AFRICAN ORGANISATION FOR RESEARCH & TRAINING IN CANCER
AORTIC
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ORGANISATION AFRICAINE POUR LA RECHERCHE ET L'ENSEIGNEMENT SUR LE CANCER

CANCER PLAN FOR THE AFRICAN CONTINENT 2013-2017

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AFRICAN ORGANISATION
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Cancer Plan for the African Continent 2013-2017

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ABOUT AORTIC

AORTIC is an African-based organization with membership from countries throughout Africa and the international cancer community. Our key objectives are to further research relating to cancers prevalent in Africa, facilitate and support training initiatives in oncology for health care workers, create cancer prevention and control programmes and to raise public awareness of cancer on the continent. We strive to unite the African continent in achieving its goal of a cancer-free Africa and seek to make a positive impact throughout the region through collaboration with health ministries and global cancer organizations.

AORTIC seeks to become the continent's pre-eminent non-profit organisation working for cancer control. AORTIC will achieve this through the facilitation of research and training as well as the provision of relevant and accurate information on the prevention, early diagnosis, treatment, and palliation of cancer. Our organisation is dedicated to providing all Africans with these benefits, as well as to increasing public awareness of cancer and reducing the stigma associated with it.

PREFACE

It gives me great joy to write the preface to this document prepared by the African Organisation for Reserch and Training in Cancer (AORTIC).It is a distillate of the strategic planning process initiated by AORTIC in 2009/2010 and represents a bold attempt by the Organisation to chart a progressive course that keeps our focus on priority cancers in Africa and offer guidance on how to develop a robust response to the cancer challenge in Africa.

Although cancer is not the number one cause of death as of now in Africa,the burden will continue to rise except we act decisively. AORTIC shall continue to maintain focus on the key mandates of research and training as vital strategic tools for building capacity needed to combat and defeat cancer in Africa.

Cancer research provides the evidence base on which cancer prevention and control (including treatment) strategies are built. Without research data, it is difficult or impossible to achieve appropriate targeted preventive or treatment strategies, efficiently use limited health care resources, and empower people, health care systems, and populations to integrate knowledge of disease into their behavior. Development of cancer researchers and research infrastructure also broadly stimulates educational, social and economic activities, and thus provides wider benefits to society.

For cancer to be conquered in Africa, and for African scientists to contribute to the global understanding of cancer prevention and control, a new cadre of researchers must be nurtured on the African continent. There are many steps in this process: developing or enhancing research training programs; mentoring researchers through research training at multiple levels; development of research infrastructure including wet and dry laboratory facilities; creating academic tracks within institutions that will allow researchers to work in a setting that is conducive to research; and creating sustainable funding and resource models that will enable capacity for research.

Implementing the essentials would require new strategies and perspectives to build bridges needed to launch an effective campaign. This would require partnerships with policy makers, scientists/researchers, clinicians,media advocates and survivors.

It is our expectation that all who use this document will find it useful as a guiding tool in the campaign to prevent, treat and control cancer in Africa.

Prof. Isaac F. Adewole
President, AORTIC
November,2013

Chapter 1

1. Overview of Cancer in Africa

"Working together to prevent, control and care for cancer in Africa"

Introduction

With over 1 billion people, Africa is the world's second-largest and second-most populous continent. In addition to having a significant proportion of the world's human population, Africa carries a disproportionate burden of communicable and non-communicable diseases. While still struggling with the clinical, humanistic, and economic impact of communicable diseases, non-communicable diseases such as cancer are creating devastating effects that will need to be stopped before they overwhelm the continent.

Conquering cancer in Africa will require a comprehensive collaborative approach with cancer clinicians, scientists, patients, advocates, policy makers and community leaders working hand-in-hand at the local, state, national, and continent levels with the primary mission: *To reduce the number of deaths from cancer and improve the quality of life of cancer patients, survivors and caregivers.* The African Organization for Research and Training in Cancer (AORTIC) decided to create an African Cancer Plan to provide cost-effective strategies that can be employed throughout the continent to fight cancer. Based on the **African proverb that "*It takes a village to raise a child*", the** Cancer Plan **provides specific strategies that can be used by individuals, employers, organizations and policy-makers to** fight cancer. In addition, we have provided overarching strategies

to address cancer in Africa and a targeted 5-year plan for prostate, breast, cervix, lung and liver cancers.

In developing this Cancer Plan, our primary goal is to decrease cancer incidence and mortality in Africa. This goal can only be achieved by stakeholders and dedicated individuals to lead and implement the strategies outlined in this plan.

In April 2007, the third session of the African Union Conference of Ministers of Health was held in Johannesburg, South Africa, with the theme of 'Strengthening of Health Systems for Equity and Development in Africa'. After this meeting the Africa Health Strategy: 2007 – 2015 was developed which specifically recognised that the "...evidence of the impact of good investments and effective interventions on burden of disease and on economic indicators is becoming stronger" (www.africanunion.org, accessed 22/12/2012). The document recognised that "Africa's people face a huge burden of preventable and treatable health problems whose solutions are known....". It was also noted that the "...triple burden from communicable and non-communicable diseases and injury and trauma, including the social impact of these, has adversely affected development in Africa".

The high burden of disease was attributed to the following factors (among others):

- Weak health systems with under-resourced services;
- Interventions that do not match the scale of the problem;
- People are disempowered to improve their own health due to contributing factors such as poverty;
- Low literacy rates

- Great inequity of access to health care;
- Lack of inter-sectoral collaboration;
- Environmental factors and degradation are given insufficient attention (including shortfalls in agricultural production, lack of safe water and adequate sanitation, electrification and infrastructure);
- War and civil strife;
- Vicious cycle of poverty that drive up the burden of disease, marginalization, displacement and disempowerment?
- Shortage of trained, motivated health care professionals.

The most important conclusion from this document is that investment in health will contribute to economic development. This document follows two important events:

- In September 2000, 189 heads of State adopted the Millennium Declaration designed to improve the social and economic conditions of the world's poorest countries by 2015. Eight goals were devised, three of which related to health issues directly.
- In April 2001, heads of State of African Union countries pledged to set a target of allocating at least 15% of their annual budgets to improve the health sector. By 2011, 27 countries had increased the proportion of total government expenditures allocated to health since 2001, but only Rwanda and South Africa achieved 'at least 15%'.

It is in this context that the issue of Cancer as a health problem in Africa needs to be addressed.

The Cancer Burden in Africa

In Africa, there are more deaths from infectious diseases than NCDs. However, the prevalence of NCDs is rising rapidly and is projected to cause almost three-quarters as many deaths as communicable, maternal, perinatal and nutritional diseases by 2020. Cancer is predicted to be an increasingly important cause of morbidity and mortality, both globally and in Africa, with 12.7 million new cases diagnosed in 2008. It is projected that this figure will rise to 21.4 million in 2030. The International Agency for Research on Cancer (IARC) Globocan Database estimated in 2008 that in Africa there were 492,135,000 men and 494,955,000 women, with a total population of 987,091,000 (http://globocan.iarc.fr). The number of new cases of cancer diagnosed in 2008 was 715,600 (325,000 in men and 390,600 in women). Overall there were 541,800 deaths attributed to cancer (i.e., 78% of people in Africa diagnosed with cancer died from their disease). The age-standardised incidence rate for cancer in Africa was 12.1/100,000 population (12.2 for men and women). The five most frequent cancers in men were prostate, liver, Kaposi sarcoma, Non-Hodgkin's lymphoma (NHL) and lung cancer. In women the most common cancers were breast, cervix, liver, colorectal and NHL (figures 1 and 2). In both men and women the case fatality rate was extremely high.

By contrast, North America has a population of 345,053,000, and the age standardised incidence rate (ASIR) of cancer in men and women is much higher than in Africa at 29.9/100,000. The five most common cancers in men are prostate, lung, colorectum, bladder and NHL. In women, they are breast, lung, colorectal, cervix and NHL (Figures 3 and 4). Of note, however, is the much lower case to fatality ratio in

North America (40%) compared to Africa, where approximately 80% of all people diagnosed with cancer die from their disease.

Table one shows cause-specific mortality rates in different regions in the world compared to cancer deaths. These data show that Africa carries the highest burden of all diseases, including deaths from cancer.

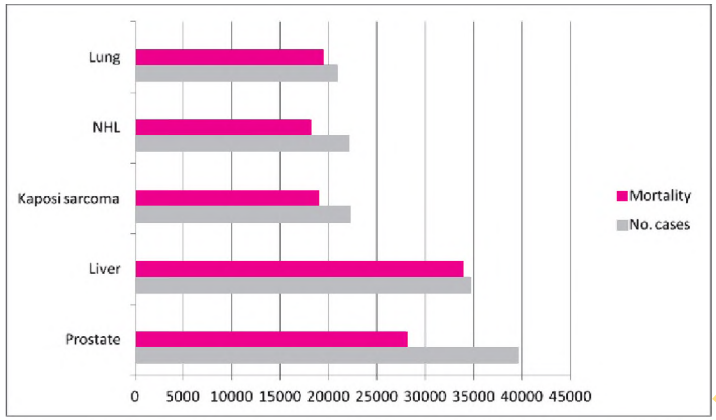

Figure 1: Five most common cancers in men in Africa, Globocan 2008

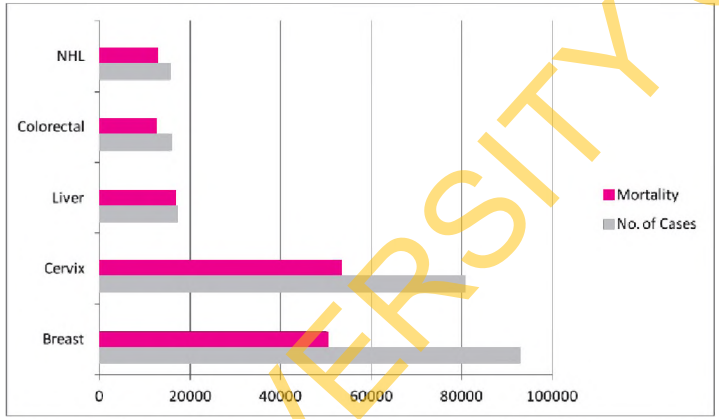

Figure 2: Five most common cancers in women in Africa, Globocan 2008

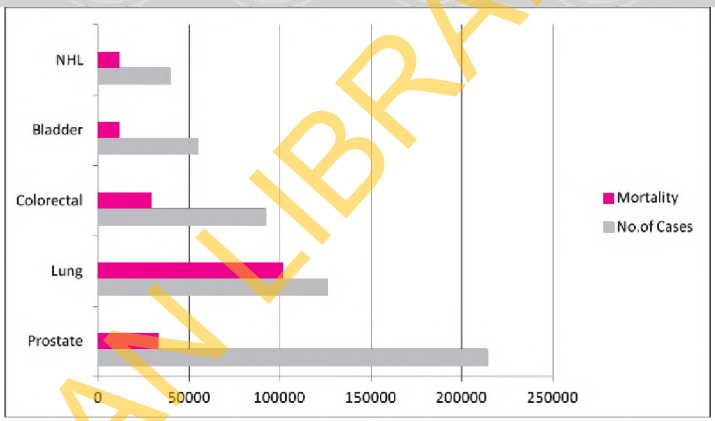

Figure 3: Five most common cancers in men in North America, Globocan 2008

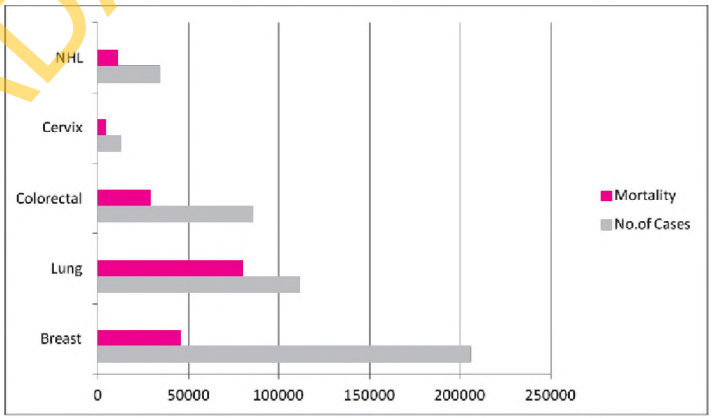

Figure 4: Five most common cancers in women in North America, Globocan 2008

	Communicable Diseases/100 000 population	NCD/per 100 000 - population	Injuries/ 100 000 population	Malaria/ 100 000	HIV/AIDs	Maternal mortality/ 100 000 live births	Cancer deaths/ 100 000
Africa	798	779	107	94	160	480	147
Region of						63	136
Americas	72	455	63	0.1	10		
SE Asia	334	676	101	2.9	13	200	125
European						20	166
Region	51	532	63	0	9.6		
East Medit	254	706	91	2.5	6.5	250	127
Western						49	168
Pacific	74	534	64	0.2	3.4		
World	230	573	78	12	27	210	150

Table 1: Cause – specific mortality in different regions of the world, World Health Statistics 2012, World Health Organisation, Geneva

There is a wide disparity in incidence and mortality patterns of cancer in developed and developing countries which is a reflection of regional differences in the prevalence and distribution of the major risk factors, availability of diagnostic and therapeutic interventions, quality of health care services and availability of appropriately trained health personnel. For instance, prostate, colorectal, female breast and lung cancer are 2 to 5 times higher in developed countries, whereas cancers related to infections, e.g., stomach, liver and cervix are more common in less developed countries. In addition, cancer in poorer countries is usually diagnosed when the cancer is at an advanced stage, making treatment, where available, largely ineffective. Sankaranarayan et al. evaluated over 300,000 cancer deaths from the 1990s in Africa, Asia and Central America. In the Gambia, the 5 year survival rate for people diagnosed with cancer was 22% and in Uganda it was 13% (with the exception of a five year survival rate of 46% for breast cancer).

Challenges in Africa

For many African countries, the challenges facing the control of cancer are significant, but not impossible to address. The process begins by recognising the extent of the problem. This has not been done well in most African countries due to poor quality data (only approximately 8% of deaths in Sub-Saharan Africa (SSA) are medically certified). Further, due to very limited pathology services in many countries in Africa the diagnosis of cancer is not made prior to death, nor are the causes of death notifiable and centrally maintained. The lack of data on cancer,

compared to the fairly extensive data on maternal mortality, infectious diseases and nutritional diseases is notable. Once the very high rate of maternal deaths was noted, the issue received political attention and resource allocation, albeit most African countries are way behind target at reducing maternal mortality to levels required by the MDGs for 2015.

Other challenges include the following:

- Lack of population-based cancer registries with accurate notification of cause of death;
- Lack of trained personnel (Scheffler et al [Health Affairs 2009;28(5):849 – 862] estimated that in 31 SSA countries in 2015, the shortage of health care professionals (doctors, nurses and midwives) will be 792 000 with wage bill of over $2.2 billion annually. Currently it is estimated that there are 145 000 physicians in SSA, which represents 5% of the 2 877 000 practising physicians in Europe;
- Lack of access to treatment (approximately 22% of the 54 countries in Africa have no access to any form of anti-cancer therapies which include surgical oncology, chemotherapy and radiation);
- Radiology and radiation therapy facilities are too few to serve the population in need. For instance, there is one radiation machine in Ethiopia for a population of 60 million, one in Democratic Republic of the Congo for a population of 73 million, one in Malawi for a population of 16 million, one in Mozambique for a population of 23 million, and one in Senegal for a population of 13 million. There are 10 radiation facilities in Nigeria for a population of 162 million, compared to 3,331 facilities in the USA for a population of over 300 million and 86

facilities in the UK for a population of 62 million (dirac@iaea.org);

- Significant out of pocket expenses incurred by people in Africa. For instance, in Nigeria 62% of all health expenditure is out of pocket, compared to 10% in the UK. Out of pocket health expenditure is estimated to push over 100 million people globally into dire poverty [(World Health Statistics 2012, World Health Organisation, Geneva);
- The 'brain drain' of African health care personnel to more attractive settings with better salaries, working conditions, career paths and support. In a survey of 168 medical schools in Africa, of which 105 responded, more than half reported losing between 6 to 18% of teaching staff to emigration in the last 5 years (Lancet 2011;377:113- 21). Additionally,the majority of medical schools have very limited teaching and training in cancer care; and
- Lack of palliative care, resulting in large numbers of people dying unnecessarily agonising deaths.

Chapter 2

1. Continental Cancer Control Plan

A. Vision, Mission, and Overarching goals

Vision
A comprehensive cancer prevention and control plan for Africa.

Mission
To reduce the number of deaths from cancer and improve the quality of life of cancer patients, survivors and caregivers.

Overarching Goals

1. Foster healthy cancer prevention behaviors among Africans to reduce the risk of cancer.
2. Promote access to effective, quality and appropriate cancer health information and services for timely cancer prevention, detection, diagnosis, treatment and survivorship.
3. Improve cancer prevention, timely diagnosis, effective treatment, palliative care and survivorship care through public-private-community partnerships.
4. Foster public-private-community partnerships to improve cancer survivorship experiences of Africans to reduce recurrence and improve quality of life.
5. Facilitate local, statewide, national, and international collaborative efforts among community-based cancer organizations, providers, public and private organizations, and academic institutions with the primary goal of fostering state-of-the-art cancer treatment, prevention, training, education, research, and outreach.
6. Foster the development of a cadre of diverse, well-r a i n e d African cancer clinicians, scientists and advocates who will implement cancer prevention and control in Africa.

7. Advance the understanding of the relationships between multilevel determinants (such as genomics, environment, behavior, cultural norms/beliefs/values, among others) and cancer with the ultimate endpoint of targeted cost-effective, sustainable community centered interventions for cancer prevention and control in Africa.

B. Overaching strategies

We have developed the following overarching strategies to address cancer in Africa. These strategies provide specific guides that can be used to control site-specific cancers. It is important to note that not all these strategies are relevant to all types of cancer and the strategies are not exhaustive.

1. Infrastructure - Develop regional infrastructure that will foster cancer control capacity to support cancer prevention, screening, education, training, research and advocacy.
2. Workforce – Increase the quality and quantity of clinical and research workforce focused on cancer control in Africa.
3. Prevention and Risk Reduction - Foster personal health habits, preferences and choices that will improve cancer health.
4. Cancer Information - Improve cancer registration in Africa.
5. Palliative care and survivorship – Promote cancer palliative care and survivorship services for patients, survivors and caregivers from diagnosis to end of life.
6. Access to optimal cancer care – Identify effective cancer care centers and improve linkages to these centers to guarantee equal access for cancer care throughout Africa.

7. Education and Training – Promote and implement cancer education and training opportunities for cancer health professionals, researchers and advocates.
8. Research – Promote and support translational research throughout the cancer control continuum across crosscutting issues, including communications, surveillance, social determinants of health, genetic testing, decision-making, dissemination of evidence-based interventions, quality of cancer care, epidemiology and measurement.
9. Advocacy – Make cancer top priority in Africa through education, community outreach, political, research, support, and fundraising advocacies.
10. Policy – Partner with governmental and non-governmental organizations to develop and implement cancer control legislation.

C. Responsibilities

According to an African proverb, "*It takes a village to raise a child*". Similarly, it will take the whole continent to control cancer in Africa. AORTIC has outlined a cancer control plan for Africa that includes responsibilities of key stakeholders on the continent. This plan enlists individuals, employers, organizations and policy-makers working independently and collaboratively to conquer cancer in Africa. Our goal is to ensure that each African country has a plan for addressing the Cancer Challenge in our continent.

Individual Responsibilities

1. **Eat Well!** Maintain a balanced and nutritious diet by eating fruits, vegetables and whole grains every day. Foods and drinks high in calories, sugar, salt, fat, and alcohol should be consumed in moderation.
2. **Stay physically active!** Stay active by doing activities that raise your breathing and heart rates, and activities that strengthen your muscles for at least 30 minutes a day, 5 days a week.
3. **Avoid smoke!** Stop smoking and avoid breathing other people's smoke.
4. **Keep germs away!** It is also important to wash your hands to get rid of germs.
5. **Talk to your doctor about check-ups!** Lower your risks for cancer through prevention, exams, screenings, and shots.
6. **Balance work, home and play to manage stress!** Take time to relax and get at least 8 hours of sleep each night.

Employer Responsibilities

1. Make the workplace smoke free.
2. Provide an environment that encourages physical activity.
3. Provide balanced and nutritious meals in the workplace.
4. Sponsor cancer health education and screening events in the workplace.
5. Provide support for employees going through cancer.

Non-Governmental Organization Responsibilities

1. Advocate for cancer prevention and control.
2. Offer cancer education and screening services in your community.
3. Support cancer patients and survivors.

Policy-makers Responsibilities

1. Develop, implement and sustain a tobacco free environment.
2. Develop, implement and sustain local, state-wide and national cancer control initiatives.
3. Promote cancer prevention and screening activities

D. Guide to using the plan

The Africa Continent Cancer Control Plan was developed by AORTIC as a guide for stakeholders (including cancer clinicians, scientists, advocates and policy-makers) to reduce the burden of cancer in Africa. While the plan is not meant to be prescriptive, it provides strategies to fight cancer in Africa by:

1. Describing the state of cancer in Africa;
2. Delineating specific goals and general strategies to control cancer; and
3. Outlining strategies for addressing the top cancers in Africa.

E. Targeted cancer sites

The top cancer sites in Africa are prostate, breast, cervix, liver, lung, haemotological and cancer in children. The 5-year strategies for these cancer sites are summarized below.

a. Prostate Cancer

Overview

Globally, prostate cancer is the second most common cancer in men and the sixth most common cause of death in men. With an estimated age-adjusted incidence rate of 17.5/100,000 and mortality rate of 12.5/100,000, prostate cancer ranks first in cancer incidence and deaths among men in Africa. The incidences of prostate cancer in men across the African regions are: 53.9/100,000 in Southern Africa; 22.2/100,000 in Western Africa; 16.4/100,000 in Middle Africa; 14.5/100,000 in Eastern Africa; and 8.1/100,000 in Northern Africa. In turn, the mortality of prostate cancer in men across the African regions is: 19.3/100,000 in Southern Africa; 18.3/100,000 in Western Africa; 13.4/100,000 in Middle Africa; 11.7/100,000 in Eastern Africa; and 6.2/100,000 in Northern Africa.

It is important to note that the incidence rates reported for African regions may be underestimated due to limited prostate cancer screening and the sparse use of prostate-specific antigen (PSA) testing in low resource countries. Despite that, prostate cancer remains one of the highest cancers in incidence and mortality among African men. Thus, addressing prostate cancer in Africa is of significant importance to men's health given the burden of the disease in Africa.

Risk Factors for Prostate Cancer

According to the American Cancer Society, the confirmed risk factors for prostate cancer are age, African ancestry, and family history of prostate cancer. The ***African ancestry*** risk factor makes prostate cancer an urgent chronic disease to address in Africa. Other risk factors that have been implicated, but remain largely unconfirmed, in prostate cancer are obesity and a diet high in processed meat and dairy foods.

Prevention and Guidelines for Screening

The roles of prostate cancer risk reduction behaviors (such as tobacco/alcohol/drug use, eating behavior, supplement consumption, and physical activity) and prostate cancer early detection as protective/risk factors are still unclear. Prevention behaviors like nutritional intakes are at best suggestive and not conclusive. An area that has received much research interest is chemoprevention, which has led to the discovery of finasteride and dutasteride. Both drugs are currently used to treat benign prostate enlargement and not officially approved for prostate cancer prevention.

The two primary screening tools rountinely used for prostate cancer diagnosis are digital rectal examination (DRE) and PSA. Although a significant number of research studies in the general population have demonstrated relatively improved mortality rates with early detection of prostate cancer, the benefits of prostate cancer screening in the general population remains controversial. In a systematic review and meta-analysis of randomized controlled trials focused on prostate cancer screening, Djulbegovic et al. concluded that: (1) Screening for prostate cancer **does not have a significant impact on either overall mortality or death** from prostate

cancer; and (2) Screening **helps to diagnose prostate cancer at an earlier stage** but at the risk of overtreatment and downstream adverse effects that currently cannot be precisely quantified. However, all the studies reviewed by Djulbegovic et al. did not include a significant number of men of African ancestry, and did not address African men at all. Thus, there is lack of evidence on the impact of prostate cancer screening in men of African ancestry. There is a dire need for dedicated screening trials for at-risk populations, such as African men, to develop targeted screening recommendations sensitive to African men's values and preferences.

Because of recent knowledge about the limited value of screening and potential for significant negative health outcomes for some men, most professional bodies have stepped back from their earlier recommendations about the use of PSA screening. However, most bodies still recognize the value of screening in some men. The American Cancer Society recommends that men at high risk of developing prostate cancer, such as men of African ancestry, should begin to discuss screening with their doctors at the age of 45. The United States (US) National Medical Association's (NMA) Urology section, in turn, supports the use of PSA in the early detection of prostate cancer as a means to support health promotion in men of African ancestry. In line with the American Urologic Association's best practice statement on prostate cancer early detection, the NMA recommends: (1) Initial PSA testing at 40 years for men of African ancestry; (2) Both DRE and PSA as part of screening; (3) An informed decision making process whereby men are informed about the pros and cons of screening; and (4) A multi-factorial assessment of risk based on age, ethnicity, family history, PSA kinetics and density. However, these recommendations have been made for men in

the US, and no similar guidelines exist in Africa.

Prostate Cancer Strategies

To effectively address prostate cancer in Africa, we have proposed strategies in the areas of capacity development, research, training, community engagement and policy.

Capacity development strategies.

1. Improve the validity of cancer registration for urological diseases.
2. Develop regional collaborative bio-banks and epidemiological data warehouses to support prostate cancer prevention and control research.
3. Develop collaborative research networks to address prostate cancer in Africa.
4. Promote the involvement of community leaders, cancer advocates and policy makers in prostate cancer research.

Research strategies

5. Determine the etiology of prostate cancer in Africa.
6. Identify factors that aid in determining optimal screening and treatment choices.
7. Understand the relative contributions of genetic, lifestyle, and environmental factors in the development and progression of prostate cancer in Africa.
8. Determine the influence of emigration on prostate cancer morbidity and mortality comparing Africans in the Diaspora to indigenous Africans.

Training strategies

9. Develop a cadre of African prostate cancer scientists through comprehensive education, training and mentoring programs.

10. Conduct continuing education workshops for and support healthcare providers to foster high quality and cost-effective care across the prostate cancer care continuum, including risk assessment, prevention, detection, diagnosis, treatment, survivorship and end-of-life care.

Community engagement strategy

11. Increase education, community outreach and support advocacies in Africa to foster prostate cancer prevention and control.

Policy engagement strategy

12. Educate African policy makers on prostate cancer issues for effective prostate cancer prevention and control policies.

13. Partner with policy makers to improve access to high quality and cost effective prostate cancer care.

b. Breast Cancer

Overview

Breast cancer is the second most common cancer in terms of both incidence and mortality in African women. Breast cancer incidence in 2008 was 21.3 per 100,000, and breast cancer mortality was 16.4 per 100,000 in Africa.

As with many cancers, breast cancer incidence rates reported for Africa may be underestimated due to limited breast cancer screening in low resource countries. Opportunities for breast cancer screening, including mammography, are limited in most regions of Africa. Many breast cancers are diagnosed beyond which effective treatments can be applied due to late presentation. In Libya and Nigeria, more than half of the

patients presented at stage III or IV, while in East Africa more than 70% of the patients presented at stage III or IV [3]. In Nigeria, 39% of the patients were reported to have fungating tumours and 13% had clinical evidence of metastasis.

Risk Factors for Breast Cancer

Numerous risk factors have been established for breast cancer, including age at onset of menarche and menopause, age at first full-term pregnancy, parity, breast feeding, and obesity. Other dietary (e.g., alcohol consumption) and lifestyle (e.g., sedentary behaviour) factors have been widely supported as risk factors. In general, women at highest risk for breast cancer are those that lead a "western" lifestyle. As African women continue to adopt reproductive, and dietary patterns consistent with "western" behaviour, it is anticipated that breast cancer incidence and mortality will continue to rise. If screening and treatment do not keep pace, it is anticipated that mortality due to breast cancer will also increase.

Prevention and Guidelines for Screening

The roles of breast cancer risk reduction behaviours (such as tobacco or alcohol use, fat consumption, and physical activity) have been widely studied in Europe and North America, but these strategies have not been evaluated in Africa. An area that has received much research interest is chemoprevention, which has been highly successful in reducing breast cancer risk. Use of tamoxifen, raloxifene, and other selective estrogen receptor modulators are used for both primary breast cancer prevention and treatment to prevent second (e.g., contralateral) tumours.

The primary screening tools routinely used for breast cancer detection are breast self exam, clinical breast exam, and mammography, with newer screening tools (breast MRI) being increasingly used in some high risk groups.

Although a significant number of research studies in the general population have demonstrated relatively improved mortality rates with early detection of breast cancer, the benefits of breast cancer screening in the general population remains controversial. Use of screening mammography in young women (e.g., less than age 50) was not recommended by the US Preventive Services Task Force, since younger women with dense breasts will not benefit from screening as do older women. Breast self exam has not been shown in every study to reduce breast cancer specific mortality. No comprehensive studies of breast screening efficacy have been undertaken in Africa. There is a dire need for dedicated screening trials in at-risk populations, such as African women, to develop targeted screening recommendations sensitive to African women's values and preferences.

Breast Cancer Strategies

To effectively address breast cancer in Africa, we have proposed strategies in the areas of capacity development, research, training, community engagement and policy.

Capacity development strategies

1. Improve the validity of cancer registration for breast diseases.
2. Develop regional collaborative bio-banks and epidemiological data ware-house to support breast cancer prevention and control research.
3. Develop collaborative research networks to address breast cancer in Africa.
4. Promote the involvement of community leaders, cancer advocates and policy makers in breast cancer research.

Research strategies

5. Determine the etiology of breast cancer in Africa.
6. Understand the relative contributions of genetic, lifestyle, and environmental factors in the development and progression of breast cancer in Africa.
7. Determine the influence of emigration on breast cancer morbidity and mortality comparing Africans in the Diaspora to indigenous Africans.

Training strategies

8. Develop a cadre of African breast cancer scientists through comprehensive education, training and mentoring programs.
9. Conduct continuing education workshops for and support healthcare providers to foster high quality and cost-effective care across the breast cancer care continuum, including risk assessment, prevention, detection, diagnosis, treatment, survivorship and end-of-life care.

Community engagement strategy

10. Increase education, community outreach and support advocacies in Africa to foster breast cancer prevention and control.

Policy engagement strategy

11. Educate African policy makers on breast cancer issues for effective breast cancer prevention and control policies.
12. Partner with policy makers to improve access to high quality and cost effective breast cancer care.

c. Cervical Cancer

Overview

Cervical cancer (CC) is a public health challenge as it is the commonest female genital tract cancer worldwide. Africa at the moment shared the largest burden of the disease. About 530,000 new cases are diagnosed annually worldwide with over 85 percent presenting with advanced disease when curative intervention is not feasible in developing countries that are mostly in Africa.More than 274,000 deaths have been estimated annually to be attributable to the disease. The age specific incidence ranges from 25 to 30/100,000 with a mean value of 28.5/ 100,000. The peak age range incidence is between 40 and 60..

Risk factors

The main causal factor for CC is infection by the Human Papilloma Virus (HPV), which is mostly transmitted sexually and is also associated with other cancers such as Nasopharyngeal, penile; and head and neck. The most common serotypes associated with CC are the 16 and 18. The pattern of HPV infection within the population varies by location and age of women. Women are mostly prone to HPV infection between 10 to 25 years of age and thereafter, the probability wanes until 40years of age. It is known that there is wider variation of the HPV types across countries, regions and continents. Africa has the highest rate of HPV infection burden amongst women by location. The biological explanation of association between HPV infection and CC at the moment is the persistence of infection for at least more than 6 months; this usually occurs in about 10 to 15 percent of cases.

Other risk factors associated with CC include: (1) environmental factors such as hormonal contraceptives, biological factors (age, high parity; presence of sexually transmitted infection and HIV status); lifestyle risk factors (age

of sexual debut, multiple sexual partners, smoking, polygamy, personal hygiene, illiteracy, poverty and family history); (2) viral cofactors such as viral types, loads and co-infections and finally (3) host cofactors such as genetic composition and variations.

Preventive strategies for Cervical Cancer

Cervical cancer is a totally preventable disorder and several countries have utilised this opportunity to reduce its burden. In general, the preventive strategies can be broadly divided into primary, secondary and tertiary prevention. HPV vaccination remains the cornerstone strategy for primary prevention of CC and this has been widely endorsed by various regulatory agencies and national governments. Following the Food and Drug Administration (FDA) approval, the two available vaccines are (1) Cervarix, and (2) Gardasil (see Table 2).

Table 2: The approved HPV vaccines

Variables	Gardasil	Cervarix
Manufacturer	Sanofi Pasteur MSD	GlaxoSmithKline
HPV genotypes	6, 11, 16, 18	16, 18
Adjuvant	Aluminium phosphate	AS04
FDA approval	2006	2008
Dosing schedule	0, 2, and 6 months	0, 1, and 6 months
Indication	Prevention of cervical cancer and genital warts	Prevention of cervical cancer

WHO recommends that HPV vaccine should be administered to young girls before sexual debut (9 to 12 years or 13 to 26 years) and it was further advised that this age limit could further be modified based on the average age of sexual initiation within the country. Several developed countries have formulated their national policy and have begun comprehensive implementation. However, several African countries are yet to implement national HPV vaccine strategy.

Behavioural change communication is another primary prevention method; this involves sharing information on safe sexual practices within the community. Counselling young girls against risky sexual activities and discouraging multiple sexual partners will potentially reduce the likelihood of HPV infection and subsequent CC risk.

Screening as a secondary level prevention aims to detect asymptomatic infected women with premalignant lesions for treatment within the population. Papanicolaou (Pap) smear is the gold standard for CC screening. It has high sensitivity and moderate specificity. It is recommended that sexually active woman should have Pap smear screening every 3 years at least until age 60. Most developed countries have used this policy to drastically reduce the burden of CC whereas several developing countries especially in Africa do not have any national screening strategy in place.

The challenges against the adoption of Pap smear in developing countries include lack of manpower such as health care providers specialised in cytological screening (cytoscreeners and cytopathologists) and high cost of the procedure. Visual inspection of cervix with acetic acid or Lugol's iodine (VIA or VILLI) was recommended as an alternative screening strategy for third world countries where access to Pap smear is limited. Studies have shown that these methods have a fairly comparable sensitivity but lower specificity in detecting premalignant lesions of cervix. The benefit of VIA or VILLI is that it is cheap, easy to perform, does not require highly specialized skills and treatment can be offered at the same spot when abnormality is detected.

The tertiary prevention involves detection of early stage disease and offering comprehensive treatment, which can be surgery or radiotherapy or both. Management of early disease is strongly associated with better cancer survival and sometimes cure is feasible. At the moment, most countries in Africa lack capacity and expertise to offer a holistic multidisciplinary treatment for CC.

Cervical Cancer Strategies

The effective strategy to reduce CC burden in Africa should be holistic, capture realistic and evidence based prevention strategies, promote translational multidisciplinary research, actively engage community and policy makers including donor agencies, build capacity of health care providers in all facets of treatments/interventions and ensure friendly policies that will promote better access to qualitative CC care.

Capacity development strategies

1. Improve the quality of cancer registration especially in the community where CC are often missed.
2. Develop a comprehensive mapping strategy of CC in the community to address the challenges of real epidemiological data.
3. Develop collaborative research networks to address CC in Africa.
4. Promote the involvement of community leaders, cancer advocates and policy makers in CC research.

Research strategies

5. Investigate the HPV types and other complimentary risk factors that are peculiar to Africa and also, determine whether there is any regional variation of the pathophysiological understanding of HPV infection clearance and subsequent CC development in the continent.
6. Understand the relative contributions of genetic, lifestyle, and environmental factors in the development and progression of CC in Africa.
7. Determine the pharmacogenomics of CC in indigenous Africa.

Training strategies

8. Promote both short and long term fellowship programs in all facets of CC care especially for young enthusiastic faculty in Africa.
9. Promote inauguration of certification for gynae-oncology sub-specialty with all other ancillary paraphernalia.
10. Lobby to increase the number of radiotherapy units in African country that will provide uninterrupted brachytherapy and teletherapy in Africa at an affordable cost
11. Conduct continuing education workshops for and support healthcare providers to foster high quality and cost-effective care across the CC care continuum, including risk assessment, prevention, detection, diagnosis, treatment, survivorship and end-of-life care.

Community engagement strategy

12. Increase education, community outreach and support advocacies in Africa to foster CC prevention and control.
13. Use the existing African socio-cultural method of information dissemination strategies to promote CC awareness as a health challenge, screening and treatment opportunities

Policy engagement strategy

14. Engage African leaders on the need to promote CC prevention in Africa by putting it on their priority list for consideration and funding.
15. Promote introduction of friendly policies that will reduce CC prevention in Africa such as incorporation of HPV vaccine into the routine immunization schedule and screening into their health insurance policy.

d. Liver Cancer

Overview

The liver is an essential organ that plays major and vital roles in the metabolic economy of the body. As a result of its central role in survival and existence, it is exposed to a barrage of antigens and xenobiotics, some of which are infectious and sometimes carcinogenic. Liver cancer is fatal and occurs worldwide. Liver cancer is majorly of two categories, that is, primary liver cancer and secondary or metastatic liver cancer. In countries with low prevalence of Hepatitis B virus (HBV) infection, hepatic secondaries are the major cause of liver cancer, while in regions with high prevalence of HBV such as China and sub-Sahara

Africa, Hepatocellular carcinoma (HCC) accounts for most of the liver cancer cases. It is however commoner in regions of the world where risk factors are more prevalent.

Worldwide, HCC is the sixth most common cancer worldwide and the fifth most common cancer in men and the eighth most common in women. Most of the over 600,000 annual deaths attributable to HCC, occur in Asia and sub-Sahara Africa, mainly because of the endemicity of the major risk factors.

Risk Factors

Liver cirrhosis is the final common pathway of most of the chronic liver diseases known, and therefore, the most important risk factor for HCC. In Africa, south of Sahara, HBV is the most important risk factor for liver cirrhosis and therefore HCC. Several studies have shown the prevalence of HBV in HCC to be between 60-80%. However, it is well established that some patients with HBV infection progress to HCC without the development of liver cirrhosis. Other important risk factors are Hepatitis C virus (HCV) and Aflatoxin B1 (AFB1). Less common causes in Africa include: Nonalcoholic Steatohepatitis (NASH), Diabetes Mellitus, obesity, alcohol, tobacco, Tyrosinosis, Haemochromatosis, Alpha1-antitrypsin deficiency, Autoimmune chronic active hepatitis, and Primary biliary cirrhosis.

Preventive strategies for Liver Cancer

The cost of care of liver diseases generally is beyond the reach of an average African where most of the citizens live below the poverty line. The soul of prevention of HCC in resource-poor

nations therefore is primary prevention of HBV, through universal hepatitis B vaccination of newborns, which the World Gastroenterology Organisation (WGO) has advanced as the only effective strategy.

Universal infant vaccination for HBV infection is the most rewarding preventive measure because most of the infected adults and children in Africa contact the infection in childhood through horizontal transmission. The energy and vigor by which this is pursued would determine whether progress will be made in containment of liver cancer in Africa. If African nations will adopt the approach of the World Health Organisation as is being deployed for polio immunization, the prevalence of HCC will come to its lowest ebb, as demonstrated by studies in the Gambia and Taiwan.

Apart from newborn immunization for HBV infection, others to be considered for vaccination are: Infants of HBV-positive mothers; Those exposed to blood and blood products (post-exposure prophylaxis); Healthcare workers; Persons with multiple sexual partners and or HIV; Individuals in closed institutions like day care, prisons, homes etc.; Those with puncture wounds such as bite, ear piercing, tattooing, toothbrush, etc.; Multiply transfused sickle cell haemoglobinopathy, haemophiliacs; Haemodialysis patients; Intravenous drug users (IVDU); and Transplant recipients (less common in Africa).

Guidelines for Screening

Screening is a one-time application of a diagnostic test amongst asymptomatic individuals to identify unrecognized early disease or precursors of disease. Screening for liver cancer and the risk factors needs to be put in place at primary, secondary and tertiary healthcare levels. The best screening methods should necessarily be non-invasive, readily available and affordable. In order to capture the majority of the populace, screening has to be carried out at various "entry points" newborn immunization for HBV infection is not widely practiced in most African countries. Screening for viral risk factors is strongly advocated.

The second level of screening is for liver cancer. Alpha-fetoprotein (AFP) has been the main screening parameter for hepatocellular carcinoma, but with the possibility of some non-alpha-fetoprotein secreting variants of HCC coupled with the low sensitivity and specificity of AFP, most authorities now recommend a combination of AFP and liver ultrasonography. However, some recent studies have found combination of another serum marker with AFP yields an increase of predictability of HCC compared to AFP alone. Such combinations are AFP and anti-p53 antibody, AFP and squamous cell carcinoma antigen, AFP and cancer testis antigens and p53 codon 249 mutations using plasma cell-free DNA among others. A protein encoded by the GPC3 gene, glypican 3 has also been found to be specific to HCC using immunohistological staining. However, some of these sophisticated modalities of diagnosis and screening are still far from the reach of most African nations.

Liver Cancer strategies

There is a need for concerted efforts and unwavering commitment by the national governments of the nations of Africa to rise up to the challenges posed by ubiquitous poverty, lack of infrastructure and medical experts and other contending demands by the people and chart a way forward through planning, dogged political willingness and collaborations with the international community to tame the looming epidemic of liver cancer in Africa. Specific strategies for control of liver cancers in Africa must necessarily be anchored on the tripod of prevention, early detection or diagnosis and treatment, and palliative care.

Capacity development strategies

1. Train doctors and laboratory scientists about current developments in the management of hepatitis.
2. Equip secondary and tertiary health facilities for screening of hepatitis viruses
3. Continuous health education to health workers and the general population.

Research strategies

4. National governments and funding agencies to encourage research on vaccine production against HBV and HCV.
5. Development of new non-invasive tests for biomarkers of HCC using serological antibodies, proteomics and genomics technology.
6. Generation of data base for HBV, HCV and Cancer registries

Training strategies

7. Train and retrain health workers about available preventive and therapeutic interventions for viral hepatitis.

Community engagement strategies

8. Voluntary screening for viral hepatitis.
9. Health education and encouragement of active participation in the World Hepatitis Day (October 1st of every year).
10. Improved grain storage to prevent aflatoxin contamination, through proper care of crops and food storage.

Policy engagement strategies

11. Compulsory universal newborn immunisation for HBV. Enforcement of HBV vaccination in the National Programme on Immunisation (NPI).
12. Surveillance and Screening programmes for known risk factors towards early detection of liver disease. Follow-up of HBV carriers, anti HCV positive, chronic hepatitis and cirrhotic individuals,
13. Vaccination of at risk groups such as health workers, prostitutes, butchers etc.
14. Establishment of Task force on Hepatitis to enhance surveillance and screening, as well as raise and sustain awareness about hepatitis.
15. Prevention of alcohol abuse.

16. Making health care cost affordable, by utilization of the National Health Insurance Scheme (NHIS) in all sectors.
17. Designation of regional specialized centres of excellence for infectious and liver disease.

e. Lung Cancer

Overview

In industrialized countries, lung cancer is the most common form of cancer among males and the leading cause of cancer related mortality worldwide. Even though diagnosis continues to grow, lung cancer remains poorly reported in. The incidence of lung cancer is low in most African countries, but it is increasing. It is most common in Northern and Southern Africa, with the lowest rates in East and West African countries. The age-adjusted incidence rate for most common cancers in males 2008 in Africa according to a report on Cancer in Africa by AORTIC ranked lung cancers as the 3rd leading cause of cancer morbidity with an incidence of 8.4 per 100,000 population. It is of note that while lung cancer according to the same report did not rank lung cancer among the 10 most common cause of cancer in females, it is however also a growing burden today, with increasing numbers of adenocarcinomas been diagnosed in women in addition to increasing rates of tobacco use among female adolescents in recent times.

The age-standardised rates of lung cancer in Kampala, Uganda, increased in men, rising from 0.5/100,000 in 1954-1960 to 1/100,000 in 1989-1991. Lung cancer in Natal, South Africa increased six-fold in men and five-fold in women between

1971 and 1982. In South-Western Zimbabwe, a study of cancer patients between 1963 and 1977 found that smoking tobacco > 15g daily was associated with increased risk of lung cancer in males compared to non-smokers. Earlier studies in Nigeria expectedly showed a very low incidence of lung cancer – 1.1% in males and 0.6% in females in the 1960s, but recent trends are beginning to show increasing reports of lung cancer.

Risk factors

Tobacco smoking remains the most common aetiological factor in lung cancer, however a number of other factors have been identified: indoor exposure to environmental tobacco smoke, cooking oil vapour, coal burning, radon, out-door pollution and occupational exposure to asbestos and other carcinogens. Eighty-five percent to 90% of individuals with lung cancer have had direct exposure to tobacco. A dose-response relation exists between the degree of exposure to cigarette smoke and the development of lung cancer. The age at which smoking began, the number of cigarettes smoked per day, and the duration of smoking all influence the likelihood of developing lung cancer. Also, the intensity of smoking, the depth of inhalation, and the composition of the cigarette influence the risk. The risk of developing lung cancer decreases over time after smoking cessation, although it never reaches that of a lifelong nonsmoker. Cigar smoking is also an independent risk factor for developing lung cancer.

Exposure to sidestream smoke, or passive smoking, may lead to an increased risk of lung cancer. The risk may vary with the level and duration of exposure. It is generally a much lower risk

than is active smoking. An estimated 2% to 9% of lung cancers are related to occupational exposures. An inherited genetic predisposition has epidemiologic support as a risk factor, but the mechanisms are theoretical. Women appear to have a higher baseline risk of developing lung cancer as well as a greater susceptibility to the effects of smoking. Lung diseases, such as tuberculosis (TB) causing fibrosis in the lung and chronic obstructive pulmonary disease (COPD), also create a risk for lung cancer.

Preventive strategies for Lung Cancer

Morbidity and mortality associated with lung cancer can be greatly reduced with cessation of smoking and use of tobacco products. It has been clearly shown that as smoking rates drop so do incidence of lung cancer. It is of paramount public health concern that tobacco use must be reduced if we are to prevent an epidemic of lung cancer in Africa. Tobacco use is a mass global phenomenon, with an estimated 1.3 billion people smoking 5.763 trillion cigarettes a year, in addition to the hundreds of millions who use oral smokeless tobacco products.

Lung Cancer strategies

Lung cancer prevention strategies is mainly based on reduction of tobacco use through awareness creation, strict legislation, denormalising its use in the community and discouraging industrial investment in tobacco in general.

Capacity development strategies

1. Improve the quality of data collection and cancer registration especially in the community including

Lung Cancer.

2. Develop a comprehensive strategy for Lung Cancer prevention at the national level.
3. Develop collaborative research networks to address Lung Cancer burden in Africa.
4. Enhance the role of enviromental protection agency to reduce air pollution and other biomass emissions.
5. Promote the involvement of community leaders and other opinion leaders, cancer advocates and policy makers in various drivers of Lung Cancer including genetics.

Research strategies

6. Investigate the Lung Cancer patterns, other causal risk factors apart from smoking in Africa and also explore the depth of genetic association with its occurrence.
7. Determine the impact of investment on tobacco production in African countries and the pattern of Lung Cancer burden in indigenous African population.
8. Investigate the relationship of genetic as an independent risk factor for Lung Cancer in African population.
9. Determine the association between household biomass emission fuel and the risk of Lung Cancer in Africa.

Training strategies

10. Promote both short and long term fellowship programs on Lung Cancer management including awareness creation on hazards of tobacco and other emissions.
11. Encourage multidisciplinary management for Lung Cancer care including hospice.

12. Engage media and other allied professionals to reduce tobacco consumption in the community through constructive engagement programs.

Community engagement strategy

13. Increase awareness creation on Lung Cancer risk factors and also dispelling superstitions assocatied with the disease.
14. Introduce health talks against smoking habits in schools, religious organisations and other social gatherings.

Policy engagement strategy

15. Engage African leaders on hazards of promoting investment on tobacco within the continent.
16. Promote a robust and strict tobacco use legislation in African countries.
17. Promote policies that will improve healthy living standards and occupational exposures to Lung carcinogens

f. Haematological Cancers

Overview

Haematologic cancers are primary clonal tumours of the blood and blood forming tissues of bone marrow and lymphoid organs. The tumours majorly involve cells of the myeloid and/or lymphoid progenitors. They are almost, always associated with chromosomal abnormalities, some of the aberrations sometimes serve as diagnostic markers, such as

the association between chronic myeloid leukaemia (CML) and Philadelphia chromosome resulting from the translocation between the long arms of chromosome 9 and 22, t(9;22). The cancers are often disseminated with infiltration of the blood, bone marrow, lymph nodes and other tissues as in the leukaemias.

The major haematological cancers include acute and chronic leukaemias (lymphoid and non- lymphoid), the malignant lymphomas, leukaemic and non-leukaemic myeloproliferative neoplasms and plasma cell tumours.

Malignant lymphomas including Hodgkin and non-Hodgkin are solid neoplasms with primary involvement of lymph nodes, and less often extra nodal structures. In 1990, the estimated age-standardised rates of lymphomas per 100,000 of the population varied across sub-regions and between males and females: 7.5/4.5 in East Africa; 12.7/7.9 for Middle Africa; 11.1/7.1; North Africa; 3.7/2.1 for South Africa and 5.1/2.9 for West Africa compared to 16.8/9.5 in Europe. In sub- Saharan Africa, non-Hodgkin lymphomas (NHLs) are among the top five cancers in males and females. Over 85 % of NHLs are of B-cell lineage, and the rest from T lymphocytes (including the Adult T-cell leukaemia lymphoma -ATLL) and/or natural killer (NK) cells. Compared to western populations, the incidence of indolent follicular lymphoma is low in Africa. In sub-Saharan tropical Africa, EBV-associated Burkitt lymphoma accounts for over 60% of childhood tumours.

The incidence of B-cell chronic lymphocytic leukaemia (CLL) is higher in the Caucasians than in any other race, the lowest incidence is found in Asians both in their native land and among immigrants to the western world. The incidence in Africans is higher than in the Asians. In the USA, the age-adjusted incidence rates per 100,000 men between 1998 and 2002 were 5.6 for whites, 3.9 for African-Americans and 1.1 for the Asians. The majority of affected patients are over 50 years at diagnosis, with peak age incidence at 60 years, compared to over 70 years in western world. Males are more prone to developing classical CLL than females, with a male: female ratio of 2: 1, except in the patients below age 50 in Africa, where female/male ratio is 6:1. CLL is rarely encountered in patients under 30 years of age.

Chronic myelocytic leukaemia (CML) is the commonest leukaemic myeloproliferative neoplasm frequently encountered in our practice. CML has a uniform annual worldwide incidence of 1-2/100, 000, with a male-female ratio of 1.8: 1. In most of Africa, the median age incidence of the typical Ph/bcr-abl-pos CML is 38 years, compared to 67 years in the Western World. CML is very uncommon after the age of 60 in Africans. The incidence of atypical CML (i.e., Ph/bcr-abl-Neg) is <5% in most reports. Occasionally, CML occurs in children. The triphasic clinical manifestations of CML comprising of the potentially treatable chronic phase, the aggressive (accelerated) phase and the terminal blastic phase reported worldwide are typically seen in African patients. The non-leukaemic MPNs such as primary polycythaemia, myelofibrosis and essential thrombocythaemia are not infrequently seen.

The incidence of acute leukaemia (ALL and AML) is higher in males than in females. ALL is seen more commonly in older African children (peak age, 10-14 years); the under 5 childhood ALL typically found in Western countries is less frequently encountered. Childhood AML is seen in younger children between the ages of 5-9 years and may be associated with granulocytic sarcoma deposits, however the disease is often seen in adults at a peak age of 60 years. ALL in Africans are characterised by adverse prognostic factors such as older age of onset (the majority are > 10 years at diagnosis), predominance of T-ALL, paucity of PAS+ blasts and high initial leucocyte counts ($>100 \times 10^9$/l).

The commonest of the plasma cell dyscrasia in Africa, as it is in other populations is the multiple myeloma (MM) with its characteristic CRAB symptoms of hypercalcaemia, renal impairment, anaemia and bone lesions of varying severity. The median age incidence of myeloma in Africa is 58 years, which is about a decade younger than the **65.8 and 69.8 years reported for American (USA)** blacks and whites populations, respectively but the male predominance (male to female ratio is 2-3:1) is similar. Available publications would suggest that the Black race has the highest incidence of myeloma in the world. The most frequent heavy chain class detected in myelomatosis is IgG (70%) followed by IgA (25-30%) and much less frequently, IgD (1-2%). IgE and IgM myeloma are very rare. Solitary plasmacytoma of bone or soft tissues are not infrequently seen.

Myelodysplastic syndromes (MDS) are not rare in Africa. MDS vary in severity from the relatively indolent refractory anaemia to the more aggressive refractory anaemia with excess blasts, which invariably terminates as overt acute myeloblastic leukaemia (AML). Inadequate diagnostic capability in particular, cytogenetics is a strong limiting factor to identification of the various sub-types, including MDS with isolated del (5q) (5q syndrome).

Clinically, haematological malignancies present with impairment of normal bone marrow function as a result of infiltration by cancer cells. There are often varying degrees of anaemia, leukopenia and thrombocytopenia, and sometimes leuco-erythroblastosis. Patients may present with lymphadenopathy, splenomegaly and/or hepatomegaly. Immunosuppression with increase susceptibility to opportunistic infections is commonly seen in haematologic cancers, usually in association with lymphoid/plasma cell neoplasms and/or therapy related.

Risk factors

Aetiologic factors for cancers are not generally known, however some biological and non-biological factors have been implicated:

i. Congenital abnormalities: Down syndrome, Bloom syndrome, combined immune deficiency syndrome: Acute leukaemias
ii. familial predisposition: Acute leukaemias, CLL, plasma cell tumours
iii. Ageing: CLL, myeloma, MDS

iv. Exposure to certain environmental carcinogens with potential for induction chromosomal abnormalities and DNA damage such as ionising radiation, organic-chemicals and solvents (eg., benzene, carbon tetrachloride, toluene, etc); chemicals such as pesticides, herbicides, wood preservatives, hair dyes, etc; chemotherapeutic agents including alkylating agents, topoisomerase II inhibitors (eg, etoposide, anthracyclines) have been implicated in MDS, MPNs, acute leukaemias, malignant lymphomas, plasma cell tumours,

v. **Infection:**

a. Viruses

i. Epstein-Barr virus and endemic Burkitt lymphoma, Hodgkin lymphoma, Lymphomas in immunocompromised individuals such as HIV/AIDS infection and organ transplantation;

ii. Human T-cell leukaemia virus type 1 (HTLV-1) and Adult T-cell leukaemia/lymphoma (ATLL);

iii. Hepatitis-C virus (HCV) and plasmacytoid lymphocytic lymphoma and Waldenstrom's macroglobulinaemia;

iv. Kaposi sarcoma–associated herpes virus (KSHV) and primary body cavity lymphoma (pleural, pericardial or peritoneal malignant effusions) in patients with HIV infection; and

v. Human immunodeficiency virus (HIV) in aggressive non-Hodgkin lymphoma and primary lymphoma of the brain.

b. Bacteria:

Helicobacter pylori infection is aetiologically related to primary mucosa-associated lymphoid tissue (MALT)-lymphoma of the stomach.

Preventive strategies for Haematological Cancers

Haematological malignancies having strong causal associations with some specific environmental carcinogens could be prevented by taking care of the offending agents. Malignant lymphomas can be prevented through healthy leaving, protection from microbial infections including malaria and viruses such as HIV. Children should sleep under mosquito net. Overcrowding should be avoided. Safe blood transfusion practice must be available. Undue exposure to all forms radiation must be avoided. Houses should not be built under high tension cable. Sources of domestic water and agricultural products must be protected from pollution by industrial chemicals, organic solvents and petrochemicals.

Haematological Cancers strategies

Strategies for effective control of haematologic malignancies should be all-embracing, realisable, achievable and practicable. It should include correct tumour diagnosis, staging, immunologic, cytogenetic and cytochemical characterisation to allow rational use of therapy, in particular targeted therapeutic agents such as tyrosine kinase inhibitors for chronic myeloid leukaemia and monoclonals for specific lymphomas or leukemias. Strategy for safe blood and blood products transfusion at all times. Strategies for obtaining the more affordable genuine generic chemotherapeutic agents

must be in place. Care givers should have in place facilities for proper documentation of all cases and follow up of patients from diagnosis.

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Capacity development strategies

1. Training of data managers and home visitors for efficient patient monitoring.
2. Upgrading of Haematology/pathology Laboratories in sub-Sahara Africa to high-tech standards with facilities for:
3. Immunohistochemistry/immunophenotyping;
4. Cytogenetics; and
5. Molecular pathology techniques.
6. Training of competent pathologists to enhance better diagnosis.
7. Participation in the online pathology programme such as iPath (https://www.ipath-network.com/inctr/object/view/511695) should be encouraged

Research strategies

8. Promotion of Intra- and inter-regional collaborative research on management of haematologic malignancies (e.g., Treatment of Burkitt lymphoma in equatorial Africa.....Br J Haematol. 2012; 158(6): 749–762)
9. Investigation of the impact of targeted therapy on the survival of defined haematologic cancers, e.g., the TKI in the management of CML.
10. Cytogenetic and immunophenotypic characteristics of

defined haematologic cancers in different sub-regions of Africa to facilitate rational use of novel therapeutic agents.

Training strategies

11. Encourage establishment of Regional/Local Postgraduate Med Colleges to facilitate training of Pathologists across Africa, in particular sub-Sahara Africa.
12. Encourage establishment of Regional/Local Med Laboratory Technology Schools to facilitate training of Medical Laboratory Scientists across Africa.
13. Encourage training of African Pathologists and Medical laboratory Scientists on the uses of operation of flow cytometry, PCR machine, ELISA machines, etc., to facilitate diagnosis of disease.
14. Encourage resident staff and younger faculty members to visit centres of excellence in other parts of the world for short term training in disease diagnosis and management.
15. Encourage extension of the International CML Foundation (iCMLf)'s Emerging Regions Support and Partnership (ERSAP) Preceptorship Program (www.cml-foundation.org) to other common haematologic cancers.

Community engagement strategy

16. Encourage community leaders to improve leaving standards of their people and popularise use of insecticide treated mosquito nets by their people.

Policy engagement strategy

17. Promote policies that will enhance availability of genuine essential cancer chemotherapy and supportive therapeutic agents such as growth factor (eg, G-CSF, EPO) for treatment of haematologic cancers
18. Promote policies that will sustain safe blood and blood products supply
19. Promote policies that will improve healthy living standards and protection of individuals from potential carcinogenic environmental pollution

g. Common Childhood Cancers

Overview

Global incidence of childhood cancer is about 160,000 new cases/year in children less than 15 years of age and accounts for 90,000 deaths/year in children in the same age group. Overall, in children less than 15 years of age, in the industrialized world, childhood cancer is listed as the 4th most common cause of death but in the United States; it is the second most common cause of death among children between the ages of 1 and 14 years, surpassed only by accidents. The overall incidence of pediatric malignant tumors is difficult to estimate in Africa because of the lack of population based national cancer registries. Incidence of childhood cancer per million children under 15 years of age is 71.2 in Nigeria, 100 in Malawi, 183.5 in Uganda, 111.2 in Zimbabwe, and 77.4 in Mali.

In Africa, the most common paediatric malignant tumours are the Lymphomas as a group. In northern Africa, Lymphomas are closely followed by Leukaemias. Burkitt Lymphoma, which

predominates in sub Saharan countries, is uncommon in northern Africa: thus most of the lymphomas are made up of Hodgkin lymphoma and other Non-Hodgkin lymphomas. In some countries such as Tunisia and Morocco, Acute Lymphoid leukaemia is generally more common than each of the aforementioned sub categories of lymphoma and therefore the predominant form of cancer. In South Africa, acute lymphoid leukaemia is also the most common childhood tumour seen.

In most sub-Saharan countries, Burkitt Lymphoma is the most common tumour seen in childhood. However, with the AIDS epidemic, the prevalence of Kaposi Sarcoma has become more prominent in some East African countries. In the Kyandondo county of Uganda, the prevalence increased from 2.2% in 1960-1971 to 33.2% in the period 1991-1997. Similar dramatic increases were observed in Malawi and Zambia. In view of the prominence of Burkitt Lymphoma in sub Saharan Africa, acute leukaemia in northern Africa and South Africa and increasing incidence of Kaposi sarcoma in East Africa, these three childhood tumours will be targeted for this document.

g: Acute Leukaemia

Overview

In white populations of Europe, the Americas and Oceania, and also in much of eastern Asia, around a third of all childhood cancers are leukaemias, with age-standardized incidence rates (ASR) of 35-50 per million. Acute lymphoblastic leukaemia (ALL) comprises 75-80% of the total in these populations, with ASRs generally in the range 25-40 per million, and a marked peak in incidence at age 2-3 years.

In North Africa, although data are relatively sparse, it appears that the incidence of leukaemia is not far below that in Europe, with a similar distribution by subtype, and a peak in incidence of ALL in young children.

In sub-Saharan Africa, recorded incidence rates of leukaemia are considerably lower. The incidence of ALL is especially low, with little or no sign of a peak in the age-incidence curve. This low incidence is partly a consequence of under diagnosis and underreporting. Estimated incidence in Nigeria 8.6, Mali 4.0, Uganda 10.3 per million children

Risk Factors for Acute Leukaemia

Risk factors for development of Leukaemia include genetic, infectious, and environmental. Benzene and ionizing radiation are two environmental exposures strongly associated with the development of childhood AML or ALL.

Childhood leukemia may also result from genetic susceptibility factors e.g. an identical twin is twice as likely as the general population to develop leukemia if his or her twin developed the illness before the age of 7 years. Siblings of children with leukemia are also at greater risk of developing leukemia than children whose siblings do not have the disease. Certain inherited diseases are associated with a higher risk of developing leukemia. Examples of these diseases include Fanconi anemia, Bloom syndrome and Down syndrome.

The risk for childhood ALL has been shown to be significantly higher among children who were born when their parents were older; significant trends in ALL incidence have been related to increasing mother's (> 35 years) and father's (> 40 years) ages. Increased birth weight is also associated with childhood ALL.

Prevention

Most adults and children with leukemia have no known risk factors, so there is no sure way to prevent their leukemias from developing. Some leukemias result from treating cancers with radiation and chemotherapy, or the use of immune-suppressing drugs to avoid rejection of transplanted organs. Whilst making effort to minimize the risk of leukemias in such patients, the obvious benefits of treating life-threatening diseases with chemotherapy, radiation therapy, or organ transplants must be balanced against the small chance of developing leukemia several years later.

X-rays or CT scans done before birth or during childhood use much lower levels of radiation than those used for treatment; therefore, any in risk from these tests is likely to be very small. However, most doctors recommend that pregnant women and children not get these tests unless they are absolutely needed.

Leukemia Strategies

To effectively address childhood Leukaemia in Africa, we have proposed strategies in the areas of capacity development, research, training, community engagement and policy.

Capacity development strategies

1. Improve the validity of cancer registration for leukaemias.
2. Develop regional collaborative epidemiological data ware-house to support leukaemia prevention and control research.
3. Develop collaborative research networks to address childhood leukaemia in Africa.

4. Promote the involvement of community leaders, cancer advocates and policy makers in child hood leukaemia research.

Research strategies

5. Determine the aetiology and risk factors of child hood leukaemia in Africa.
6. Understand the relative contributions of genetic, lifestyle, and environmental factors in the development and progression of childhood leukaemia in Africa.
7. Determine the influence of emigration on leukaemia morbidity and mortality comparing Africans in the Diaspora to indigenous Africans.

Training strategies

8. Develop a cadre of Paediatric Leukaemia scientists through comprehensive education, training and mentoring programs.
9. Conduct continuing education workshops for and support healthcare providers to foster high quality and cost-effective care across the Leukemia care continuum, including risk assessment, prevention, detection, diagnosis, treatment, survivorship and end-of-life care.

Community engagement strategy

10. Increase education, community outreach and support advocacies in Africa to childhood Leukaemia early detection and treatment.

Policy engagement strategy

11. Educate African policy makers on child hood leukaemia issues for effective leukaemia treatment and control policies.
12. Partner with policy makers to improve access to high quality and cost effective leukaemia care for children.

Other Infection related cancers

h1: Burkitt Lymphoma

Overview

Burkitt lymphoma (BL) is a highly aggressive B cell non-Hodgkin lymphoma characterized by the translocation and deregulation of the c-MYC gene on chromosome 8. Three distinct clinico-epidemiologic forms of BL are recognized: endemic (African) form found in equatorial Africa and New Guinea, the sporadic form found in the United States (US) and Western Europe, and the immunodeficiency-associated form primarily seen in HIV infection, and less commonly in patients with other causes of immunodeficiency.

The exact worldwide incidence of Burkitt lymphoma (BL) is not known, due to lack of resources needed for epidemiologic data and accurate diagnosis in the developing countries that have the highest apparent incidence (e.g, equatorial Africa). The highest incidence and mortality rates of BL are seen in Eastern Africa. BL affects mainly children, and boys are more susceptible than girls. Burkitt Lymphoma accounts for 30 to 50 percent of all childhood cancer in equatorial Africa with an estimated incidence of 3 to 6 cases per 100,000 children per year. BL comprises 30 percent of pediatric lymphomas and less than 1 percent of adult non-Hodgkin lymphomas in the US. This

translates into an estimated incidence of approximately three cases per million persons per year in both children and adults. In Europe, the incidence is approximately 2.2 cases per million persons per year. Within the Cancer Registries available in Africa, the incidence of BL is highest in the cancer registry from the Kyadondo County, Uganda, with an age-standardized rate (ASR) per 100,000 of 4.7 for boys and 3.0 for girls. The second ranking registry is Malawi with ASR per 100,000 of 2.8 for boys and 0.6 for girls. Incidence rates of BL in Mali, Nigeria, Congo and The Gambia are lower than those reported in Uganda but substantially higher than those observed in other African Regions.

Risk Factors for Burkitt Lymphoma

Risk factors for African Burkitt lymphoma include Epstein Barr virus (EBV), Malaria and HIV infections. Ad hoc studies indicate that BL is more common in areas where malaria is endemic. In Uganda, children with higher baseline titers to EBV antigens are at a higher risk of developing BL, and higher antibody levels were detected many years before BL diagnosis. The sap of the milk bush (Euphorbia tirucalli spurge) and other Euphorbiaceae species have also been implicated as possible environmental risk factors for BL due to their ability to activate the viral replication cycle in the latent phase of EBV-infected cells. The milk bush is a succulent plant containing rubbery, white latex, which grows as shrub or small trees in many parts of tropical Africa. The impact of socioeconomic factors in the distribution and clinical characteristics of BL is unclear.

Prevention

In a case-control study of Burkitt lymphoma among children in Malawi, cases were more likely than controls to be HIV positive, and to have raised antibody titres against EBV and malaria. The study also showed the potential of the use of bed nets in decreasing the risk of Burkitt lymphoma in African children. Reported use of household insecticides and mosquito nets were have also been associated with a lower risk of Burkitt lymphoma in Uganda, lending support to the view that malaria prevention may decrease the risk of this childhood Burkitt Lymphoma. A decrease in the relative frequency of Burkitt Lymphoma compared to other childhood tumours has also been observed in Ibadan, Nigeria and this has been attributed to better malaria control and living conditions.

The association of HIV infection with Burkitt lymphoma observed in separate studies in Malawi and Uganda suggests a potential for HIV control in reducing the incidence of Burkitt lymphoma.

Burkitt Lymphoma Strategies

To effectively address Burkitt Lymphoma in Africa, we have proposed strategies in the areas of capacity development, research, training, community engagement and policy.

<u>Capacity development strategies</u>

1. Improve the validity of cancer registration for childhood cancer.
2. Develop regional collaborative bio-banks and epidemiological data ware-house to support Burkitt lymphoma prevention and control research.

3. Develop collaborative research networks to address Burkitt Lymphoma in each country and across sub-region of Africa.
4. Promote the involvement of community leaders, cancer advocates and policy makers in Burkitt Lymphoma research.

Research strategies

5. Determine the specific role of malaria in etiology of Burkitt Lymphoma in Africa. Compare settings where Burkitt lymphoma incidence seems to have dropped with settings with high incidence of Burkitt Lymphoma to elucidate factors that might help control the disease.
6. Understand the relative contributions of genetic, lifestyle, socio-economic status and other environmental factors in the development of Burkitt Lymphoma.

Training strategies

7. Develop a cadre of African physicians competent in the treatment of Burkitt Lymphoma through comprehensive education, training and mentoring programs.
8. Conduct continuing education workshops for and support healthcare providers to foster high quality and cost-effective care across the Burkitt Lymphoma care continuum, including prevention, early diagnosis, treatment, survivorship and palliative care.

Community engagement strategy

9. Increase educations, community outreach and support advocacies in Africa to foster Burkitt Lymphoma prevention and control.

Policy engagement strategy

10. Educate African policy makers on Burkitt Lymphoma issues for effective prevention and control policies.
11. Partner with policy makers to improve access to high quality and free treatment of Burkitt Lymphoma in children.

h2: Kaposi sarcoma

Overview

Kaposi sarcoma (KS) is a spindle-cell tumor thought to be derived from endothelial cell lineage. It carries a variable clinical course ranging from minimal mucocutaneous disease to extensive organ involvement. It can be primarily categorized into 4 types: Epidemic or AIDS-related, Immunocompromised, Classic, or sporadic and Endemic (African). Before the AIDS epidemic, Kaposi sarcoma (KS) was rare in the United States with an incidence of about 2 per million people. Most often, the types of KS that occurred were classic and transplant-related. With the AIDS epidemic, the rate of KS in the United States increased more than 20 times — peaking at about 47 cases per million people (per year) in the early 1990s. With new treatments for AIDS, KS has become less common in the United States, and it now occurs at a rate of about 6 cases per million people each year. By contrast, the prevalence of KS remains high among African people, in particular in children living in East Africa. The age standardized rate in the Kyandondo county

of Uganda increased from 2.5 per million in the 60s to 55.8 per million in the 90s. In Zambia, the frequency of KS among cases of childhood cancer increased from 2.6 % in 1980-82 to 19.5% in 1990-92. In Malawi, the frequency increased from 4.4% in 1967-76 to 16.1% in 1991-95.

Risk Factors for Kaposi sarcoma

Kaposi sarcoma is caused by infection with a virus called the Kaposi sarcoma herpes virus (KSHV), also known as human herpes virus 8 (HHV8). Infection with HHV8 seems to be needed to cause KS, but in most cases infection with KSHV alone does not lead to KS. The percentage of people infected with KSHV varies in different places around the world. In the United States, studies have found that less than 10% of people are infected with KSHV while in some areas of Africa, more than 90% of the population shows signs of KSHV infection. KSHV infection is more common in people infected with HIV than in the general population in the United States.

Risk factors for KS are immunosuppression due to HIV infection, organ transplant and older age. In persons with HHV-8 infection, co-infection with HIV is associated with an increased risk of Kaposi sarcoma. The occurrence of classic KS in men of Mediterranean or eastern European Ashkenazi descent suggested a possible genetic predisposition to this tumour, which is yet to be proven.

Prevention

HIV infection is associated with increased incidence of Kaposi sarcoma. Therefore, taking measures to avoid becoming infected with HIV could prevent most cases of KS. Prevention of HIV infection through safe sex practices, use of anti-retroviral

therapy and prophylaxis to HIV infected pregnant women and their babies and appropriate infant feeding choices would contribute to reduction in the risk of development of Kaposi sarcoma. Similarly, avoidance of the use of contaminated needles for injections would contribute to reduction of the risk of Kaposi sarcoma.

HIV testing and counseling offered to the population can identify people infected with this virus. Administration of highly active antiretroviral therapy (HAART) to eligible children will reduce the risk of development of Kaposi sarcoma. Treating infections that commonly occur in people with weakened immunity also reduces the likelihood of developing problems with KS.

Management of childhood HIV-associated KS in resource-poor settings is challenging. In addition, there are no randomized controlled studies of chemotherapy for KS in children.

Kaposi Sarcoma Strategies

To effectively address Kaposi sarcoma in Africa, we have proposed strategies in the areas of capacity development, research, training, community engagement and policy.

Capacity development strategies

1. Improve the validity of cancer registration for childhood cancers.
2. Develop regional collaborative bio-banks and epidemiological data ware-house to support Kaposi sarcoma prevention and control research.
3. Develop collaborative research networks to address Kaposi sarcoma in Africa.

4. Promote the involvement of community leaders, cancer advocates and policy makers in Kaposi sarcoma research.

Research strategies

5. Determine effective treatment of Kaposi sarcoma in African children.
6. Understand the relative contributions of genetic, lifestyle, and environmental factors in the development and progression of endemic Kaposi sarcoma in Africa.

Training strategies

7. Develop a cadre of African Kaposi sarcoma scientists through comprehensive education, training and mentoring programs.
8. Conduct continuing education workshops for and support healthcare providers to foster high quality and cost-effective care across the Kaposi sarcoma care continuum, including risk assessment, prevention, detection, diagnosis, treatment, and palliative care.

Community engagement strategy

9. Increase educations, community outreach and support advocacies in Africa to foster early detection of Kaposi sarcoma and HIV prevention and control.

Policy engagement strategy

10. Educate African policy makers on Kaposi sarcoma and its relationship with HIV with regards to prevention and control.
11. Partner with policy makers to improve access to high quality and cost effective Kaposi sarcoma treatment.

Chapter 3

3. The Way Forward

The AORTIC Executive Council working in partnership with several International Organisations such as UICC,ASCO,IAEA,INCA,ACS,NIH/NCI formulated 'The Dakar Declaration' in 2010 (see annexure D). This document further serves as a guide for cancer initiatives in Africa. The actions proposed by the Council are summarised below;

- **Cancer Advocacy**
  - Declare cancer a significant public health problem in Africa
  - Promote development and implementation of National Cancer Control Programmes by every Ministry of Health in Africa
  - Prioritise cancer control strategies to "key" cancers that are preventable or curable; incorporate vaccination against preventable cancers such as HPV, Hepatitis B into national vaccination programmes; support campaign on tobacco control and obesity
  - Promote synergy of efforts by linking and forming partnerships with organisations working toward cancer control

- **Cancer Care**
  - Provide palliative care services
  - Increase access to effective anti-cancer therapies
  - Support quality cancer care through development of relevant diagnostic and therapeutic resources, including pathology, radiology, surgery, chemotherapy and others

- **Cancer Education**
  - Promote mass educational and public health campaigns to the media, government and the general population to improve prevention, earlydetection and treatment of "key" cancers
  - Develop Cancer Training Programmes for African clinicians, researchers, and patient advocates

- **Cancer Research**
  - Create and resource population-based cancer registries
  - Develop and support research to create new knowledge and drive innovation in cancer control.

Chapter 4

1. Partnership For Cancer in Africa

AORTIC has working relationships with several organizations such as WHO, ASCO,AACR,IAEA,Afrox,INCA,IARC,UICC and several others. These partnerships have helped to potentiate our impact in the fight against cancer.
Here are some examples of current partnership programmes:

International Cancer Control Partnership (ICPP)
A group of international organisations, committed to the fight against cancer , modwifed the ICCP in November 2012. The Partners involved plan to work together to maximise collective resources and efforts to support National Cancer Control Plans (NCCPs) development, implementation and evaluation. The ICCP seeks to make cancer prevention and control a priority in order to achieve a 25% reduction in premature mortality due to NCDs by 2025.
The goal of this partnership is to collaborate on projects that will complement the mission and vision of each other in terms of cancer control planning. ICCPP has two overall priorities:

1) Encourage developing countries to advocate for the prioritization of cancer within their health systems by reaching out to country decision-makers through ICCPP's collective networks.
2) Assist countries to develop and implement quality cancer control and prevention plans. ICCPP helps to coordinate efforts around development and dissemination of cancer control planning materials and tools, technical assistance and training, and to address data gaps.

Although the ICCPP priorities are not specific to Africa at this time, it is expected that some of the tools will be beneficial to many countries e.g. database of cancer control plans. ICCPP is currently defining the scope of the technical assistance, and is aiming to tailored such assistance to the country/region/population.

Collaboration on HPV vaccination in developing countries

The Global Alliance for Vaccines and Immunization (GAVI Alliance) is supporting cancer control planning in the HPV vaccine demonstration project countries. Ghana, Kenya, Madagascar, Malawi, Niger, Sierra Leone and Tanzania were selected for the HPV vaccine demonstration projects in Africa.

Cancer Surveillance

Cancer registry data is vital for informing cancer control planning. The Global Initiative for Cancer Registry Development in Low- and Middle-Income Countries (GICR), is led by the International Agency for Research on Cancer (IARC). GICR is implemented through regional hubs that provide technical and scientific support, deliver tailored training for population-based cancer registration, advocate for cancer registration and affiliated associations and networks, and coordinate international research projects (http://gicr.iarc.fr/). Regional hubs for Western Asia & North Africa at Izmir Cancer Registry (Turkey), and Sub-Saharan Africa in collaboration with the African Cancer Registry Network, will become operational in the near future.

National cancer Institute(NCI)

The Center for Global Health supports National Cancer Institute's goal to advance global cancer research, build expertise, and leverage resources across nations to address the challenges of cancer and reduce cancer deaths worldwide. The Center for Global Health will continue to seek and collaborate with national and international partners to develop and implement plans to inform cancer control, and provide technical assistance as countries work to implement cancer control programs in developing countries.

APPENDIX A
Terminologies

Breast Cancer Cancer that forms in tissues of the breast, usually the ducts (tubes that carry milk to the nipple) and lobules (glands that make milk). It occurs in both men and women, although male breast cancer is rare.

Burkkitt Lymphoma Cancer that arises from the lymphatic system and it is a common cancer in children

Carcinoma Cancer that begins in the skin or in tissues that line or cover internal organs.

Carcinoma in Situ A group of abnormal cells that remain in the place where they first formed. They have not spread. These abnormal cells may become cancer and spread into nearby normal tissue. Also called stage 0 disease.

Cervical Cancer Cancer that forms in tissues of the cervix (the organ connecting the uterus and vagina). It is usually a slow-growing cancer that may not have symptoms but can be found with regular Pap tests (a procedure in which cells are scraped from the cervix and looked at under a microscope). Cervical cancer is almost always caused by human papillomavirus (HPV) infection.

Diabetes Any of several diseases in which the kidneys make a large amount of urine. Diabetes usually refers to diabetes mellitus in which there is also a high level of glucose (a type of sugar) in the blood because the body does not make enough insulin or use it the way it should.

Diabetes Insipidus A condition in which a person is very thirsty and makes large amounts of urine. The most common types of diabetes insipidus are central diabetes insipidus (a pituitary disorder) and nephrogenic diabetes insipidus (kidney failure). Diabetes insipidus is not related to diabetes mellitus, which is more common.

Haematological cancer Cancer that developed from any of the cell types within the blood systems.

Immunization A technique used to cause an immune response that results in resistance to a specific disease, especially an infectious disease.

Liver Cancer Primary liver cancer is cancer that forms in the tissues of the liver. Secondary liver cancer is cancer that spreads to the liver from another part of the body.

Lung Cancer Cancer that originates in the tissues of the lungs or the cells lining the airways.

Prevention In medicine, action taken to decrease the chance of getting a disease or condition. For example, cancer prevention includes avoiding risk factors (such as smoking, obesity, lack of exercise, and radiation exposure) and increasing protective factors (such as getting regular physical activity, staying at a healthy weight, and having a healthy diet).

Prostate Cancer Cancer that forms in tissues of the prostate (a gland in the male reproductive system found below the bladder and in front of the rectum).

Screening Checking for disease when there are no symptoms. Since screening may find diseases at an early stage, there may be a better chance of curing the disease. Examples of cancer screening tests are the mammogram (breast), colonoscopy (colon), and the Pap test and HPV test (cervix). Screening can also include checking for a person's risk of developing an inherited disease by doing a genetic test.

ANNEXURE B

AORTIC DAKAR DECLARATION FOR CANCER CONTROL IN AFRICA – 2011

The members of the **AORTIC Executive Council** met in Dakar, Senegal in November 2010, to develop a strategic plan for advocacy, training and research on cancer in Africa.

The Council recognized the following challenges:

1. That there are approximately 700,000* new cases of cancer diagnosed in Africa per year with over 500,000 deaths recorded annually.
2. That the mortality to incidence ratio of people diagnosed with cancer ranges from 75 – 90 %, which is much higher than documented in Europe where mortality ranges from 30 – 50%.
3. That by 2030 there will be an estimated 1.3 million new cases of cancer in Africa with a similarly high mortality to incidence ratio as currently documented unless drastic action is taken.
4. That there is on average only 1 radiotherapy machine per 5 million people in Africa (in some countries this figure reaches 1 per 60 million), compared to 5 per million in Europe, a 25 – fold difference.
5. In at least 15 countries in Africa the population have no access to any form of anti-cancer therapies at all.
6. In addition, only 5/53 countries in Africa have National Cancer Registries, so that the true incidence of cancer and its impact on the population is largely undocumented.
7. That in Africa, people with cancer present with late stage disease making treatment or cure impossible and that the population rarely has access to palliative care.

8. That there is a general lack of awareness among communities, the health care profession and health care authorities about cancer, there is poor quality of population-based or pathological data on cancer and generally, the health care systems for people living in Africa are weak.

The Council acknowledged the following needs in Africa:

9. An urgent need for the development of National Cancer Control Programs.
10. The need to work with multiple agencies to prevent, to control and to provide care for patients with cancer in Africa.
11. To identify and prioritise 'key' cancers such as breast, cervix, prostate and tobacco-related cancers, with special emphasis on childhood cancers, infectious/HIV/AIDs related malignancies and lympho-proliferative disorders. The need to develop innovative strategies for prevention, and early detection of cancer and to ensure access to low-cost anti-cancer therapies, which are country and region specific.
12. To establish, maintain and support ongoing training in palliative care, and to ensure widespread awareness of the critical need for palliative care to prevent needless suffering of people with advanced cancer. This includes making available effective drugs for pain control and other interventions to relieve suffering. To develop appropriate regional and country cancer training programmes, including short, medium, and long term courses/degrees and to identify and catalogue those that already exist.

13. To develop resources that support cancer care in priority areas such as: pathology services and the use of telemedicine; diagnostic services such as radiology; clinical services including gynaecological, medical and surgical oncology, capacity building in research methodology, ethics and development of Institutional Review Boards.
14. To create and cultivate partnerships with global cancer organisations, the media, technology providers; AORTIC membership expertise and regional professional organisations, policy makers, the private sector, healthcare workers, community groups and non-communicable disease alliances, while prioritising synergy of efforts.

The Council endorsed actions in the following areas;

- **Cancer Advocacy**
  - Declare cancer a significant public health problem in Africa
  - Promote development and implementation of National Cancer Control Programmes by every Ministry of Health in Africa.
  - Prioritise cancer control strategies to "key" cancers that are preventable or curable; incorporate vaccination against preventable cancers such as HPV, HepB into national vaccination programmes; support campaign on tobacco control and obesity
  - Promote synergy of efforts by linking and forming partnerships with organisations working toward cancer control;

- **Cancer Care**
  - Provide palliative care services
  - Increase access to effective anti-cancer therapies
  - Support quality cancer care through development of relevant diagnostic and therapeutic resources, including pathology, radiology, surgery, chemotherapy and others.

- **Cancer Education**
  - Promote mass educational and public health campaigns to the media, government and the general population to improve prevention, early detection and treatment of "key" cancers
  - Develop Cancer Training Programmes for African clinicians, researchers, and patient advocates

- **Cancer Research**
  - Create and resource population-based cancer registries
  - Develop and support research to create new knowledge and drive innovation in cancer control.

"Working together to prevent, control and care for cancer in Africa"

*This figure is based on the approximately 35 000 cases of Kaposi's sarcoma that are not yet included in the GLOBOCAN database, but will be in the next version (J Ferlay, IARC, October 2011)

** Subsequent to the AORTIC meeting in Dakar, Senegal November 2010, the United Nations held a high level summit on Non-Communicable Diseases (NCDs) and made a political declaration which acknowledged that cancer and other NCDs are a challenge of epidemic proportions that require a co-ordinated and sustainable response on a global scale. AORTIC refers all interested readers to the UICC website which carries the document (www.uicc.org)

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