEMENS, SOMATOM SENSATION OPEN)		Bronchoscopy
Computerized dosimetry system for LA	C - arm Digital Mobile C-arm	C-arm		
HDR dosimetry system for Brachytherapy	Negative Isolator (I) at Cancer Ward			

The Nuclear Medicine Department at the Yangon General Hospital was founded in 1964. The department was assisted by IAEA technical cooperation programs since its beginning. In later years Nuclear Medicine Departments have been established at Mandalay General Hospital and Nay Pyi Taw 1000 bedded General Hospital but the functions are limited mainly to radio-immunoassays. At present, the following equipment were installed and were functioning since there installation.

Table 3. Equipment installed at RHC

Sr.	**Equipment**	**Date of installation**
1.	Spect gamma camera	2003
2.	Spect/ct	2014
3.	Pet/ct	2015
4.	Cyclotron	2015
5.	Thyroid uptake unit	More than 10 years
6.	Hot lab	More than 10 years
7.	Gamma counter for ria and laboratory equipment	More than 10 years
8.	Radiation monitors	More than 10 years
9.	Computer network system	More than 10 years

Chapter 3. Radiation Safety

Myanmar has promulgated the Atomic Energy Law 1998 which is outdated and need revisions. Regulations are also needed. A regulatory body with responsibilities and functions in compliance with IAEA standards and in compliance with international standards is lacking. The regulatory body should then develop and implement a comprehensive system of regulations and guidelines for ensuring the protection and safety in all the applications of ionizing radiation in compliance with IAEA standards.

The Ministry of Health and Sports promotes measures to prevent health care providers, patients and general public from radiation hazards as nuclear energy related procedures are commonly used in health facilities. The Department of Medical Services employs different basis of radiation sources such as radioisotopes, high-energy emitters, and X ray radiation. The Department of Medical Research also uses radioisotopes in the molecular-based laboratory diagnostic tests and radio-immuno assays. The Radiation Protection Committee (Ministry of Health and Sports) has been formed in 1999 with the principal objectives of organizing radiation safety measures at all levels of health practices. The activities carried out are carefully planned and organized to enable the benefits of radiation energy to reach the end user yet ensuring prevention of radiation hazards.

However, radiation safety practices are not widely practiced in most hospitals. Manuals are lacking for protection of radiation workers (medical doctors, medical physicists, technicians, nurses and for protection of patients undergoing imaging or therapy. Safe and secure disposal of disused radioactive source (cobalt-60 and caesium-137) also need to be addressed.

At the Department of Medical Research, a Radiation Safety Unit has been established and a Radiation Safety Officer assigned for efficient control of radiation safety. A DMR Manual for safe Handling of Radioisotopes has been made available to those handling radioactive materials. Ordering of radioisotopes from sources outside/inside the country, storage and transport of radioisotopes are permitted only out with agreement of the Head of Nuclear Safety Unit. Personal exposure records are maintained for all research workers using radioactive nuclides and monitored monthly for personnel safety. Area

monitoring is carried out every four months for radiation contamination and safety of work places. Waste storage and disposal of solid and liquid wastes are carried out under supervision.

Chapter 4. Co-operation with International and Local Organizations

Myanmar is working closely with IAEA and WHO in control of cancer. IAEA had supported the establishment of Radiotherapy and Nuclear Medicine Departments at the Rangoon General Hospital (now Yangon General Hospital) and a Radioisotope Laboratory at the Department of Medical Research (DMR). IAEA further support human resource development by provision of training programs and expert missions. The IAEA Technical Co-operation Program at the Department of Medical Research (DMR) started in 1976-78. Since then DMR has been collaborating closely with the IAEA under regular Technical Co-operation Programs and periodic Research Contracts and Co-ordinated Research Programs.

According to WHO biennial work plans since 1994, WCO Myanmar provides support for fellowship training abroad for various aspects of cancer, in country trainings and provides technical assistance for cancer prevention, early diagnosis and treatment. Currently WHO Country Office, Myanmar in collaboration with the programme manager / focal point for cancer has been formulating the National Cancer Control Plan for 2017-2021

Recently, Asia Pacific Hospice Network / Lian Foundation provides three-year palliative care training programme for 14 doctors, 8 nurses and 3 social workers from four tertiary cancer centers (NGH, YGH, MGH and Sao San Htun Hospital).

Myanmar has two 50-bedded hospices run by the charity U Hla Tun Hospice Foundation (in Yangon and Mandalay) which provide free services (eg pain relief, accommodations and bereavement support). The Project was initiated since 1997. It started with modest ambulatory care facilities and gradually expanded. Now, each hospice facility has two doctors, three senior nurses, ten nursing aides and an oncologist visits once per week. Recently another charity funded out-patient facility was established in Yangon (Shwe Yaung Hnin Si Cancer Foundation).

Chapter 5: Budget (Summary)

The summary table is shown in Table 5.1 and the required budgets (in USD) for each strategy are shown in Tables 5.2 to 5.8

5.1. Estimated budget by strategy by year (in USD)

Strategy	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
Primary prevention	112,500	63,500	63,000	62,500	62,500	**364,000**
Early detection of cancer	7,939,200	1,537,400	1,546,600	1,588,800	1,631,000	**14,243,000**
Improved effective diagnosis and treatment of cancer	25,712,335	23,387,160	19,688,660	7,809,160	7,384,160	**83,981,475**
Improvement of the quality of life of cancer patients	142,000	104,500	84,500	84,500	84,500	**500,000**
Documentation of cancer patients	200,000	1,000,000	2,000,000	2,000,000	2,000,000	**7,200,000**
Surveillance and research	26,000	1,008,500	8,500	10,000	10,000	**1,063,000**
Radiation safety	219,224	278,000	160,148	93,000	208,000	**958,372**
TOTAL	**34,351,259**	**27,379,060**	**23,551,408**	**11,647,960**	**11,380,160**	**108,309,847**

Table 5.2. Budgetary Requirement for Primary Prevention (in USD)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	To reduce percentage of smokers to 15% by 2021	19,000	12,000	11,500	11,500	11,500	**65,500**
2.	To reduce liquid tobacco use to 20% by 2021	10,500	8,500	8,500	8,000	8,000	**43,500**
3.	To reduce percentage of persons with insufficient physical activity defined as <150 minutes of moderate intensity activity per week, or equivalent to 10% by 2021	15,000	7,500	7,500	7,500	7,500	**45,000**
4.	To promote use of healthy food in 80% of the population by 2021	31,000	16,000	16,000	16,000	16,000	**95,000**
5.	To reduce percentage of overweight persons (BMI > 25kg/m2) to 20% by 2021	15,000	7,500	7,500	7,500	7,500	**45,000**
6.	To reduce those who are current drinkers to 10% in 2021	15,000	7,500	7,500	7,500	7,500	**45,000**
7.	To promote expansion of immunization program	3,500	2,500	2,500	2,500	2,500	**13,500**
8.	To promote awareness on environmental carcinogens	3,500	2,000	2,000	2,000	2,000	**11,500**
9.	To monitor carcinogens in the environment	G	G	G	G	G	**G**
	TOTAL	**112,500**	**63,500**	**63,000**	**62,500**	**62,500**	**364,000**

5.3. Budgetary Requirement for early detection of cancer (in USD)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	To promote awareness on the importance of early detection of oral cancer and to conduct screening campaigns	180,000	130,000	120,000	120,000	120,000	**670,000**
2.	To promote awareness on the importance of early detection of breast cancer	1,721,000	738,500	729,000	729,000	729,000	**4,646,500**
3.	To promote awareness on the importance of early detection of cervical cancer	13,500	13,500	13,500	13,500	13,500	**67,500**
4.	To conduct hospital programs or screening campaigns to increase the percentage of women aged 30-49 years who had ever had a screening test for cervical cancer to 25% of the population	64,500	64,500	64,500	64,500	64,500	**322,500**
5.	To promote awareness on the availability of treatment for HCV and HP infections, Hepatobiliary and pancreatic cancer	10,200	25,900	14,600	16,800	19,000	**86,500**
6.	To increase the percentage (25%) of those with HCV /HP / Hepatobiliary and pancreatic cancer getting treatment	5,950,000	565,000	605,000	645,000	685,000	**8,450,000**
	TOTAL	**7,939,200**	**1537400**	**1,546,600**	**1,588,800**	**1,631,000**	**14,243,000**

5.4. Budgetary Requirement for improved effective diagnosis and treatment of cancer (in USD)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	To improve quality of pathology and immunology services	956,640	956,640	956,640	956,640	956,640	**4,783,200**
2.	To upgrade blood bank services	1,677,520	1,677,520	1,677,520	1,677,520	1,677,520	**8,387,600**
3.	To expand or upgrade facilities for cancer care	22,211,075	20,310,500	16,652,500	4,865,500	4443500	**68,483,075**
4.	To improve the quality of care of adult and pediatrics hematological cancers	297,100	170,500	209,000	113,500	113,500	**903,600**
5.	To increase and to upgrade cancer work force	570,000	272,000	193,000	196,000	193,000	**1,424,000**
	TOTAL	**25,712,335**	**23387160**	**19,688,660**	**7,809,160**	**7,384,160**	**83,981,475**

5.5. Budgetary Requirement for improvement of the quality of life of cancer patients (in USD)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	To increase number of Palliative clinics	30,000	30,000	10,000	10,000	10,000	**90,000**
2.	To improve the quality of palliative care given to cancer patients	98,500	72,500	72,500	72,500	72,500	**388,500**
3.	To establish for Public awareness program	13,500	2,000	2,000	2,000	2,000	**21,500**
	TOTAL	**142,000**	**104,500**	**84,500**	**84,500**	**84,500**	**500,000**

5.6. Budgetary Requirement for documentation of cancer patients (in USD)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	To establish steering and working committee for development HBCR in Hospitals with RT facility and PBCR in Myanmar	-	-	-	-	-	**-**
2.	To complete data entry system and set up pilot dedicated cancer registry unit in NPTGH	200,000	1,000,000	-	-	-	**1,200,000**
3.	To set up the dedicated Cancer registry units in all major cancer centers (YGH, MGH, TGH, Military)	-	-	2,000,000	-	-	**2,000,000**
4.	To develop PBCRs in Nay Pyi Taw and Yangon regions as initial phase	-	-	-	2,000,000	2,000,000	**4,000,000**
	TOTAL	**200,000**	**1,000,000**	**2,000,000**	**2,000,000**	**2,000,000**	**7,200,000**

5.7. Budgetary Requirement for surveillance and research (USD)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	To conduct a pilot implementation for the application of telemedicine as a tool for population-based cancer registry, followed by study at District level	8,500	8,500	8,500	10,000	10,000	**45,500**
2.	To promote research on basic, clinical, and epidemiological aspects of cancer (workshops) - to identify priority cancer research areas - to set up ethical standards and procedures	17,500	-	-	-	-	**17,500**
3	To determine and evaluate effective methods of preventing cancer (Cancer Research Center)	-	1,000,000	-	-	-	**1,000,000**
	TOTAL	**26,000**	**1,008,500**	**8,500**	**10,000**	**10,000**	**1,063,000**

5.8. Budgetary Requirement for radiation safety (in USD)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	To establish radiation safety units in all facilities using radioisotopes and radioactive sources	4,000	4,000	4,000	4,000	4,000	**20,000**
2.	To upgrade equipment for radiation safety	211,224	270,000	152,148	85,000	200,000	**918,372**
3.	Development of human resources in radiation safety	4,000	4,000	4,000	4,000	4,000	**20,000**
	TOTAL	**219,224**	**278,000**	**160,148**	**93,000**	**208,000**	**958,372**

Annex 1

National Comprehensive Costed Cancer Control Plan

(2017-2021)

Strategy 1. PRIMARY PREVENTION

1. PRIMARY PREVENTION

Tobacco use

Goal - Reduce cancer incidence, illness, and death due to tobacco use among Myanmar people

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To reduce percentage of smokers to 15% by 2021**								
1.1	Expansion of tobacco free areas (e.g. Restaurants, railway stations, airport)	No. and location of free areas	MOHS Other ministries	1000	1000	1000	1000	1000	MOHS, WHO
1.2	Development of IEC materials (e.g., Development of SLT 85000(Pamphlet) (T-shirt)	Type of IEC materials & messages	MOHS	3500	2500	2500	2500	2500	MOHS, WHO
1.3	Activities in support of preventing passive smoking	Public awareness HE	MOHS Other ministries	5000	2500	2000	2000	2000	MOHS, WHO
1.4	Advocacy campaigns to promote awareness of health, social and economic impact of tobacco use HE Poster / Bill Board Display (YCDC)	No. of campaigns	MOHS Other ministries	5500	2000	2000	2000	2000	MOHS, WHO
1.5	Re-enforcement of the control of law on smoking and consumption of tobacco product enacted in 2006	Re-enforced	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
1.6	Further increase on tobacco excise tax	Tobacco excise tax increased	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
1.7	To further increase the size of warnings on tobacco packages	Size of warnings increased	MOHS Other ministries	G	G	G	G	G	MOHS, WHO

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1.8	To monitor youth tobacco use rates	Youth tobacco use rate	MOHS Other ministries	4000	4000	4000	4000	4000	MOHS, WHO
1.9	Ban on tobacco advertisement, promotion and sponsorship in public media and areas	Bans initiated	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
2	**To reduce liquid tobacco use to 20% by 2021**								
2.1	To discourage smokeless tobacco	Types of discouragement	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
2.2	Advocacy campaigns to promote awareness of health, social and economic impact of liquid tobacco use at central level	No. of campaigns	MOHS Other ministries	3000	2000	2000	1500	1500	MOHS, WHO
2.3	To intensify public awareness on health hazards of smokeless tobacco use	Types of IEC materials/ media campaigns	MOHS Other ministries	3500	2500	2500	2500	2500	MOHS, WHO
2.4	To monitor smokeless tobacco use among taxi and bus drivers	Percentage of current smokeless tobacco users among taxi and bus drivers	MOHS Other ministries	4000	4000	4000	4000	4000	MOHS, WHO

Promotion of physical activity

Goal – Myanmar people will carry out healthy physical activity choices for cancer prevention

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To reduce percentage of persons with insufficient physical activity defined as <150 minutes of moderate intensity activity per week, or equivalent to 10% by 2021**								
1.1	Awareness campaigns to promote physical activity at central level (NPT), State and Region levels	No. of campaigns	MOHS Other ministries	15000	7500	7500	7500	7500	MOHS, WHO
1.2	Physical exercise classes in schools, work places, public places	No. of schools, work places & public places	MOHS Other ministries	G	G	G	G	G	MOHS, WHO

Nutrition

Goal – Myanmar people will make healthy nutrition choices for cancer prevention

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To promote use of healthy food in 80% of the population by 2021**								
1.1	Advocacy meetings with law makers and policy makers (to introduce restrictions on marketing of unhealthy foods (sweets /high fat /soft drinks/food with high salt preservatives/ contaminants in edible oil/ sauce) at central level (NPT), State and Region levels	No. of advocacy meetings	MOHS Other ministries	15000	7500	7500	7500	7500	MOHS, WHO
1.2	Advocacy meetings with food manufacturers on use of chemical dyes in food processing at central level	No. of food manufacturers advocated	MOHS Other ministries	1000	1000	1000	1000	1000	MOHS, WHO
1.3	To scale up awareness campaigns to promote balanced nutrition at State and Region levels and NPT	No. of campaigns	MOHS Other ministries	15000	7500	7500	7500	7500	MOHS, WHO
1.4	To define permissible level of Aflatoxin in groundnut oil	Permissible level defined	MOHS Other ministries & organizations	G	G	G	G	G	MOHS, WHO

Obesity

Goal – Less no. of Myanmar people will become obese and will prevent cancer

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To reduce percentage of overweight persons (BMI > 25kg/m2) to 20% by 2021**								
1.1	Public campaigns to reduce carbohydrate and fat intake at State and Region levels and NPT	No. of campaigns	MOHS Other ministries	15000	7500	7500	7500	7500	MOHS, WHO
1.2	Awareness campaigns to promote balanced nutrition to in collaboration with nutrition activity 1.3	No. of campaigns	MOHS Other ministries	-	-	-	-	-	MOHS, WHO
1.3	To establish obesity clinics in hospitals (tertiary/ district)	No. of obesity clinics	MOHS	G	G	G	G	G	MOHS, WHO
1.4	To promote action plan to reduce physical inactivity/ promote physical activity among obese persons	No. and types of physical activities	MOHS	G	G	G	G	G	MOHS, WHO

Alcohol

Goal – Reduction of cancer related to alcohol use among Myanmar people

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To reduce those who are current drinkers to 10% in 2021**								
1.1	Information on alcohol-related cancer burden presented to policy makers	Information imparted	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
1.2	Public campaigns using various media to prevent alcohol abuse, especially in teenagers at S/R+NPT	No. of campaigns	MOHS Other ministries	15000	7500	7500	7500	7500	MOHS, WHO
1.3	Further efforts to increase alcohol excise tax (SIN TAX)	Increase in SIN TAX	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
1.4	Ban on alcoholic beverages advertisement, promotion and sponsorship in public media and public places	Ban established	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
1.5	To reinforce minimum age for off-premises sales of alcoholic beverages	Re-enforced	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
1.6	To implement legally binding regulations on alcohol advertising	Regulations enacted	MOHS Other ministries	G	G	G	G	G	
1.7	Strengthening capacities for counseling and treating alcohol abuse	Strengthened	MOHS Other ministries	G	G	G	G	G	MOHS, WHO

Biological carcinogens (HBV, HCV, HPV, H pylori)

Goal – To reduce cancer deaths from biological carcinogens

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To promote expansion of Immunization Program**								
1.1	To increase coverage of hepatitis B vaccination program up to 90%	Increased	MOHS	G	G	G	G	G	MOHS, WHO
1.2	To introduce birth dose of hepatitis B vaccination in district hospitals	No. of hospitals	MOHS	G	G	G	G	G	MOHS, WHO
1.3	To promote catch up HBV immunizations for girls aged 15-18 years	No. of girls immunized	MOHS	G	G	G	G	G	MOHS, WHO
1.4	To introduce routine HPV vaccination for girls aged 9-13 years of age	No. of girls immunized	MOHS	G	G	G	G	G	MOHS, WHO
1.5	To develop IEC materials for promoting awareness of *H.pylori* as a biological carcinogen for stomach cancer	No. and type of IEC materials developed	MOHS	3500	2500	2500	2500	2500	MOHS, WHO

Environmental Contaminants

Goal – To reduce the exposure of Myanmar people to harmful levels of carcinogenic environmental contaminants

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To promote awareness on environmental carcinogens**								
1.1	To develop/ produce IEC materials for health personnel and public	IEC materials developed /produced	MOHS Other ministries	3500	2000	2000	2000	2000	MOHS, WHO
2	**To monitor carcinogens in the environment**								
2.1	To build up capacity for monitoring of priority environmental hazards (e.g. lead, arsenic, mercury)	Capacity built up	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
2.2	To expand monitoring of the misuse of pesticides in agriculture sector	Misuse monitored	MOHS Other ministries	G	G	G	G	G	MOHS, WHO
2.3	To monitor radiation exposure and radon activity from medical and industrial use	Exposure monitored	MOHS Other ministries	G	G	G	G	G	MOHS, WHO

STRATEGY 1. PRIMARY PREVENTION

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	**To reduce percentage of smokers to 15% by 2021**	19000	12000	11500	11500	11500	**65500**
2.	**To reduce liquid tobacco use to 20% by 2021**	10500	8500	8500	8000	8000	**43500**
3.	**To reduce percentage of persons with insufficient physical activity defined as <150 minutes of moderate intensity activity per week, or equivalent to 10% by 2021**	15000	7500	7500	7500	7500	**45000**
4.	**To promote use of healthy food in 80% of the population by 2021**	31000	16000	16000	16000	16000	**95000**
5.	**To reduce percentage of overweight persons (BMI > 25kg/m2) to 20% by 2021**	15000	7500	7500	7500	7500	**45000**
6.	**To reduce those who are current drinkers to 10% in 2021**	15000	7500	7500	7500	7500	**45000**
7.	**To promote expansion of immunization program**	3500	2500	2500	2500	2500	**13500**
8.	**To promote awareness on environmental carcinogens**	3500	2000	2000	2000	2000	**11500**
9.	**To monitor carcinogens in the environment**	G	G	G	G	G	**G**
	TOTAL	112500	63500	63000	62500	62500	**364000**

Annex 2

National Comprehensive Costed Cancer Control Plan

(2017-2021)

Strategy 2.EARLY DETECTION OF CANCER

1. EARLY DETECTION OF CANCER

Oral Cancer

Goal – To reduce death from oral cancer

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To promote awareness on the importance of early detection of oral cancer and to conduct screening campaigns**								
1.1	Raising public awareness on early signs using FM radio and TV, Articles in Newspapers and weekly Journals, Mass Media Campaigns (monthly in two distinguished local Newspaper)	Numbers of Newspaper Advertisements	MOHS Other ministries	10000	10000	10000	10000	10000	MOHS, WHO
1.2	Health education on dental hygiene and betel quid chewing as a major risk for oral cancer, University- based patient education and community-based health education (yearly to a specific region in country and monthly to peri-urban areas around Yangon)	Number of Health education talks	MOHS Dental Association	30000	30000	30000	30000	30000	MOHS, WHO
1.3	Training programs for GP, Dental Surgeons ; 40 dental surgeons trained per years (training of the trainers by using advanced technology)	No. of dental surgeons trained per year	MOHS and Dental Association	50000	20000	30000	30000	30000	MOHS, WHO

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1.4	Oral cancer screening using oral visual/ ultra violet apparatus in dental clinics and surveys 10000 persons screened per years in University clinic as well as in community- based survey	No. of persons screened per year	MOHS and Dental Association	90000	70000	50000	50000	50000	MOHS, WHO

Breast cancer

Goal – To reduce death from breast cancer

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To promote awareness on the importance of early detection of breast cancer**								
1.1	Public awareness on early warning signs using FM Radio and TV for community, Articles in Newspaper / Weekly Journal and Mass Media Campaigns	Types of messages	MOHS Other ministries	13500	13500	13500	13500	13500	MOHS, WHO
1.2	To teach breast self-examination (BSE) to nurses and midwives attending nurses / midwives training schools	No. of nurses and midwives with knowledge on BSE	MOHS	-	4000	4000	4000	4000	MOHS WHO
1.3	Promotion of Self Breast Examinations in the community using Health Education Talks and Breast Models (Bi-annually for 45 to 65 years)	No. of women with knowledge on BSE	MOHS Associations / Foundations / Societies	G	G	G	G	G	MOHS, WHO
1.4	Development of guide lines and Training of GPs	Guidelines developed and distributed to GPs	MOHS Associations / Foundations / Societies	-	13500	4000	4000	4000	MOHS, WHO
1.5	Mammography mobile vehicle (2 vehicles)	No. of vehicles	Associations / Foundations / Societies	1,000,000					
1.6	Installation of Mammograms in major hospitals (10 in numbers)	No. of mammograms installed	MOHS	700,000	700,000	700,000	700,000	700,000	MOHS, WHO

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1.7	Human Resource Development (training for radiologists/ radiology technician	No. of trained persons	MOHS	4000	4000	4000	4000	4000	MOHS, WHO
1.7.1	2 month training for two radiologists	No. of trained persons	MOHS	2200	2200	2200	2200	2200	
1.7.2	1 month training for two Radiology Technicians	No. of trained persons	MOHS	1300	1300	1300	1300	1300	

Cervical Cancer

Goal – To reduce death from cervical cancer

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To promote awareness on the importance of early detection of cervical cancer**								
1.1	Public awareness on early warning signs using FM Radio and TV for community,Articles in Newspaper/Weekly Journal and Mass Media Campaigns	Types of messages	MOHS Other ministries	13,500	13,500	13,500	13,500	13,500	MOHS, WHO
2	**To conduct hospital programs or screening campaigns to increase the percentage of women aged 30-49 years who had ever had a screening test for cervical cancer to 25% of the population**								
2.1	Training program and guidelines on VIA method for nurses and midwives	Guidelines produced	MOHS	15,000	15,000	15,000	15,000	15,000	MOHS, WHO
2.2	Promotion of Field Screening Campaigns using VIA (Visual Inspection with Acetic Acid) kits for Associations	No. of women screened	MOHS Associations / Foundations / Societies	36,000	36,000	36,000	36,000	36,000	MOHS, WHO
2.3	Routine pap-smear testing at Women Clinics (25 to 65 years old females once a year)	No. of women tested	MOHS Associations	G	G	G	G	G	MOHS, WHO
2.4	On-site management using (Cryotherapy)	No. of women treated	MOHS associations	G	G	G	G	G	MOHS, WHO
2.5	Distribution of clinical guidelines on pap smear testing, VIA testing, and treatment to district hospitals	No. of District hospitals	MOHS	13,500	13,500	13,500	13,500	13,500	MOHS, WHO

Early treatment of infections (to prevent cancer development)

Goal – To initiate treatment of HCV and HP infections to reduce liver, gastric, hepatobiliary and pancreatic cancer

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To promote awareness on the availability of treatment for HCV, HP infections, Hepatobiliary and pancreatic cancer**								
1.1	Public awareness on HCV treatment using FM Radio and TV for community,Articles in Newspaper/Weekly Journal and Mass Media Campaigns	Types of messages -to initiate the importane of early treatment of HCV infection to reduce liver cancer	MOHS Associations / Foundations / Societies	10000	12000	14000	16000	18000	MOHS, WHO
1.2	Public awareness on H pylori treatment using FM Radio and TV for community,Articles in Newspaper/Weekly Journal and Mass Media Campaigns	Types of messages	MOHS Associations / Foundations / Societies	-	13500	-	-	-	MOHS, WHO
1.3	To promote awareness of Hepatobiliary and pancreatic malignancy	Type of messages	MOHS Associations / Foundations / Societies	200	400	600	800	1000	MOHS, WHO
2	**To increase the percentage (25%) of those with HCV /HP/ Hepatobiliary and pancreatic cancer getting treatment**								
2.1	To develop guidelines for treatment of HCV infection and distribute to District hospitals	No. of District hospitals	MOHS Associations / Foundations / Societies	50000	60000	70000	80000	90000	MOHS, WHO

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
2.2	To develop guidelines for treatment of H pylori infection and distribute to 6 hospitals	Guidelines distributed	MOHS Associations / Foundations / Societies	30,000	5,000	5,000	5,000	5,000	MOHS, WHO
2.3	Equipment and medicine for treatment of H. pylori	Equipment received	MOHS Associations / Foundations / Societies	850,000	400,000	400,000	400,000	400,000	MOHS WHO IAEA
2.3.1	Equipment and supplies for early detection and surgical planning	Equipment	MOHS	20,000	40,000	60,000	80,000	100,000	MOHS WHO IAEA
2.3.2	USG/ Fibroscan	Equipment in use (fibroscan)	MOHS Associations / Foundations / Societies	1,000,000	-	-	-	-	MOHS WHO IAEA
2.3.3	MRI	Equipment in use (MRI)	MOHS Associations / Foundations / Societies	3,500,000	-	-	-	-	MOHS WHO IAEA
2.3.4	HCV screening	Rapid diagnosis test	MOHS Associations / Foundations / Societies	50,000,	60,000	70,000	80,000	90,000	MOHS WHO IAEA
2.3.5	HCV treatment	PCR machine for viral load and genotype	MOHS Associations / Foundations / Societies	500,000	-	-	-	-	MOHS WHO IAEA

STRATEGY 2. EARLY DETECTION OF CANCER

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	**To promote awareness on the importance of early detection of oral cancer and to conduct screening campaigns**	180,000	130,000	120,000	120,000	120,000	670,000
2.	**To promote awareness on the importance of early detection of breast cancer**	1,721,000	738,500	729,000	729,000	729,000	4,646,500
3.	**To promote awareness on the importance of early detection of cervical cancer**	13,500	13,500	13,500	13,500	13,500	67,500
4.	**To conduct hospital programs or screening campaigns to increase the percentage of women aged 30-49 years who had ever had a screening test for cervical cancer to 25% of the population**	64,500	64,500	64,500	64,500	64,500	322,500
5.	**To promote awareness on the availability of treatment for HCV and HP infections, Hepatobiliary and pancreatic cancer**	10,200	25,900	14,600	16,800	19,000	86,500
6.	**To increase the percentage (25%) of those with HCV /HP / Hepatobiliary and pancreatic cancer getting treatment**	5,950,000	565,000	605,000	645,000	685,000	8,450,000
	TOTAL	7,939,200	1,537,400	1,546,600	1,588,800	1,631,000	14,243,000

Annex 3

National Comprehensive Costed Cancer Control Plan

(2017-2021)

Strategy 3. IMPROVED EFFECTIVE DIAGNOSIS AND TREATMENT OF CANCER

3. Improve effective diagnosis and treatment of cancer

Goal - To diagnose cancer timely and correctively for effective treatment

Objective 1. To improve quality of pathology and immunology service for diagnosis of adult and paediatric cancers

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
1	**To improve quality of pathology and immunology services**								
1.1	To utilize advanced tools								
1.1.1	a) Flow cytometry	CD markers for 20 panels	Clinical Pathology Departments (YGH, MGH, YCH, MCH, CWH, MCHs, Taungyi, NPT)	200,000	200,000	200,000	200,000	200,000	IAEA, WHO
		Accessory reagent for flow cytometry		50,000	50,000	50,000	50,000	50,000	
1.1.2	b) IHC reagent for common cancer (41 panels of IHC markers)	Primary Ab		546,640	546,640	546,640	546,640	546,640	
		Detection kit		104,000	104,000	104,000	104,000	104,000	
		HER 2 cell line		24,000	24,000	24,000	24,000	24,000	
		Slides and Accessory reagents		32,000	32,000	32,000	32,000	32,000	
2	**To upgrade blood bank services (YGH, MGH, YCH, MCHs, CWH, NPT, Taunggyi, Magwe)**								
2.1	To purchase following equipment for safer blood supply								
2.1.1	a) Hemofuge Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	269,600	269,600	269,600	269,600	269,600	IAEA, WHO
2.1.2	b) Heating bloc Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	7,200	7,200	7,200	7,200	7,200	

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
2.1.3	c) Tube Sealer (Blood Bag tube thermo sealer) Terumo Pempol S-1010 Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	26,400	26,400	26,400	26,400	26,400	
2.1.4	d) Tube Sealer (Blood Bag tube thermo sealer) T-SEAL II (Terumo) Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	26,400	26,400	26,400	26,400	26,400	
2.1.5	e) Centriguge (32) Eight hospitals. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	37,600	37,600	37,600	37,600	37,600	
2.1.6	f) Separation stand Eight hospitals. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	720	720	720	720	720	
2.1.7	g) Deep Freezer Eight hospitals (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	74,400	74,400	74,400	74,400	74,400	
2.1.8	h) Blood Bank Refrigerator Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	44,800	44,800	44,800	44,800	44,800	
2.1.9	i) Spectra Optia Apheresis System Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	1,111,200	1,111,200	1,111,200	1,111,200	1,111,200	
2.1.10	j) Plasma Thawing Bath Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	22,400	22,400	22,400	22,400	22,400	
2.1.11	k) Cryobath CB100 Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	22,400	22,400	22,400	22,400	22,400	
2.1.12	l) Blood Bank Refrigerator Eight hosp. (one for each hospital)	No. of equipment purchased	MOHS (Hospitals)	30,400	30,400	30,400	30,400	30,400	

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
2.2	To reinforce the skill of Medical technologists in blood group serology and component preparation (MGH)	No. of trained persons		4,000	4,000	4,000	4,000	4,000	
3	**To expand or upgrade facilities for cancer care**								
3.1	To establish tele-conferencing facilities for joint management for cancers in tertiary hospitals	Tele-conferencing facilities established	MOHS	G	G	G	G	G	IAEA, WHO
3.2	To develop clinical treatment and referral guidelines on common cancer including doctors working in district hospitals	No. of district hospitals receiving clinical and referral guidelines	MOHS Associations / Foundations / Societies	13,500	13,500	13,500	13,500	13,500	IAEA, WHO
3.3	To purchase essential and supportive drugs for cancer care	Amount of cancer drugs purchased in respective hospitals	MOHS	200,000	200,000	200,000	200,000	200,000	
3.4	To establish system for preparation of cancer medicine; a) laminar flow hood, b) cytotoxic drug compounding box, c) pumps, d) flexures, etc. e) Chemothrapy chairs	System established	MOHS	200000	200000	200000	200000	200000	IAEA, WHO
3.5	Equipment for pre-chemo assessment (MTH)								

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
3.5.1	a)Echocardiogram	Equipment purchased	MOHS						IAEA, WHO
3.5.2	b) SEPCT/CT (MTH,TGI)		MOHS	700,000	700,000				IAEA, WHO
3.5.3	c) Esophago-gastro duodenoscope (OGDS) complete set (2)		MOHS	411,380					IAEA, WHO
3.5.4	(d) Video bronchoscope complete set (2)			381,270					
3.5.5	(e) EBUS FNAC needle (Olympus) NA-201SX-4022 22G (20 x US $200)			4,000					
3.5.6	d)To establish imaging facilities (e.g. PET/CT)	Facility established	MOHS	2,000,000					IAEA, WHO
3.6	To establish new cancer facilities and satellite centers in major tertiary hospitals	New cancer facilities and satellite centers established	MOHS	G	G	G	G	G	MOHS
3.7	Build new building for National Cancer Centre (YGH, MGH)	New building for National Cancer Center established	MOHS	G	G	G	G	G	MOHS
3.8	e-library (ClinicalKey, UptoDate)(Journal of Clinical Oncology - ASCO, Annals of Oncology – ESMO, Lancet,)	e-library established	MOHS	30,000	30,000	30,000	30,000	30,000	MOHS
3.9	Build new buildings for new radiotherapy machines (YGH, MGH)	New buildings for RT machines established	MOHS	G	G	G	G	G	MOHS

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
3.10	To install new radiotherapy machines and related equipment for new RT centres	Radiotherapy machine installed	MOHS	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	IAEA, WHO
3.11	Establishment of Nuclear Medicine Department with installation of new SPET/CT (TG)	New SPET/CT established	MOHS	700,000					IAEA, WHO
3.12	CT Simulator (128 slices) (MGH)	CT Simulator installed	Radiotherapy Dept of the respective hospital	900,000		900,000			IAEA, WHO
3.13	A new 24 Channel HDR Brachytherapy machine with Iridium 192 Source and applicators sets (YGH, MGH, Magwe, TG)	HDR Brachytherapy machine installed	Radiotherapy Department of the respective hospital	780,000		780,000			IAEA, WHO
3.15	Manchester applicators for HDR Brachytherapy (from Varian , USA and Be –Big, Germany) (YGH, TG) three for each center	Applicators installed	Radiotherapy Department of the respective hospital	30,000 x 3 (90,000) (YGN)	30,000 x 3 (90,000) (TG)				IAEA, WHO
3.16	Interstitial needles and Ring applicator & its accessories for HDR Brachytherapy (YGH, NPT, MGH, TG)	Equipment installed	Radiotherapy Department of the respective hospital	540,000		540,000			IAEA, WHO
3.17	Fletcher applicator (MGH) for HDR Brachytherapy Set content SET 0109 + SET 1102	Equipment installed	Radiotherapy Department of the respective hospital	7,725 7,200					IAEA, WHO

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
3.18	Stump applicators for HDR Brachytherapy (YGH)	Equipment installed	Radiotherapy Department of the respective hospital	48,000					IAEA, WHO
3.19	LA machines (CliniX iX) for new RT centres	Equipment installed	Radiotherapy Department of the respective hospital	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	IAEA, WHO
3.20	Linear Accelerator & accessories (e.g. True Beam) (YGH, MGH) Elekta	Installed	Radiotherapy Department of the respective hospital	5,400,000 (minimum)	Varian 5,400,000 (minimum)	Varian 5,400,000 (minimum)			IAEA, WHO
3.21	Linear Accelerator & accessories (e.g. True Beam) (MGH, NPT) Elekta	Installed	Radiotherapy Department of the respective hospital		4,000,000 (Elekta)	4,000,000 (Elekta)			IAEA, WHO
3.22	Work stations for planning (Varian LA Machine) (YGH, MGH, TG)	Installed	Radiotherapy Department of the respective hospital		252,000	252,000	252,000		IAEA, WHO
3.23	Work Station for planning(Elekta LA machine) MGH, NPT	Installed	Radiotherapy Department of the respective hospital		252,000	252,000			IAEA, WHO

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
3.24	Work station for Contouring (Varian LA Machine) (YGH, MGH, TG)	Installed	Radiotherapy Department of the respective hospital	85,000	85,000	85,000	85,000		IAEA, WHO
3.25	Work station for contouring (Elekta) MGH, NPT	Installed	Radiotherapy Department of the respective hospital	85,000	85000		85,000		IAEA, WHO
3.26	Gamma knife (YGH, MGH)	Installed	Radiotherapy Department of the respective hospital	5,000,000	5,000,000				IAEA, WHO
3.27	Base plate for treatment planning system (TG, MGH)	Installed	Radiotherapy Department of the respective hospital	3,000	3,000				IAEA, WHO
3.28	EPID for existing ELEKTA Precise (MGH)	Installed	Radiotherapy Department of the respective hospital	600,000					IAEA, WHO
3.29	C-arm Couch for HDR Brachytherapy(BEBIG) (MGH) (MIZUHO, Japan)	Installed	Radiotherapy Department of the respective hospital	25,000					IAEA, WHO

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
4	**To improve quality of care for adult and paediatric haematological cancers**								
4.1	To enable high dose chemotherapy with haemopoietic stem cell rescue		Department of Clinical Haematology YGH, MGH, NOGH	G	G	G	G	G	MOHS Interna-tional organiza-tions
4.1.1	a) Apharesis machine for Therapeutic Plasma Exchange & stem cell collection (Spectra Optia) – 1 Unit with Spectra Optia Collection Set Spectra Optia Exchange Set Spectra Optia IDL Set COBE Spectra LRS ELP Sets COBE Spectra TPE Sets COBE Spectra WBC Sets COBE Spectra AutoPBSC Sets COBE Spectra RBCX Sets	Availability of equipment	MOHS	150,000	15,000	1,500			IAEA WHO
4.1.2	b)Control Rate Freezer (for Cryo-Preservation of Stem Cells). Karyo 560-16. Planer. UK. – 1 Unit			42,000	42,000	42,000			
4.1.3	c) MU-800 (Medical Grade) MICROCON MAP800MUV Portable Air Purification Unit Complete with UV Germicidal Lamp System - 4 Units	Availability of equipment	MOHS	52,000	52,000	52,000	52,000	52,000	WHO IAEA

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
4.1.4	d) Spectra Optia Collection Set Spectra Optia Exchange Set Spectra Optia IDL Set COBE Spectra LRS ELP Sets COBE Spectra TPE Sets COBE Spectra WBC Sets COBE Spectra AutoPBSC Sets COBE Spectra RBCX Sets			48,000	48,000	48,000	48,000	48,000	IAEA WHO
4.1.5	e) Therapeutic Plasma Enhance Set (TPE) 225 ml (Hemonectics) x 3	Availability of equipment	MOHS	5,100	5,100	5,100	5,100	5,100	IAEA WHO
4.1.6	f) PBSC+set (Hemonectics)				5,400	5,400	5,400	5,400	
4.1.7	g) ACDA Spike Bag (Hemonectics)				3,000	3,000	3,000	3,000	
4.1.8	h) Control Rate Freezer (for Cryo-Preservation of Stem Cells). Karyo 560-16. Planer. UK. – 1 Unit					42,000			
4.1.9	i) Patient Monitor with ECG - 4 Units					10,000			
5	**To increase and to upgrade cancer work force**								
5.1	To improve the knowledge and skills of cancer professionals								
5.1.1	Review and update the curriculum of MSc (Medical Oncology, Radiation oncology) training course (YGH, MGH)	Curriculum review and updated	MOHS	10,000	-	-	-	-	MOHS
	To organize Multidisciplinary Team for Cancer Control		MOHS	G	G	G	G	G	
5.1.2	Create network with oversea cancer centre for videoconference (YGH, MGH)	Network established	MOHS	8,000	4,000	4,000	4,000	4,000	MOHS, IAEA

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
5.1.3	Onsite training for Radiation Oncologists, Physicists RTTs & Nurses, Onco Pharmacist,Medical Oncologists, Oncoharmacist, Onco-Nurses for ahematology and oncology, (YGH, MGH, NPT, TG)	No. of persons trained in each category of health professional	MOHS	10,000	10,000	10,000	10,000	10,000	MOHS, IAEA
5.1.4	Train (12) Radiation Oncologists 3-6 months courses(YGH, MGH, NPT, TG)	No. of persons trained	MOHS	30,000	30,000	30,000	30,000	30,000	MOHS, IAEA
5.1.5	Train (8) Medical Physicists - 2 year international training course at Thailand for 2 physicists (YGH, MGH, NPT, TG)	No. of persons trained	MOHS	20,000	20,000	20,000	20,000	20,000	MOHS, IAEA
5.1.6	Train (8) RTTs (Radiation Technology Technicians) for 1 month international training course (2 persons per year for each centre) (YGH, MGH, NPT, TG)	No. of persons trained	MOHS	20,000	20,000	20,000	20,000	20,000	MOHS, IAEA
5.1.7	Train (4) engineers (YGH, MGH, NPT, TG) for each RT center	No. of persons trained	MOHS	20,000	20,000	20,000	20,000	20,000	MOHS, IAEA
5.1.8	Training of (7) staff for Medical Oncology and haemato-oncology for short-term and long-term training (Singapore) (YGH, MGH, NOGH, YCH, MCH, NPT, TG)	No. of persons trained	MOHS	20,000	20,000	20,000	20,000	20,000	MOHS, IAEA

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
5.1.9	Fellowship trainings and expert missions for nuclear medicine physicians,medical physicists, medical technologists, cyclotron operators, radiopharmacists (YGH, MGH)	No. of persons trained in each category of health professional	MOHS	30,000	30,000	-	-	-	MOHS, IAEA
5.1.10	Training for (4) radiation safety protection officer (MGH, YGH, NPT, TG)	No. of persons trained	Radiotherapy Department	20,000	20,000	20,000	20,000	20,000	IAEA, WHO
5.1.11	Training of Clinical Pathologist, Medical Technologist (MGH, TG, YGH, YCH, MCHs, Magway, Satsanhtun)	No. of persons trained	Clinical Pathology	20,000	20,000	20,000	20,000	20,000	IAEA, WHO
5.1.12	Invite expert / consultants for short term training for doctors (outreach training) (Singapore) (YGH, YSH, MGH, NPT, TG) on Oncology and allied services	No. of experts/ consultants	Respective departments	30,000	30,000	-	-	-	IAEA, WHO
5.1.13	Hepatobiliary and pancreatic cancer training hort term-UM1(YSH),	Training accomplished	MOHS	6,000	6,000	-	-	-	MOHS WHO IAEA
5.1.14	Hepatobiliary and pancreatic cancer training Long term – UM2, UMM, UMT and NPT	Training accomplished	MOHS	24,000	-	-	-	-	MOHS WHO IAEA
5.1.15	Hepatobiliary and pancreatic cancer training Foreign experts (Joint operation)	No. of experts	MOHS	10,000	10,000	-	-	-	MOHS WHO IAEA
5.1.16	Hepatobiliary and pancreatic cancer training Attending symposium	No. of doctors	MOHS	3,000	3,000	-	3,000	-	MOHS WHO, IAEA

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donor
5.1.17	Hands-on Training in Surgical Oncology for (neuro-oncology, Head and Neck, Thoracic Oncology, Breast Oncology, Sarcomas, GI, HPB, Uro-oncology, and Gynaecological Oncology)	No of Doctors in each category of health professional	MOHS	15,000	15,000	15,000	15,000	15,000	
5.1.18	International Symposium Surgical Oncology for (neuro-oncology, Head and Neck, Thoracic Oncology, Breast Oncology, Sarcomas, GI, HPB, Uro-oncology, and Gynaecological Oncology)	No of Doctors attending international symposium and relevant technical area	MOHS	4,000	4,000	4,000	4,000	4,000	
5.1.19	NMP-22 ELISA KIT for TCC bladder 56 strips	No of strips		10,000	10,000	10,000	10,000	10,000	
5.1.20	Narrow Band imaging for urology TCC Bladder	Instruments in place		180,000					
5.1.21	EDAP TMS(Ablapack) HIFU Coolant	Equipments in place		80,000					

STRATEGY 3. IMPROVED EFFECTIVE DIAGNOSIS AND TREATMENT OF CANCER

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	**To improve quality of pathology and immunology services**	956,640	956,640	956,640	956,640	956,640	4,783,200
2.	**To upgrade blood bank services**	1,677,520	1,677,520	1,677,520	1,677,520	1,677,520	8,387,600
3.	**To expand or upgrade facilities for cancer care**	22,211,075	20,310,500	16,652,500	4,865,500	4443500	68,483,075
4.	**To improve the quality of care of adult and paediatircs haematoligcal cancers**	297,100	170,500	209,000	113,500	113,500	903,600
5.	**To increase and to upgrade cancer work force**	570,000	272,000	193,000	196,000	193,000	1,424,000
	TOTAL	25,712,335	23,387,160	19,688,660	7,809,160	7,384,160	83,981,475

Annex 4

National Comprehensive Costed Cancer Control Plan

(2017-2021)

Strategy 4. IMPROVEMENT OF THE QUALITY OF LIFE OF CANCER PATIENTS

4. Improvement of the quality of life of cancer patients

Goal – To provide the best quality of life possible to cancer patients

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To increase number of Palliative clinics**								
1.1	To establish Palliative clinics in tertiary hospitals	No. of palliative Clinics established	MOHS	G	G	G	G	G	MOHS, WHO, IAEA
1.1.1	To establish Palliative clinics in Mandalay	Established		20,000					
1.1.2	To establish Palliative clinics in NPT	Established			20,000				
1.1.3	Require human resources "2" doctors at consultant level (Oncologist) "2" Medical officers "2" Registered nurses "1" Medical Social workers "1" Administrative Assistant	No. of staff	MOHS	G	G	G	G	G	MOHS
1.1.4	Require equipment :"1" Computer, Printer, Communications equipment "1" phone Medical equipment: "2" syringe drivers for subcutaneous Infusions	No. of Equipment	MOHS	G	G	G	G	G	MOHS
1.1.5	Training for young doctors, nurses and social-workers	No. of trained persons	MOHS	10,000	10,000	10,000	10,000	10,000	WHO IAEA

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
2	**To improve the quality of palliative care given to cancer patients**								
2.1	To make available the required essential drugs (e.g. Oral Morphine, Codeine ,Tramadol, Fentanyl Patch) in the clinics	Available essential drugs	MOHS	50,000	50,000	50,000	50,000	50,000	MOHS, WHO, IAEA
2.1.1	To provide Human Resources for comprehensive and holistic Palliative care(eg. Palliative care specialist , Doctor, Nurse, Admin)	provided	MOHS	3,000	3,000	3,000	3,000	3,000	MOHS, WHO, IAEA
2.1.2	To draw the essential drug list and equipment for Palliative care	Essential drugs lists formulative	MOHS	4,000	-	-	-	-	MOHS, WHO, IAEA
2.1.3	To provide time line for availability of essential drugs	Timeline provided	MOHS	G	G	G	G	G	
2.2	To develop manuals for palliative care	No. and type of manuals developed	MOHS	13,500	3,500	3,500	3,500	3,500	MOHS, WHO, IAEA
2.2.1	To draw the list of manuals(eg. cancer pain management, stoma care, wound care) technical working group	List prepared	MOHS	2,000	-	-	-	-	MOHS, WHO, IAEA
2.2.2	To establish the organizing committee for drawing of manuals	Established	MOHS	G	G	G	G	G	
2.3	To conduct seminars, workshops, training courses for doctors and nurses	No. of doctors and nurses, social workers, allied health personnel trained	MOHS	10,000	10,000	10,000	10,000	10,000	MOHS, WHO, IAEA

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
2.3.1	To establish organizing committee to conduct seminars, workshops and trainings	Established	MOHS	G	G	G	G	G	
2.3.2	To establish fund raising committee to conduct training, seminars and workshops	Committee established	MOHS Associations / Foundations / Societies	G	G	G	G	G	
2.3.3	To implement Teaching curriculum for Palliative care	Committee/ established	MOHS Associations / Foundations / Societies	5,000					
2.4	To provide training to the care givers on palliative care	No. of care givers trained	MOHS Associations / Foundations / Societies	5,000	5,000	5,000	5,000	5,000	MOHS, WHO, IAEA
2.4.1	To establish organizing committee for conducting training for care givers	Committee established	MOHS	G	G	G	G	G	
2.5	To organize local and international collaboration and sharing of information in the support of cancer patients	No. of organizations	MOHS Associations / Foundations / Societies	G	G	G	G	G	MOHS, WHO, IAEA
2.5.1	To develop inter-departmental net-working system in each hospital	System developed							
2.5.2	To establish meeting, discussion and data sharing among 4 main cancer centers	Established	MOHS	5,000					

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
2.5.3	To establish Proper referral system to Palliative care service	Committee / established	MOHS	1,000	1,000	1,000	1,000	1,000	
3	To establish for Public awareness program								
3.1	To prepare public awareness program	Program Established	MOHS	13,500	2,000	2,000	2,000	2,000	WHO IAEA

STRATEGY 4. IMPROVE THE QUALITY OF LIFE OF CANCER PATIENTS (Palliative Care Service)

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	**To increase number of Palliative clinics**	30,000	30,000	10,000	10,000	10,000	90,000
2.	**To improve the quality of palliative care given to cancer patients**	98,500	72,500	72,500	72,500	72,500	388,500
3.	**To establish for Public awareness program**	13,500	2,000	2,000	2,000	2,000	21,500
	TOTAL	142,000	104,500	84,500	84,500	84,500	500,000

Annex 5

National Comprehensive Costed Cancer Control Plan

(2017-2021)

Strategy 5. DOCUMENTATION OF CANCER PATIENTS

5. Documentation of cancer patients

Goal – To provide reliable epidemiological data on cancer for research, cancer prevention and control, planning and evaluation of health services by establishing Population Based Cancer Registries in Myanmar

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To establish steering and working committee for development HBCR in Hospitals with RT facility and PBCR in Myanmar**								
1.1	To establish technical working group for development of HBCR in all major cancer centers and PBCRs in Myanmar	Technical working group formed	MOHS, Cancer Departments, Myanmar Oncological Society						
1.2	To identify the coordinating center	TBD (UPH/NCD Dept of MOHS)	MOHS, Steering Committee						
2	**2. To complete data entry system and set up pilot dedicated cancer registry unit in NPTGH**								
2.1	To complete data entry system in NPTGH	1. Software (CanReg5) 2. Cancer Registration Form 3. Guidelines for data abstracting and entry 4. Coding & users' manuals 5. Structural requirements (Desktop-5, Laptop-10, Printers, Projector etc.)	MOHS, Radiotherapy Department of NPTGH	200,000					MOHS, WHO, IAEA

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
2.2	To develop infrastructure for pilot cancer registry unit in NPTGH	1. Building 2. Computer systems (server, work stations, Laptops & Printers) 3. Software (CanReg5 and Statistical analysis) 4. Networking facility 5. Protocols for registration	MOHS						MOHS, WHO, IAEA
2.3	To develop Human Resources for pilot cancer registry unit	No. of persons TBD 1. Registrar 1.1 Case finder and Abstractor 1.2 Data Entry 1.3 Coder 2. Analysist 3. Supervisor (Data manager) 4. IT technician 5. Statistician 6. Director	MOHS		1,000,000				
2.4	Capacity Building (Training)	No. of Workshops/ meetings among cancer registrars	MOHS, Cancer Registry unit of NPTGH						MOHS, WHO, IAEA, IARC, IACR

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017		Budget 2019	Budget 2020	Budget 2021	Potential donors
2.5	Evaluation workshop based on findings of pilot cancer registry unit	TBD (Based on time frame)	Experts from MOHS, WHO, IAEA, IARC, IACR						MOHS, WHO, IAEA, IARC, IACR
3	**To set up the dedicated Cancer registry units in all major cancer centers (YGH, MGH, TGH, Military)**								
3.1	To set up necessary equipment in each target cancer centers	1. Computer systems (servers, work stations, Laptops & Printers) 2. Software (CanReg5 and Statistical analysis, staging, ICD –O-3 Codes) 3. Networking facility 4. Protocols for registration	MOHS, Radiotherapy Departments of YGH, MGH, TGH, Military Cancer center			2,000,000			
3.2	To recruit human resources in each target cancer centers	No. of persons recruited in each center-TBD 1. Registrar	MOHS						MOHS, WHO, IAEA, IARC,

		1.1 Case finder and Abstractor 1.2 Data Entry 1.3 Coder 2. Analysist 3. Supervisor (Data manager) 4. IT technician 5. Statistician 6. Director							IACR
3.3	Capacity Building (Training)	Workshops/ meetings among cancer registrars	MOHS, Cancer Registry Unit of each centers						MOHS, WHO, IAEA, IARC, IACR
3.4	Monitoring and Evaluation for registry program	Internal or External evaluation (end of project year)	Experts from MOHS, WHO, IAEA, IARC, IACR						
4	**To develop PBCRs in Nay Pyi Taw and Yangon regions as initial phase**								
4.1	Advocacy meetings with parliamentarians for legislation of compulsory notification of cancer	No. of meetings-TBD	Hluttaw (Central & Regional) MOHS				2,000,000	2,000,000	MOHS
4.2	To identify the coordinating unit in the region	TBD (Cancer registry unit of NPTGH)	MOHS, Steering committee						

4.3	To organize seminars/ workshops /meetings with directors from public hospitals, private hospitals, pathological laboratories, hospices and other ministries like MOHA for death certificate data	No of seminars/workshops- TBD	MOHS, MOHA						
4.4	To make/extend Network of all the hospitals (Public , Private)/pathology labs for cancer data communications	1.CanReg5 2 Cancer registration form 3. Registration protocols	MOHS						
4.5	Capacity Building (Training/ workshop/ meetings)	No. of Training /workshops /meetings- TBD	MOHS						
4.6	Monitoring and Evaluation of PBCRs processes	Internal/ external evaluation (end of project year)	Experts from MOHS, WHO, IAEA, IARC, IACR						

MOHS - Ministry of Health and Sport
WHO - World Health Organization
IAEA - International Atomic Energy Agency
IARC - International Agency of Research on Cancer
IACR - International Association of Cancer Registries

STRATEGY 5. DOCUMENTATION OF CANCER PATIENTS

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	**To establish steering and working committee for development HBCR in Hospitals with RT facility and PBCR in Myanmar**	-	-	-	-	-	**-**
2.	**To complete data entry system and set up pilot dedicated cancer registry unit in NPTGH**	200,000	1,000,000	-	-	-	**1,200,000**
3.	**To set up the dedicated Cancer registry units in all major cancer centers (YGH, MGH, TGH, Military)**	-	-	2,000,000	-	-	**2,000,000**
4.	**To develop PBCRs in Nay Pyi Taw and Yangon regions as initial phase**	-	-	-	2,000,000	2,000,000	**4,000,000**
	TOTAL	200,000	1,000,000	2,000,000	2,000,000	2,000,000	**7,200,000**

Annex 6

National Comprehensive Costed Cancer Control Plan

(2017-2021)

Strategy 6. SURVEILLANCE AND RESEARCH

6. SURVEILLANCE AND RESEARCH

Goal – To down grade cancer using evidence-based interventions

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1.	**To conduct a pilot implementation for the application of telemedicine as a tool for population-based cancer registry, followed by study at district level**								
1.1	Holding stakeholder meetings at the central level and township level by using the specific discussion guide to formulate the strategic approach/work plan for implementation	Meetings conducted	Department of Medical Research (DMR)	8,500	8,500	8,500	10,000	10,000	Korea Foundation for International Health Care (KOFIH) /DMR
1.2	Developing the cancer registry forms, pre-testing and modification	Forms developed and pre-tested	Department of Medical Research (DMR)						Korea Foundation for International Health Care (KOFIH) /DMR
1.3	Reporting system through mobile technology by transferring images of the filled forms to the cancer database unit at DMR	Reporting system established	DMR						

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1.4	Computerize the information in the electronic data-base structure (EXCEL sheet) at DMR cancer unit	Electronic database established	DMR						
1.5	Face-to-face interviews to identify the challenges encountered in the population-based cancer registry system and practical solutions	Face-to-face interviews conducted	DMR						
2	**To promote research on basic, clinical, and epidemiological aspects of cancer**								
2.1	To organize a workshop to identify priority cancer research areas	Workshop conducted	DMR	4,000	-	-	-	-	WHO, IAEA
2.2	To set up ethical standards and procedures for participation in multi-center anti- cancer drugs trials	Standards and procedures established	DMR	13,500	-	-	-	-	WHO, IAEA
3	**To determine and evaluate effective methods of preventing cancer**								
3.1	To establish a Cancer Research Center for effective screening and diagnosis - Tumour markers – Tissue, blood - Genetics – oncogenes - Immunology – IHC, IF - Molecular – ISH, PCR, RT-PCR, sequencing - Electron Microscopy - Flowcytometry - Cytogenetics	Cancer Research Center established	MOHS	-	1,000,000	-	-	-	WHO, IAEA

STRATEGY 6. SURVEILLANCE AND RESEARCH

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	**To conduct a pilot implementation for the application of telemedicine as a tool for population-based cancer registry, followed by study at District level**	8,500	8,500	8,500	10,000	10,000	**45,500**
2.	**To promote research on basic, clinical, and epidemiological aspects of cancer (workshops)** - **to identify priority cancer research areas** - **to set up ethical standards and procedures**	17,500	-	-	-	-	**17,500**
3	**To determine and evaluate effective methods of preventing cancer (Cancer Research Center)**	-	1,000,000	-	-	-	**1,000,000**
	TOTAL	26,000	1,008,500	8,500	10,000	10,000	**1,063,000**

Annex 7

National Comprehensive Costed Cancer Control Plan

(2017-2021)

Strategy 7.RADIATION SAFETY

7. RADIATION SAFETY

Goal – To prevent health workers and patients from radiation hazards

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
1	**To establish radiation safety units in all facilities using radioisotopes and radioactive sources**								
1.1	To organize a workshop to identify gaps in radiation safety	No. of workshops	MOHS	4000	4000	4000	4000	4000	WHO IAEA
1.2	To establish a National Radiation Protection Committee for vigilance of radiation hazards	Established	MOHS other related ministries	G	G	G	G	G	WHO IAEA
2	**To upgrade equipment for radiation safety**								
2.1	T-780 source dispose (old source)		YGH	100,000					
2.2	Personal dosimeter	50 in numbers	MOHS	25,000			25,000		
2.3	Blue Water Phantom (one set)	2 in numbers	MOHS		200,000				
2.4	Blue Water Phantom (one set)	2 in numbers	MOHS					200,000	
2.5	Area survey meter	7 in number	MOHS	70,000					
2.6	Area survey meter	7 in number	MOHS		70,000				
2.7	Contamination (old source)	1 no.	YGH			100,000			
2.8	Auto Injector for 18F dose preparation	1 no	YGH (NM)				20000		
2.9	Neutron detector		YGH (NM)			5000			
2.10	Shielded moveable protection (for bench 55mm Pb)		YGH (NM)			3000			
2.11	Shielded fumehood laminar flow or PED CT tracer preparation		YGH (NM)				15,000		
2.12	Manual syringe dose drawing system for FDG		YGH (NM)				25,000		

Sr.	Objectives and Activities	Indicators	Stake holders	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	Potential donors
2.13	Alert 4 monitor	2 in No.	MOHS	3,510					
2.14	Contamination Survey Meter	2 in No	MOHS			5,148			
2.15	Personal Alarming Dosimeter	6 in No.	MOHS	7,644					
2.16	Directional Portable X'Ray Tube (14") Low kv	1 in No.	MOHS			39,000			
2.17	Cs 137 source with shielded box	1 in No.	MOHS	1,300					
2.18	30 x 30 cm lead sheet	4 in No.	MOHS	200					
2.19	Mild steel sheet (10 mm)	1 in No	MOHS	60					
2.20	Decontamination Kit (Model – decon-1)		MOHS	3,510					
3	**To development human resources in radiation safety**								
3.1	To provide training to health personnel in radiation safety	No. of health persons trained	MOHS other related ministries	4,000	4,000	4,000	4,000	4,000	WHO IAEA

STRATEGY 7. RADIATION SAFETY

Sr.	Objectives	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	**TOTAL**
1.	**To establish radiation safety units in all facilities using radioisotopes and radioactive sources**	4,000	4,000	4,000	4,000	4,000	**20,000**
2.	**To upgrade equipment for radiation safety**	211,224	270,000	152,148	85,000	200,000	**918,372**
3.	**Development of human resources in radiation safety**	4,000	4,000	4,000	4,000	4,000	**20,000**
	TOTAL	219,224	278,000	160,148	93,000	208,000	**958,372**

Annex 8

NATIONAL COMPREHENSIVE COSTED CANCER CONTROL PLAN TOTAL BUDGET

By Strategy / By Budget Year	Budget 2017	Budget 2018	Budget 2019	Budget 2020	Budget 2021	TOTAL
1. Primary prevention	112,500	63,500	63,000	62,500	62,500	**364,000**
2. Early detection of cancer	7,939,200	1,537,400	1,546,600	1,588,800	1,631,000	**14,243,000**
3. Improve effective diagnosis and treatment of cancer	25,712,335	23,387,160	19,688,660	7,809,160	7,384,160	**83,981,475**
4. Improvement of the quality of life of cancer patients	142,000	104,500	84,500	84,500	84,500	**500,000**
5. Documentation of cancer patients	200,000	1,000,000	2,000,000	2,000,000	2,000,000	**7,200,000**
6. Surveillance and research	26,000	1,008,500	8,500	10,000	10,000	**1,063,000**
7. Radiation safety	219,224	278,000	160,148	93,000	208,000	**958372**
TOTAL	**34,351,259**	**27,379,060**	**23,551,408**	**11,647,960**	**11,380,160**	**108,309,847**