The Next Twenty Years: Predicting and Preparing for the Future Cancer Landscape in Sub-Saharan Africa

Prévoir et se préparer aux nouvelles caractéristiques du cancer en Afrique Subsaharienne pour les vingt prochaines années

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What Will the Leading African Cancers Be in 2035? Can They Be Prevented?

Cancer incidence and mortality will increase over the next 20 years. The age-standardized numbers of new cancer cases (incidence) or death (mortality) per 100 000 are shown in Table 1 and the predicted increases between 2015 and 2035 in Fig. 1. The numbers are based on Globocan predictions for the WHO-AFRO region (i.e., Sub-Saharan Africa; SSA), and account for the anticipated demographic changes (e.g., population aging) during this period [1].

In 2015, Globocan predicts that approximately 286 530 men and 412 912 women will be diagnosed with cancer; 221 131 men and 270 472 of women are predicted to die from cancer (Table 1). By 2035, cancer incidence is predicted to increase by 83–87% and mortality will increase by 84–89%. All of the leading cancers in both men and women are predicted to increase in incidence and mortality by 2035, with most cancers exhibiting an approximate doubling between 2015 and 2035. These figures are based on limited population-based registry data in SSA, and the future predictions are based on models that do not account for many factors that could affect future rates. However, it is clear that incidence and mortality from cancer will be a growing public health problem in SSA.

Of the most common cancers (Table 1), many deaths could be avoided if screening and early detection were available. These include cervical cancer, which can be prevented by vaccination or if detected early by pap smear or visual inspection with acetic acid. These technologies exist in SSA and can be implemented in low resource settings [2]. Similarly, liver

cancer could be prevented by hepatitis B vaccination [3], and smoking eradication programs could prevent lung cancer [4]. These are by no means easy solutions to implement, but they are possible even in low resource settings. Other screening and early detection tools may require much more resource- and training-intensive strategies, including mammography for breast cancer and colonoscopy for colorectal cancer. Prevention strategies for prostate cancer, the most common cancer in SSA men, are fraught with difficulties of poor screening properties of prostate-specific antigen (PSA) [5]. Implementation of PSA screening in SSA will require careful consideration and additional data before implementation.

What Factors Will Influence Changes in Cancer Rates by 2030?

Numerous factors will contribute to changes in cancer risks and mortality in the coming decades. These include changes in demographics and life expectancy, common causes of death, and cancer risk factors.

Increasing Lifespan

Cancer in general tends to be a disease of aging. As populations age, more cancers will be diagnosed. It is likely that a greater proportion of the population will fall into the range of risk for many common cancers by 2035. As shown in Fig. 2, life expectancy in 1990 at birth in the WHO-AFRO region was 51.5 in women and 47.8 in men [6]. Life expectancy did not change between 1990 and 2000, but began to increase in 2011 to 57.6 in women and 55.0 among men. Trends toward longer life spans are likely to continue.

Changes in Causes of Death

Based on WHO Global Health Observatory Data Repository (Table 2) [6,7], all-cause mortality in SSA is predicted to

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Table 1 Number of newly diagnosed cancers and cancer deaths, 2015 and 2035.							
Rank	Site	Incidence			Mortality		
		2015	2035	% Increase	2015	2035	% Increase
Men	All Sites^a	286 530	535 094	87	221 131	417 465	89
1	Prostate	51 689	107 170	107	37 486	76 321	104
2	Liver	24 791	50 684	104	23 758	48 419	104
3	Kaposi sarcoma	23 100	44 205	91	15 832	31 360	98
4	Colorectum	15 505	32 203	108	11 315	23 460	107
5	Non-Hodgkin lymphoma	15 036	28 501	90	10 852	21 116	95
6	Esophagus	13 695	28 784	110	12 514	26 259	110
7	Lung	11 786	24 877	111	10 522	22 186	111
8	Stomach	10 496	21 969	109	9556	19 934	109
9	Leukemia	8782	16 732	91	7804	15 147	94
10	Lip, oral cavity	8009	16 520	106	5026	10 480	109
Women	All Sites^a	412 912	755 334	83	270 472	498 803	84
1	Cervix uteri	92 340	185 764	101	56 601	114 406	102
2	Breast	99 760	199 873	100	49 061	97 917	100
3	Liver	14 032	28 186	101	13 403	26 903	101
4	Colorectum	15 037	30 242	101	11 029	22 220	101
5	Ovary	13 034	25 918	99	9758	19 621	101
6	Esophagus	9767	19 783	103	8981	18 825	110
7	Kaposi sarcoma	13 313	24 806	86	8920	17 102	92
8	Stomach	8614	17 408	102	8033	16 243	102
9	Non-Hodgkin lymphoma	11 232	20 985	87	8399	15 987	90
10	Leukemia	7186	13 714	91	6496	12 582	94

^a Excluding non-melanoma skin cancer.

Fig. 1 Age-adjusted incidence and mortality for men and women in the WHO-AFRO region. 2015–2035

Fig. 2 Life expectancy at birth by gender, WHO-AFRO region. Source: Global Health Observatory, WHO, 2014

Table 2 Causes of mortality in WHO-AFRO region, per 100 000 population; all ages, all causes, communicable vs. non-communicable, and top 20 causes in 2015 and 2030.

Cause	2015	Cause	2030
All Causes	1044.1	All Causes	918.8
Communicable & other Group I	601.9	Communicable & other Group I	425.9
Non-communicable diseases	344.6	Non-communicable diseases	390.1
Infectious and parasitic diseases	324.9	Infectious and parasitic diseases	228.5
Cardiovascular diseases	125.0	Cardiovascular diseases	149.9
Respiratory infections	119.9	Injuries	102.8
Lower respiratory infections	119.6	HIV/AIDS	98.9
HIV/AIDS	118.7	Respiratory infections	88.6
Neonatal conditions	100.9	Lower respiratory infections	88.3
Injuries	97.6	Unintentional injuries	83.0
Unintentional injuries	75.9	Neonatal conditions	74.5
Diarrheal diseases	73.6	Malignant neoplasms	73.7
Malignant neoplasms	55.2	Stroke	65.3
Stroke	54.5	Ischemic heart disease	48.4
Parasitic and vector diseases	48.3	Diarrheal diseases	42.1
Preterm birth complications	46.3	Digestive diseases	37.7
Malaria	41.2	Road injury	37.2
Digestive diseases	40.4	Parasitic and vector diseases	35.7
Nutritional deficiencies	39.8	Preterm birth complications	34.2
Ischemic heart disease	39.8	Malaria	31.6
Birth asphyxia and birth trauma	35.4	Diabetes mellitus	29.8
Protein-energy malnutrition	34.6	Respiratory diseases	27.2
Respiratory diseases	24.9	Birth asphyxia and birth trauma	26.2

Source: Global Health Observatory Data Repository, WHO 2014.

drop in the coming decades. Communicable diseases will remain the most important causes of death, but the number of deaths due to communicable diseases will drop, and non-communicable diseases will comprise a larger proportion of deaths. Deaths from major infectious diseases including HIV/AIDS, respiratory infections, diarrheal diseases, parasitic and vector diseases, and malaria will drop. Deaths due to some non-communicable causes including infant mortality will also drop. In contrast, the proportion of deaths attributable to chronic diseases will grow. These include cardiovascular disease, stroke, and cancer. Cancer will grow from 55.2 deaths per 100 000 individuals in the WHO-AFRO region in 2015 to 73.7 per 100 000 in 2030. This represents an increase in cancer-specific deaths of 34% in 15 years.

Changes in Cancer Risk Factors

Trends in lifestyle, exposures, and risk factors are also likely to impact the pattern of SSA cancer risk in the coming decades. One metric of change in lifestyle that is also correlated with the risk of some cancers is obesity. As shown in Fig. 3, the proportion of men and women who are overweight or

obese (body mass index (BMI) > 25) in SSA grew between 2002 and 2010. In this relatively short time frame, numerous countries moved from low rates of overweight/obese (<25%), to moderate rates (25–50%), to high rates (>50%) in both men and women. For example, over 50% of South African men were overweight or obese in 2002. By 2010, over half of men in Botswana and Cameroon were also overweight/obese. There are a growing number of SSA countries in which over 50% of women are overweight/obese (8 in 2002 to 13 in 2010). These trends reflect changes that may confer higher cancer risks for obesity-related cancers, and for other cancers associated with physical activity, diet, and other lifestyle factors.

How Can We Prepare for 2035?

Numerous statements provide guidance to those who need to develop effective cancer prevention and control programs in SSA [7–9]. Table 3 summarizes steps toward this goal. These include creation of an evidence base about the cancer burden in a population, including cancer types, incidence, mortality, and prevalence. Currently, this information is

Fig. 3 Percent of men and women who are overweight or obese (BMI > 25), by country, 2002 and 2010. <25% (Green), 25–50% (Orange), >50% (Red)

sub-optimal in SSA. High quality information about the cancer burden will provide the foundation around which current and future needs for cancer control are determined.

Situational analyses are required to provide information about the current state of preparedness for cancer-related activities. This assessment includes research, clinical, and staffing capacity, as well as the potential for these domains to address identified needs. The specific goals for these domains depend on the current state of the system, as well as knowledge about the gaps between the current system and the future needs and goals.

Once sufficient evidence has been collected to assess needs, a cancer plan can be created. This plan may be developed on the local, regional, or national levels, and should lay

out a sustainable system for the prevention and control of cancer. This plan should be developed in conjunction with key stakeholders, including advocates, policy-makers, the clinical community, and those responsible for funding. Protocols, success metrics, and evaluation methods should be developed and implemented. In some cases, research should be undertaken to determine the optimal means of implementation. Finally, the implemented plan requires monitoring and evaluation, including assessment of cost-effectiveness of the implemented strategies.

Given the growing cancer burden in SSA and the anticipated needs for cancer prevention and control in the coming decades, these steps cannot wait: serious and expedient action to address these concerns is needed.

Table 3 Framework for the development, implementation, and monitoring of effective cancer control strategies.		
Step	Goal	Possible Tasks
Create evidence base	• Obtain accurate tumor registry data • Assess present and future cancer risks • Assess prevention and treatment needs	• Link with tumor registry systems and experts • Situational or SWOT-type analysis
↓		
Assess research needs and capacity	• Identify research domains that are needed to address cancer needs in evidence base	• Situational or SWOT-type analysis • Needs assessment
↓		
Assess prevention and treatment needs and capacity	• Identify clinical resources and technologies • Identify infrastructure gaps	• Situational or SWOT-type analysis • Needs assessment
↓		
Assess staffing and training needs and capacity	• Quantify existing clinical, research, and advocacy infrastructure and staffing • Evaluate training programs and their potential to meet current and future staffing needs	• Situational or SWOT-type analysis • Needs assessment
↓		
Develop local, regional, or national cancer plan	• Create a sustainable system for cancer prevention, control, treatment, and advocacy to meet the cancer needs of the population	• Create protocols, metrics, and evaluation methods for plan components • Interact with stakeholders • Develop and implement timeline
↓		
Implement cancer plan	• Undertake implementation and dissemination research to ensure the strategy works in the population • Perform cost-effectiveness analysis to assess feasibility of cancer plan	• Develop necessary infrastructure and protocols • Educate the public, policy-makers, clinicians, and educators about the need for cancer activities
↑		
Monitor cancer plan	• Assess impact of cancer plan • Modify cancer plan as needed	• Regular evaluation of plan and metrics of success
SWOT: Strengths-Weaknesses-Opportunities-Strengths.		

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