

Chapter 2

How to Prioritize Cancer Care for Countries in Transition

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Introduction

As cancer increasingly becomes a global health problem, WHO predicts 22 million new cases of cancer a year by 2030 60 % of which will be in low to middle income countries [1].

Developing countries face great challenges in addressing the ever-growing burden of cancer in their countries, there is a growing view that a global response is needed to achieve significant success in cancer control and prevention throughout the developing world. This view has been backed up by:

The UICC in 2009 launched The World Cancer Declaration [2]. The declaration brings the growing cancer crisis to the attention of government leaders and health policymakers across the globe. To those who sign up to it, it represents a consensus among government officials, public health experts, and cancer advocates from around the world who are committed to eliminating cancer. So far, the declaration has collected over 500,000 signatures.

In September 2011, the adoption of the Political Declaration of the High-Level Meeting on the Prevention and Control of Non-Communicable Diseases (NCDs) by the 193 member states of the United Nations (UN) provided the global cancer community with a robust platform to launch the next phase of advocacy to ensure the following World Cancer Declaration targets are met by 2020:

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1. Ensure effective delivery systems in all countries
2. Significantly improve measurement of the cancer burden
3. Decrease tobacco, alcohol consumption and obesity
4. Ensure universal coverage of the HPV/HBV vaccine
5. Dispel damaging myths and misconceptions surrounding cancer
6. Diagnose more cancers via screening and early detection
7. Improve access to diagnosis, treatment, rehabilitation and palliative care
8. Provide universal availability of effective pain control
9. Improve training opportunities for cancer control professionals
10. Reduce emigration of health care workers specialized in cancer
11. Through all of the above, significantly improve global cancer survival rates

Members of the UN have a responsibility to respond to and work towards these targets [3].

Before considering how cancer care should be prioritized in transition countries, there is a case to be made for jointly tackling NCDs (diabetes, cardiovascular/strokes and respiratory disease) as a whole rather than focusing on improving just one of them, as it could be argued that an integrated approach will do more to strengthen individual Nation's health systems, than taking a vertical, disease-specific programme.

Although all NCDs require different treatment and specialist clinics are needed in each field to treat the different conditions, when it comes to prevention and awareness of NCDs there are a number of overlapping risks that make increase the chance of people developing an NCD like diet, usage of tobacco, fitness and amount of alcohol you consume (see Fig. 2.1 poster being used in Ghana). It is likely that there will be a movement towards more generic NCD planning in developing nations, but in the short and medium term, there is momentum behind Cancer Control, driven by need and mobilization of the global oncology community.

National Cancer Control Plan

A National Cancer Control Plan (NCCP) defines a nation's strategy for preventing, detecting, treating and providing palliative care for cancer. There are a number of steps needed to begin developing an NCCP:

- Establish a National Cancer Control Committee of Oncology experts, Health Ministry Officials and NGOs
- Use the committee to research the actual burden of cancer within the country and the current resources the country has
- From this assessment establish what resources will be needed to help reduce the burden of cancer within the country and which cancers and care models should be prioritized
- Write the national cancer plan based on these assessments, prioritizing steps that the National Health service needs to take to reduce the burden of disease



Fig. 2.1 A cancer awareness poster designed for use in African Health Centres

All NCCPs should include the seven elements of cancer control:

- Cancer intelligence units
- Tobacco control

- Awareness raising and advocacy from civil society
- Early diagnosis and prevention
- Cure the curable
- Palliative care
- Training and education
- Health economy and budgeting individual elements of the plan

Cancer Intelligence Units

A cancer intelligence unit or registry is a vehicle to enable the systematic collection of regionally relevant data on cancer incidence, making it possible to assess reliably the types and prevalence of cancers experienced by populations in low to middle income countries, assess changes in these patterns over time and, therefore, assess the effect of any interventions associated with the cancer control programme.

There are two different types of cancer intelligence unit:

Hospital-Based Registries (HBR), collect data on all patients diagnosed and treated for cancer within that hospital or collection of hospitals.

Population-Based Registries (PBR), collect data on new incidences of cancer in a geographical region with a population of 100,000 or more to meaningfully extrapolate data on cancer for an entire population of their country.

PBRs are the most reliable way to collect data on cancers that are effecting.

Cancer registries also form a useful framework for evidence-based cancer research and, therefore, the lack of provision is undermining research capacity within low to middle income countries.

In common with all other areas of cancer control, there is a need for infrastructure, appropriate software and hardware, human resources and training, together with incentives for sustainability. The obvious partner to drive this programme forward is the International Agency for Research on Cancer (IARC)—the world leader in this field. IARC has developed a cost-effective training programme with scalable capacity to accommodate more trainees from low to middle income countries.

The World Health Organization (WHO), IARC has created the Global Initiative for Cancer Registry Development (GICR).

Tobacco Control

Tobacco-related illness already kills 5.4 million people globally a year if current trends continue smoking will kill more than eight million a year by 2030 of which 80 % [4] will be in low and middle income countries, in relation to cancer smoking is linked to cancers of the lung, throat, mouth, pancreas, bladder, stomach, liver and kidney.

Further, decreasing markets for the tobacco industry in high income countries cause the industry to seek new markets, such as in sub-Saharan Africa, where it sees enormous potential for growth.

Use of chewed tobacco is high in some nations, especially in villages in rural areas. Efforts must be made to control this more traditional use of tobacco in order to avert cancers of the mouth and throat.

It is possible to avert the epidemic of tobacco-related morbidity and mortality manifest, we need to educate civil society about the dangers of tobacco use and the benefits of cessation, special efforts are needed to educate young people, health care practitioners and policymakers. It is necessary to adopt effective policies such as tax and price increases on tobacco, which will not only lower prevalence but also increase government revenues, which can be used to pay for tobacco control measures and other health and social programmes. Other required policy changes include the placing of effective warning labels on tobacco products, banning advertising and promotion of tobacco use, prohibiting smoking in public places, banning sales of single cigarettes and prohibiting the sales of tobacco to the young. In order to implement effective tobacco control policies and programmes, civil society must be mobilized in support of this issue. A key to this is the nomination of champions who will promote the cause of tobacco control. Such individual champions throughout the world have proved to be essential in influencing policy-makers, educating civil society and exposing and fighting the tactics of the tobacco industry.

In countries where farmers rely on growing tobacco for income, support needs to be provided to farmers to encourage planting of alternative crops, and to establish the infrastructure for distribution of the alternative crops.

Surveillance data are needed to track tobacco use and related behaviours, knowledge and attitudes. Without such data evaluations of tobacco control programmes are not possible.

Most importantly with tobacco control, we need to educate and raise awareness about populations, the damage smoking does to your health and how it affects you and others around you.

Early Diagnosis and Prevention

Liver cancer [predominantly hepatocellular carcinoma (HCC)] has one of the highest mortality rates of cancer in low to middle income countries. The main aetiological agents are chronic infections by hepatitis viruses, mainly hepatitis B (HBV), which is endemic throughout these countries and present in 8–10 % of the general population. The effect of HBV is compounded by widespread exposure to a potent carcinogen, aflatoxin and a mycotoxin that contaminates staple diets.

Thus, the two main risk factors for HCC are relatively well known and effective strategies are at hand to reduce their effect. A safe and efficient HBV vaccine has been available since the early 1982. Simple, behavioural methods to reduce aflatoxin exposure have been tested in the field, with significant improvements on individual contamination.

HBV is available in 116 countries worldwide with the Global Alliance for Vaccines (GAVI) ensuring it is available to all poorer nations by the end of 2015.

Worldwide there are more than 273,000 deaths from cervical cancer each year, and it accounts for 9 % of female cancer deaths. Mortality rates vary 17-fold between the different regions of the world. Cervical cancer contributes over 2.7 million years of life lost among women between the ages of 25 and 64 worldwide, of which, tellingly, some 2.4 million occur in developing areas and only 300,000 in developed countries. Cervical cancer incidence and mortality rates have decreased substantially in high income countries following the introduction of screening; however, such programmes are either rudimentary or non-existent in low to middle income countries. The vast majority of women who suffer cervical cancer in these countries present with disease advanced far beyond the capacity of surgery or other treatment modalities to offer cure. Palliative care services are poorly developed and, therefore, these unfortunate women are often sentenced to a miserable end of life.

Human papillomavirus (HPV) types 16 and 18 cause 70 % of cervical cancer cases and two vaccines that guard against these HPV types have been developed by the pharmaceutical industry. There is a large, international trials database that suggests that these vaccines can offer 100 % protection against infection by these HPV types (given as three injections over 6 months). The data are sufficiently compelling that the UK recently announced its commitment to a national vaccination programme for all 12–13-year-old girls. These remarkable vaccines give us the opportunity to eradicate 70 % of all known cervical cancer within a generation, saving almost 200,000 lives per annum, the vast majority in the developing world. GAVI is also helping to introduce HPV vaccinations to low income countries.

High income countries have reduced the burden of cancer in their populations by the screening of vulnerable groups, identified through their cancer surveillance programmes, for example, in the UK all women over 25 are invited to cervical cancer screening to check for precancerous lesions. In low to middle income countries, these programmes are in their infancy, using techniques such as Visual Inspection by Acetic Acid (VIA) and new DNA marker tests.

Cure the Curable

Although treatment is often considered to be overemphasized relative to primary prevention, it has been estimated that between 2012 and 2030 that cancer annual cancer cases will increase to 22 million a year (from 14 million in 2012) 13.2 million of these cases will be in low to middle income countries. Although it is crucially important to institute primary preventive measures, even if all such measures were fully implemented today they would have little effect on cancer mortality in the next 10–15 years. Mortality: incidence ratios are much higher in low to middle income countries than in more affluent world regions, and therefore improved access to proven, cost-effective therapy, efficiently delivered, would save many lives. However, as the majority of poorer patients present with advanced disease, when cure is unlikely, treatment programmes must be undertaken

in concert with attempts to diagnose cancer earlier; it is essential, if such programmes are to be successful, that patients diagnosed with early-stage cancer have immediate access to care, with a preliminary focus on childhood cancer.

Cancer treatment should be included in NCCP and afforded a proportion of the available resources. Treatment programmes will need to be built in the context of the available human resources and infrastructure and supported to the degree feasible by in-country resources as well as by external assistance. Ideally, countries should have at least one National Cancer Centre with access to surgery, radiation and chemotherapy. Radiation programmes might be built on models provided by the International Atomic Energy Agency (IAEA), and their excellent Programme for Action on Cancer Treatment [5] and chemotherapy regimens based on simplified regimens using drugs from the WHO Essential Drugs List.

Cytotoxic and Adjuvant Medicine from WHO Essential Drugs List:

Complementary list	
Allopurinol	Tablet: 100, 300 mg
Asparaginase	Powder for injection: 10,000 IU in vial
Bleomycin	Powder for injection: 15 mg (as sulphate) in vial
Calcium Folate	Injection: 3 mg/mL in 10-mL ampoule Tablet 15 mg
Carboplatin	Injection: 50 mg/5 mL; 150 mg/15 mL; 450 mg/45 mL; 600 mg/60 mL
Chlorambucil	Tablet: 2 mg
Cyclophosphamide	Powder for injection: 500 mg in vial Tablet: 25 mg
Cytarabine	Powder for injection: 100 mg in vial
Dacarbazine	Powder for injection: 100 mg in vial
Dactinomycin	Powder for injection: 500 µg in vial
Daunorubicin	Powder for injection: 50 mg (hydrochloride) in vial
Docetaxel	Injection: 20, 40 mg/mL
Doxorubicin	Powder for injection: 10, 50 mg (hydrochloride) in vial
Etoposide	Capsule: 100 mg Injection: 20 mg/mL in 5-mL ampoule
Fluorouracil	Injection: 50 mg/mL in 5-mL ampoule
Hydroxycarbamide	Solid oral dosage form: 200, 250, 300, 400, 500 mg; 1 g
Ifosfamide	Powder for injection: 1 g vial; 2 g vial
Mercaptopurine	Tablet: 50 mg
Mesna	Injection: 100 mg/mL in 4-mL and 10-mL ampoules Tablet: 400 mg; 600 mg
Methotrexate	Powder for injection: 50 mg (as sodium salt) in vial Tablet: 2.5 mg (as sodium salt)
Paclitaxel	Powder for injection: 6 mg/mL
Procarbazine	Capsule: 50 mg (as hydrochloride)
Thioguanine	Solid oral dosage form: 40 mg
Vinblastine	Powder for injection: 10 mg (sulphate) in vial
Vincristine	Powder for injection: 1 mg; 5 mg (sulphate) in vial

Regional or transnational networks could be built on a hub-and-spoke model, integrating vertically with existing AIDS programmes, and would greatly benefit from the sort of teleconferencing or telemedicine being pioneered in India by the Tata Memorial Centre and its associate centres [6].

In addition, it is important to exploit modern innovations in delivering chemotherapy in a predominantly out-patient setting. It should prove possible to design effective treatment regimes that do not require access to costly in-patient beds and seek to use oral agents when available [7, 8].

One other aspect of such an approach is to consider carefully the clinical pharmacology and therapeutic window for each antineoplastic drug so as to widen the safety margin as effectively as possible. For example, there are several trials suggesting that low dose is as effective as high dose folinic acid, with the potential to reduce drug costs tenfold. Conventional cytotoxic drugs have steep dose-response curves, but if we aim to generalize drug usage and widen access then we must think how we might train paramedical personnel to deliver cancer therapeutics with a simplified dosing algorithm that minimizes toxicity. Clearly, we must not carry this utilitarian approach too far, especially when considering treatment of childhood cancer, but this could be the subject of important research in low to middle income countries.

All oncologist use treatment guidelines to best treat their patients, unfortunately these guidelines have been written by high income countries using the newest treatment options they use available to them, so even though they are useful in low to middle income countries they sometimes are not fit for purpose. Therefore, we need to work with partners in Low to Middle Income Countries (LMICs) to develop setting appropriate guidelines.

Palliative Care

Palliative care must be a priority component of affordable and effective cancer care. It should be provided as early as possible after diagnosis as it provides pain and symptom control, terminal care and bereavement support.

Palliative care greatly improves the quality of life of patients and their families facing problems associated with cancer. It is ideally suited to home-based care, where it supports people during illness, enabling them to die with dignity.

The best palliation drugs are opiates like morphine, unfortunately 90 % of the world's morphine is used by the USA, Canada, Britain, Japan, France and Germany reducing the amount of morphine available to LMICs. Also due to strong anti-drugs laws in most LMICs, there is a legislative barrier to access the morphine making it difficult for doctors and their patients to access it.

Training and Education

There need to be an emphasis on training and education in all NCCPs. Most importantly to reduce the prevalent lack of cancer awareness, to improve knowledge and capacity throughout countries and to ensure that education and training programmes cover specialist and generic requirements, from specialist clinical disciplines to research training to health care management and operational/logistical health care disciplines, as well as initial and continuing needs.

Successfully tackling each of these identified priorities could be considered a major project in its own right, but, of course, sustainable and comprehensive integration of the clinical and public health systems requires a parallel approach. The key to cost-effective and successful implementation of the fit-for-purpose training, mentorship and public and professional education programmes that are required to meet the priority objectives is connectivity.

Connectivity at all levels, namely in a country, across regions and internationally, is needed to achieve strong collaborative leadership and effective sharing of existing and newly created resources. With the rapidly rising number of cancers in low to middle income countries, partnerships between existing bodies, health care organizations and consortia in high income countries and low to middle income countries (including local health care delivery systems, research institutions, international organizations, NGOs, national governments and the pharmaceutical industry) will be essential [9].

Moreover, AfrOx will seek to collaborate with the UK National Health Service, which is well placed to provide resources to underpin the cancer care training, education and partnership objectives for Africa [10].

Prioritization of Elements of Cancer Control Plans

In 2011 the WHO along with the World Economic Forum published a report, 'Reducing the Economic Impact of Non-Communicable Diseases in Low to Middle Income Countries', which estimated that between 2011 and 2025 that the cumulative economic losses from cancer, cardiovascular disease, diabetes and chronic respiratory diseases will surpass 7 trillion US dollars, an average annual economic loss of around 500 billion US dollars which is equivalent to an estimated 4 % of these countries annual economic output.

By contrast, the findings from a WHO research into "best buys," population-based measures for reducing tobacco, harmful alcohol consumption, trying to reduce unhealthy diets, informing people to do more physical activity are estimated to cost \$2 billion a year to reduce the burden of NCDs in LMICs.

In health terms, these "best buys" would help many millions of people to avoid an early death.

The best buys recommended in this report are:

Risk factor/disease	Interventions
Tobacco use	• Tax increases
	• Smoke-free indoor workplaces and public places
	• Health information and warnings
	• Bans on tobacco advertising, promotion and sponsorship
Harmful alcohol use	• Tax increases
	• Restricted access to retailed alcohol
	• Bans on alcohol advertising
Unhealthy diet and physical inactivity	• Reduced salt intake in food
	• Replacement of trans fat with polyunsaturated fat
	• Public awareness through mass media on diet and physical activity
Cardiovascular disease (CVD) and diabetes	• Counselling and multi-drug therapy for people with a high risk of developing heart attacks and strokes (including those with established CVD)
	• Treatment of heart attack with aspirin
Cancer	• Hepatitis B immunization to prevent liver cancer
	• Screening and treatment of precancerous lesions to prevent cervical cancer

This is not to say that improving treatment facilities, training health care workers and developing clinical pathways for the management of patients with cancer should be ignored. This clearly depends on the fraction of a Nation's GDP is allocated to the Health Ministry, and how much of that would be devoted to cancer. It is essential to have an estimate for the cost and likely impact of any intervention in the NCCP and to use these data to prioritize which programmes will be funded from existing resources [11, 12].

Funding NCCP

While any foreign funds would be welcome, the financing of cancer care requires money from the national budget. This needs to be supplemented by a system of health insurance which covers basic care for the common tumour types. This "investment" will be offset against the negative economic impact of cancer on society by loss of workforce, skills and key family members.

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