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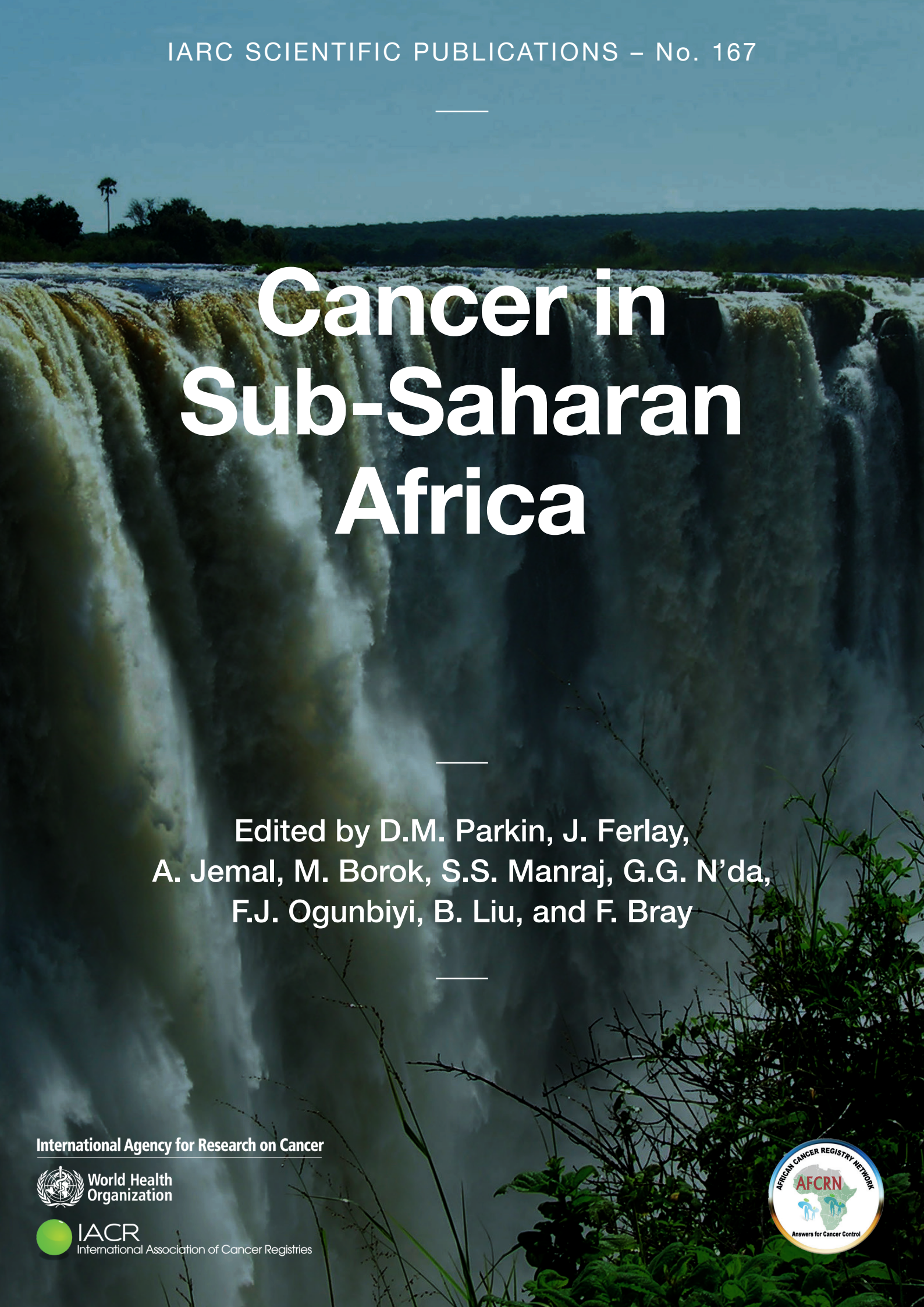

Cancer in Sub-Saharan Africa

Edited by D.M. Parkin, J. Ferlay, A. Jemal, M. Borok, S.S. Manraj, G.G. N'da, F.J. Ogunbiyi, B. Liu, and F. Bray

International Agency for Research on Cancer
World Health Organization
IACR International Association of Cancer Registries
AFRICAN CANCER REGISTRY NETWORK AFCRN Answers for Cancer Control

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Contents

Foreword

Throughout its more than 50 years, the International Agency for Research on Cancer (IARC) has emphasized the critical importance of population-based cancer registries (PBCRs) in providing the evidence base to inform cancer control policy and to drive cancer research. Direct liaison with registries through the International Association of Cancer Registries (IACR) and collaboration with PBCRs worldwide continue to be cornerstone activities of IARC.

Aligning with the high-level commitment of the World Health Organization (WHO) to tackle noncommunicable diseases (NCDs), including cancer, the IARC-led Global Initiative for Cancer Registry Development (GICR) was launched in 2011 as a partnership with other international organizations. The overall objective is to coordinate action to strengthen cancer data and address the fact that high-quality PBCRs are present in only one in three countries around the world. GICR is now providing governments with a mechanism to obtain information that can guide national cancer planning. It is also the official tool of WHO for supporting Member States in measuring cancer incidence as a core indicator within the NCD Global Monitoring Framework.

A key component of GICR in the past 5 years has been the provision of six IARC Regional Hubs, established to directly support the countries in their designated regions. Each Hub is designed to deliver structured technical training programmes and to facilitate consultation, the building of regional networks, and the dissemination of scientific and policy reports. The African Cancer Registry Network (AFCRN), established in 2012 and coordinated by Dr Max Parkin, has been an exemplar as a consortium, providing Hub activities for the PBCRs across sub-Saharan Africa (SSA). A total of 30 registries in 23 countries, covering approximately 15% of the population of SSA, are members of AFCRN. Although there remain major challenges to the development and improvement of cancer registries across the region, this IARC publication, titled *Cancer in Sub-Saharan Africa*, is truly a milestone in measuring the depth of registry activity in SSA. The report presents cancer incidence data from 25 PBCRs in 20 countries in the region. Based on periods of diagnosis between 2001 and 2015, the report describes in detail the fascinating cancer patterns in each registry population and the marked variations in the rates of the major cancer types in SSA.

This is the second IARC volume presenting compiled cancer incidence data from Africa. The first, the IARC Scientific Publication *Cancer in Africa* (Parkin et al., 2003), had a similar mandate in describing the changing profile of cancer, but for the whole continent. This informed both cancer planning and research, and enabled the generation of hypotheses to explain the observed patterns. A further reason for this report stems from the strict evaluation of data quality prior to inclusion in the IARC series *Cancer Incidence in Five Continent*s (CI5). This stringency, although necessary, has limited the ability of registries from resource-challenged settings such as SSA to contribute to CI5; only four of the PBCRs included in *Cancer in Sub-Saharan Africa* were included in the most recent volume of CI5 (Volume X). Non-inclusion can be a stigma for registries and can lead to difficulties as they work to develop and expand, if they are considered by programme owners or stakeholders to be of low quality simply because they are not able to meet the extremely rigorous standards of operations and data output required for inclusion in CI5.

This is the first of a series of continental reports aiming to address this problem. Reports are also planned covering North Africa and West Asia; South, East, and South-East Asia; and Latin America and the Caribbean, and will provide an essential means of disseminating results from all registries within these regions by making the data available for the dual purposes of cancer control planning and cancer research. It is hoped that GICR and AFCRN can help to measurably improve the availability and quality of the cancer registry data in SSA in the coming years, with the surveillance map of a decade from now looking very different from today's.

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Coordination of the project was undertaken within the framework of AFCRN's activities. AFCRN is a project of the Cancer Registry Program of the International Network for Cancer Treatment and Research (INCTR). It is supported financially through the INCTR Challenge Fund, a UK-registered charity (charity number 1079181) that raises funds for INCTR projects. The Challenge Fund in turn receives donations to support cancer registry activities in low- and middle-income countries.[1] For this project in particular, the support of the American Cancer Society, via an IARC collaborative research agreement (CRA no. CIN/92/7/Hub/AFCRN), is gratefully acknowledged.

AFCRN is the Regional Network Hub for Sub-Saharan Africa within the framework of the Global Initiative for Cancer Registry Development (GICR). GICR owes its success to the support of several international organizations that contribute to this common purpose (http://gicr.iarc.fr/Partners).

Within IARC, Mr Sébastien Antoni and Mr Eric Masuyer of the Section of Cancer Surveillance provided support in the organization of the data from the cancer registries within the AFCRN database, from which the tables were prepared.

[1] AFCRN acknowledges the generous contributions of the following organizations: the Doris Duke Charitable Foundation, GlaxoSmith-Kline Oncology, F. Hoffmann-La Roche Ltd, the Union for International Cancer Control (UICC), and the American Cancer Society (ACS). AFCRN Research Coordinator: http://afcrn.org/research-collaboration/researchcoordinator

CHAPTER 1
Introduction

There is an increasing global recognition of the need for high-level investment in the control of cancer alongside other major noncommunicable diseases (NCDs). At the Seventieth World Health Assembly in May 2017, governments from around the world adopted a cancer resolution (WHA70.12): *Cancer prevention and control in the context of an integrated approach.* This was in response to the growing burden of the disease: cancer is now responsible for one in three premature deaths globally, and was the leading cause of premature death in 48 countries in 2012, ranking above infectious and parasitic diseases, cardiovascular disease, and intentional and unintentional injuries (WHO, 2016).

Cancer is an increasing problem in Africa because of the ageing and growth of the population, as well as the changing prevalence of risk factors associated with social and economic transition (including smoking, alcohol consumption, obesity, physical inactivity, and reproductive behaviours). The number of new cancer cases per year will increase by 70% in Africa between 2012 and 2030 due to demographic changes alone – faster than in any other region of the world (Ferlay et al., 2013). The total increase due to all factors combined is likely to be even greater, given the ongoing urbanization of Africa and the associated lifestyle changes (Bray, 2014).

Despite this growing cancer burden, cancer continues to be a relatively low public health priority in Africa, largely because of limited resources and other pressing public health problems, including communicable diseases such as HIV/AIDS, malaria, and tuberculosis. Another factor may be a general lack of awareness of the magnitude of the current and future cancer burden and its economic impact on the continent among policy-makers, the general public, and international private and public health agencies. The World Health Organization (WHO) has promoted the development of national cancer control programmes to reduce cancer incidence and mortality and to improve the quality of life of cancer patients in individual countries and states. This is accomplished through the systematic and equitable implementation of evidence-based strategies for prevention, early detection, treatment, and palliation, making the best use of available resources (WHO, 2002).

The need for a functional cancer surveillance system is evident in all documents relating to cancer control planning, as is the essential role of cancer registries in the context of low- and middle-income countries. In 2005, the World Health Assembly passed a resolution on cancer prevention and control, calling upon WHO Member States to intensify action against cancer by developing and reinforcing cancer control programmes and requesting WHO to "advise Member States, especially developing countries, on development or maintenance of a national cancer registry containing the type [and] location of the cancer and its geographical distribution" (WHO, 2005). The 2017 cancer resolution builds on the WHO Global Action Plan for the Prevention and Control of NCDs 2013–2020 and the United Nations Sustainable Development Goals 2015–2030, which include the target (SDG 3.4) to reduce premature mortality from NCDs by one third by 2030. Included as part of the resolution is a responsibility of Member States to establish population-based cancer registries to inform planning.

Given the changing landscape of cancer burden and cancer surveillance, IARC established the Global Initiative for Cancer Registry Development (GICR) (http://gicr.iarc.fr/) in 2011, as a coordinated multipartner approach to improving the availability of the data necessary to drive policy and reduce the burden and suffering due to cancer. GICR works through a group of Regional Hubs, which are tasked with providing expertise and support to registries in their respective regions.

In 2012, the African Cancer Registry Network (AFCRN) was formally inaugurated as a consortium of registries with a defined set of membership criteria (http://afcrn.org/membership/membership-criteria), becoming the Regional Network Hub for Sub-Saharan Africa in the same year. AFCRN expanded the activities of its predecessor, the East African Cancer Registry Network (EARN), which was established in January 2011 thanks to a grant from the Doris Duke Charitable Foundation. AFCRN is a project of the Cancer Registry Program of the International Network for Cancer Treatment and Research (INCTR). AFCRN aims to improve the effectiveness of cancer surveillance in sub-Saharan Africa by providing expert evaluation of current problems and technical support to remedy identified barriers, with the long-term goals of strengthening health systems and creating research platforms for the identification of problems, priorities, and targets for intervention.

This volume represents one of the fundamental Hub activities, which is to provide regional reports on cancer to complement IARC's role in publishing international cancer incidence data in its *Cancer Incidence in Five Continents* (CI5) series. This volume brings together results from 25 cancer registries in 20 sub-Saharan African countries, from time periods ranging from 1 to 10 years within the past two decades. Not all of these results will be of sufficient quality (i.e. completeness and/or validity) to qualify for inclusion in

the next volume of the CI5 series. However, because AFCRN membership requires that registries meet minimum criteria for completeness of case ascertainment (> 70% of the cases expected in the area must be registered), the results are undoubtedly a reasonable reflection of the true cancer profile in their respective populations. The individual registry presentations (Chapter 4, p. 13) include commentary on specific factors that should be taken into account in interpreting the observations.

This is not the first volume presenting compiled incidence data from Africa. The IARC Scientific Publication *Cancer in Africa* (Parkin et al., 2003) provided a description of recent and historical cancer registration activity in Africa and included data published in Volumes I–VIII of CI5 and data from other sources. As was the case with that earlier publication, it is hoped that the compiled data in this new volume will be of value to those interested in the patterns and evolution of cancer in Africa, as a means of elucidating, confirming, and evaluating causes of the disease. The data will also be an invaluable resource to anyone concerned with determining priorities for preventive and curative programmes at regional or national levels, evaluating whether goals are reached in target groups, or determining what has been achieved in relation to resources expended. A subset of the data included here has also been published in a recent report on incidence rates of childhood cancer in sub-Saharan Africa (Stefan et al., 2017).

Although we were able to compile and present data from only 20 of the 46 countries of sub-Saharan Africa (i.e. the 46 countries in the WHO African Region) in the present volume, there is every hope that IARC, through GICR and through AFCRN as its Regional Hub, will be able to increase this number in the years to come.

CHAPTER 2
Processing and presentation of the data

PROCESSING OF THE DATA

The data used to create the tables presented in this book were extracted from the database of the African Cancer Registry Network (AFCRN). A list of individual anonymized cases with the following variables was extracted for each contributing registry:

- registration number that identifies the patient or the case
- sex
- ethnic group or race (optional)
- age
- date of incidence
- anatomical site of the tumour
- morphology of the tumour
- behaviour of the tumour
- basis of diagnosis.

All data had been coded according to the *International Classification of Diseases for Oncology, 3rd edition* (ICD-O-3) (Fritz et al., 2000). They were processed by the IARC software packages DEPedits and IARCcrgTools (Ferlay et al., 2005) for validation. After validation, the records were converted to *International Statistical Classification of Diseases and Related Health Problems, 10th revision* (ICD-10) coding (WHO, 1992) for presentation purposes. Because all contributing registries used the CanReg system, a software program developed at IARC for use by population-based cancer registries, the data had already undergone the same edits as those performed by the IARCcrgTools programs. This simplified and expedited the data validation process.

PRESENTATION OF THE DATA

The main sets of tables in this book present data on age-specific and age-standardized incidence, either by covered population (i.e. by cancer registry) or as summary tables by anatomical site.

Tables of incidence by registry

Average annual population at risk: The AFCRN database contains data on the population at risk by sex and age for each registry for as many years as possible. A denominator corresponding to the period of the incident cases (person-years at risk) was estimated based on this information, using intercensal estimates and postcensal projections as necessary. For each registry, the average annual population at risk for the period analysed is presented in a population pyramid within the description of the registry. The numbers (by 5-year age group) are also shown at the foot of the incidence tables for each registry.

The age-specific incidence tables: The numbers presented in the body of these tables are the numbers of cancer cases registered during the corresponding period by sex, anatomical site, and age group, along with summary rates of incidence. An example is shown in Fig. 2.01 (p. 5). The column headings are defined as follows:

Site: A shortened version of the full ICD-10 title describing each anatomical site or site grouping

All ages: The total number of cases (i.e. in patients of all ages) by site

Age unk: The number of cases in patients whose age is unknown; these cases are included in the total (i.e. all-ages) number of cases and in the calculation of the crude average annual incidence rate; they are also taken into account in the computation of the world age-standardized and cumulative incidence rates

MV%: The percentage of microscopically verified cases; i.e. the proportion of cases known to be diagnosed by a microscopic method (either histology or cytology), expressed as a percentage of all cases registered, including cases with unknown patient age or unknown basis of diagnosis

Age group (years): The number of cancer cases registered by age group, using the 5-year age bands indicated (0 to < 5 years, 5 to < 10 years, etc., up to 70 to < 75 years and 75+ years)

Crude rate: The crude average annual incidence rate, calculated by dividing the total number of cases (including those with unknown patient age) by the corresponding population at risk (i.e. all males or all females), expressed per 100 000 person-years

%: The proportional frequency of cases occurring at each site compared with the total number of cases at all sites except C44 (other skin)

CR 74: The cumulative incidence rate up to and including the age of 74 years, expressed per 100 000 person-years; this is the sum of the age-specific incidence rates over each year of age from birth through the age of 74 years; this cumulative rate is computed using 5-year age bands (0 to < 5 years, 5 to < 10 years, etc., up to 70 to < 75 years) and adjusted to account for cases with unknown patient age (Parkin et al., 1997)

ASR (W): The world age-standardized incidence rate, expressed per 100 000 person-years; this is calculated by the direct method, using the world standard population and 5-year age bands (0 to < 5 years, 5 to < 10 years, etc., up to 70 to < 75 years and 75+ years) and adjusted to account for cases with unknown patient age (Bray & Ferlay, 2014)

ICD-10: The ICD-10 code(s) corresponding to the anatomical site or site grouping listed in the left-most column

Average annual population: These numbers, listed at the foot of the table, indicate the average annual population at risk (in each 5-year age group) for the

period analysed. To calculate the incidence rate per 100 000 person-years for a particular age group, anatomical site, and sex, divide the pertinent number of cancer cases by the corresponding average annual population and the number of years for which the applicable data are presented, and multiply the result by 100 000.

Data quality indicators tables

The data quality indicators tables included in this volume (Chapter 5, p. 114) present the values (by anatomical site, covered population, and sex) for two indicators of data quality:

1. the percentage of cases that were microscopically verified (MV%); and
2. the percentage of death-certificate-only cases (DCO%), i.e. cases for which no information source other than a death certificate mentioning cancer could be found. Only a few of the cancer registries included in this volume have access to routinely processed death registry data, which is noted where applicable in the registry descriptions in Chapter 4 (p. 13).

Summary tables

The summary tables presented in Chapter 6 (p. 136) summarize the numbers of cases, the world age-standardized incidence rates, and the cumulative incidence rates up to and including the age of 74 years, by anatomical site, covered population, and sex.

Fig. 2.01. An example of an age-specific incidence table

Country, registry (year)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	212	0	89	0	-	9	4	6	6	2	12	11	15	22	29	27	26	15	12	16	2.6	5.2	0.91	**7.5**	C00-06
Salivary gland	25	0	80	4	-	-	1	-	1	-	1	3	2	5	2	-	2	2	4	2	0.3	0.6	0.15	**1.0**	C07-08
Nasopharynx	203	0	91	1	-	-	13	17	24	16	9	21	21	32	16	11	11	9	2	1	2.5	5.0	0.46	**4.2**	C11
Other pharynx	53	0	57	26	-	-	-	2	1	-	3	5	3	5	6	3	11	4	3	7	0.7	1.3	0.24	**2.1**	C09-10, C12-14
Oesophagus	319	0	77	7	-	-	-	3	2	5	13	22	30	18	44	34	31	39	28	50	4.0	7.9	1.70	**14.1**	C15
Stomach	225	0	71	12	1	1	1	2	1	6	8	6	27	28	30	24	23	28	19	20	2.8	5.6	1.22	**9.2**	C16
Colon	223	0	68	9	-	1	1	1	4	7	16	12	18	33	18	31	26	20	13	22	2.8	5.5	1.00	**8.3**	C18
Rectum	136	0	79	1	-	-	1	1	1	6	4	19	8	15	16	12	20	12	11	10	1.7	3.4	0.68	**5.2**	C19-20
Anus	7	0	100	0	-	-	-	-	-	-	-	-	1	1	-	-	2	1	-	2	0.1	0.2	0.03	**0.4**	C21
Liver	196	0	72	17	1	-	3	6	1	4	16	15	15	25	18	22	23	13	16	18	2.4	4.8	0.91	**7.2**	C22
Gallbladder etc.	35	0	77	9	-	-	-	-	-	-	1	2	1	-	6	2	5	6	7	5	0.4	0.9	0.30	**2.0**	C23-24
Pancreas	85	0	55	9	-	-	1	-	-	-	3	3	3	9	7	15	12	7	8	17	1.1	2.1	0.45	**4.0**	C25
Larynx	81	0	83	1	-	-	-	-	-	-	-	3	4	10	8	14	11	10	8	13	1.0	2.0	0.49	**3.9**	C32
Trachea, bronchus, and lung	116	0	72	9	-	-	-	-	1	3	2	3	6	14	11	16	17	16	12	15	1.4	2.9	0.72	**5.5**	C33-34
Bone	123	0	73	2	2	5	12	22	16	11	5	6	5	7	8	5	10	4	3	2	1.5	3.0	0.30	**2.7**	C40-41
Melanoma of skin	18	0	94	6	-	-	-	-	1	-	-	1	1	3	3	1	-	4	2	2	0.2	0.4	0.12	**0.8**	C43
Non-melanoma skin	112	0	90	4	1	2	1	3	5	6	11	11	10	9	14	8	10	6	8	7	1.4		0.44	**3.5**	C44
Mesothelioma	1	0	100	0	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	175	0	85	15	1	5	5	2	2	15	27	31	31	24	9	7	4	4	2	6	2.2	4.3	0.30	**3.2**	C46
Connective and soft tissue	83	0	82	5	6	10	6	5	11	8	5	5	5	5	3	3	6	1	3	1	1.0	2.0	0.19	**1.7**	C47, C49
Breast	72	0	74	8	-	1	-	2	-	-	4	2	8	12	6	5	15	5	5	7	0.9	1.8	0.35	**2.9**	C50
Penis	11	0	91	0	-	1	-	-	-	1	-	1	2	2	-	-	1	-	-	3	0.1	0.3	0.01	**0.4**	C60
Prostate	683	0	75	6	-	-	-	-	1	-	4	1	5	15	44	66	101	111	133	202	8.5	16.8	5.57	**43.9**	C61
Testis	10	0	80	0	1	1	-	1	-	3	1	1	-	-	1	-	-	-	-	1	0.1	0.2	0.01	**0.2**	C62
Kidney and renal pelvis	43	0	84	7	8	2	-	-	3	-	2	2	3	5	2	6	1	-	7	2	0.5	1.1	0.21	**1.4**	C64-65
Bladder	70	0	79	9	1	-	1	-	-	-	-	-	3	5	4	11	9	7	17	12	0.9	1.7	0.60	**4.0**	C67
Ureter and other urinary	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	136	0	90	1	28	7	3	3	7	7	10	7	23	14	6	4	4	4	4	5	1.7	3.4	0.29	**2.8**	C69
Brain and nervous system	94	0	66	7	7	3	5	7	3	5	8	3	5	6	8	5	8	9	4	8	1.2	2.3	0.35	**3.0**	C70-72
Thyroid	20	0	85	0	-	-	-	-	1	-	4	1	3	2	1	2	1	2	2	1	0.2	0.5	0.10	**0.7**	C73
Hodgkin lymphoma	56	0	100	0	2	15	6	8	2	4	3	2	6	2	2	1	-	-	1	2	0.7	1.4	0.07	**0.9**	C81
Non-Hodgkin lymphoma	208	0	94	4	7	14	14	13	5	10	16	18	20	21	20	9	16	10	8	7	2.6	5.1	0.63	**5.3**	C82-85, C96
Multiple myeloma	54	0	93	7	-	-	-	1	-	-	1	4	3	9	10	5	10	4	4	3	0.7	1.3	0.28	**2.1**	C90
Lymphoid leukaemia	65	0	100	0	12	17	11	2	-	1	1	2	3	2	2	1	8	2	1	-	0.8	1.6	0.15	**1.4**	C91
Myeloid leukaemia	43	0	98	2	3	5	4	2	3	2	3	2	4	5	3	-	2	1	2	2	0.5	1.1	0.11	**1.0**	C92-94
Leukaemia, unspecified	29	0	69	31	1	1	4	1	3	2	2	-	1	3	3	1	3	-	1	3	0.4	0.7	0.07	**0.8**	C95
Other and unspecified	144	0	56	17	4	5	7	3	7	1	4	12	10	6	14	23	11	10	12	15	1.8	3.6	0.66	**5.3**	O&U
All sites	4166	0	78	7	86	105	104	113	112	125	199	237	305	374	375	374	440	366	362	489	52.0		20.05	**162.6**	C00-96
All sites except C44	4054	0	78	7	85	103	103	110	107	119	188	226	295	365	361	366	430	360	354	482	50.6	100.0	19.60	**159.2**	C00-96 exc. C44
Average annual population					199381	151900	119951	115772	211089	234596	182623	134459	89109	65901	41682	24304	15061	7358	4462	5772	1603420				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in this chapter.

CHAPTER 3
The editorial process

The purpose of this volume is to present incidence rates for various types of cancer from the population-based cancer registries of sub-Saharan Africa. The participating registries are all members of the African Cancer Registry Network (AFCRN); therefore, their data meet the minimum quality criteria required for AFCRN membership. Specifically, member registries must collect information on at least 50% of the cancer cases in their target population, and must achieve at least 70% coverage within 3 years of joining AFCRN (http://afcrn.org/membership/membership-criteria/).

However, the quality of the data from these registries is not necessarily consistent from one year to the next, nor is the completeness (or validity) of the data across the different types of cancers. Therefore, in order to present incidence rates that are reasonably comparable, we submitted the datasets to an editorial process that enabled us to (1) decide for which period (i.e. for which years) the data should be presented and (2) establish an indication of the probable data quality.

The methods used in this editorial process are described below, and the results of these evaluations are incorporated into the *Notes* sections within the descriptions of the overall results by registry in Chapter 4 (p. 13). The results are also presented in the data quality indicators tables (Chapter 5, p. 114), which list the values (by anatomical site, covered population, and sex) for two key indicators: the percentage of cases that were microscopically verified (MV%) and the percentage of death-certificate-only cases (DCO%), i.e. cases for which no information source other than a death certificate mentioning cancer could be found.

ELEMENTS OF THE EVALUATION

The practical aspects of evaluating the quality of cancer registry data, along with the techniques used to do so, have been examined in a two-part review (Bray & Parkin, 2009; Parkin & Bray, 2009). They are also described briefly, in the context of low- and middle-income settings, in the recent IARC Technical Publication No. 43: *Planning and developing population-based cancer registration in low- and middle-income settings* (Bray et al., 2014).

The editors of the present volume evaluated the completeness and validity of each registry's contributed data using a specially designed set of editorial tables, based on those used in IARC's *Cancer Incidence in Five Continents* (CI5) series.

Stability of the incidence rates over time: Editorial table 1

Changes in the completeness of registry data from year to year may lead to the appearance of unexpected or implausible incidence trends within a registry's dataset. Therefore, one of the key editorial tables (Editorial table 1, p. 8) lists the number of new cases registered by anatomical site per calendar year and the corresponding percentage of the total number of cases, broken down by sex. The average numbers of cases registered per month are listed at the bottom of the "Both sexes" section of the table, with an accompanying bar chart that provides a visual check of the amount of variation in the total numbers of cases registered each month (at all anatomical sites and in both sexes) over the time period covered. In some cases, this visual check may suggest potential problems with the registration process (or the source population data) during the registration period.

The choice of years to be included in the main analysis for each registry was based on the information in Editorial table 1. Therefore, a more limited time period appears in the subsequent editorial tables and in the final table of incidence that accompanies each registry's entry in Chapter 4.

Annual incidence by age group: Editorial table 2

Editorial table 2 (p. 9), which is generated separately for males and females, presents average annual incidence rates (per 100 000 person-years) by anatomical site and patient age group, as well as summary rates for the time period selected on the basis of Editorial table 1.

For each site listed, the table also shows the number of registered cases with unknown patient age (Age unk) and the percentage of registered cases that were microscopically verified (MV%).

The definition of microscopically verified cases includes histologically confirmed cases, cases diagnosed on the basis of exfoliative cytology specimens, and cases of leukaemia diagnosed on the basis of haematological examination (without examination of bone marrow). The main use of MV% as an indicator of data quality is as a measure of validity; however, a very high proportion of cases diagnosed by histology, cytology, or haematology – higher than might reasonably be expected – may also suggest that a registry is overreliant on pathology laboratories as sources of information and is therefore failing to find cases diagnosed by other means. MV% values are also presented in Editorial table 4 (p. 11), where observed values that are significantly different than expected for the region are flagged. See the section on Editorial table 4 for more details.

At the foot of Editorial table 2 is a set of reference values for incidence rates (all sites) in the childhood age groups (0–4 years, 5–9 years, and 10–14 years), derived from the data of Volume X of CI5. These reference values are included for the purpose of comparison with the corresponding observed rates presented in the table, in order to investigate

the possibility of underenumeration or duplicate registration within the data pertaining to paediatric cases. In general, the overall incidence rates of all types of cancers combined tend to be much less variable in children than in adults, although there are some well-documented geographical and ethnic differences for certain childhood cancers.

Age-specific incidence curves: Editorial table 3

Editorial table 3 (p. 10) shows a set of age-specific incidence curves for 12 anatomical sites by sex. These curves were examined to detect any abnormal fluctuations in the anticipated patterns, such as an unexpected drop in the rate of increase in incidence in older age groups, which may be indicative of underascertainment within these groups (although there can also be other explanations). These curves can also reveal problems with the source files used to determine the size of the populations at risk in the various age groups.

Comparison of observed versus expected values: Editorial table 4

The main purpose of Editorial table 4 (p. 11) is to investigate the possibility of incomplete registration by comparing observed incidence rates with expected values (reference values) calculated using data from registries in the same region. The table presents the observed age-standardized incidence rates (ASRs) and their standard errors for cancers occurring at 22 anatomical sites (and the total for all sites) in males and females, along with the ratio of the observed value to the expected value (O/E). If an observed ASR is significantly different from the reference value for the region, the ASR and the O/E are shown in bold, and the ASR is flagged with a greater-than symbol (>) if the value is higher than expected or a less-than symbol (<) if the value is lower than expected. The statistical test used for this comparison is described in Volume VIII of CI5 (Parkin & Plummer, 2002). The ASRs used as reference values for comparison are the estimated average rates reported in GLOBOCAN 2012 (Ferlay et al., 2013) for the same region of Africa (eastern, central, southern, or western). In some cases, deviation from regional reference values may be a result of true local variations in the prevalence and distribution of risk factors, or in the presence or intensity of screening for certain cancers, but systematic discrepancies (i.e. those seen consistently across several different anatomical sites) suggest the possibility of underregistration (or overregistration, e.g. due to the inclusion of duplicate records).

The percentage of registered cases that were microscopically verified (MV%) is also shown in Editorial table 4, with any observed value that is significantly greater than or less than the expected value marked in bold and flagged with a greater-than symbol (>) or a less-than symbol (<), respectively. The reference MV% values used for this comparison are the mean observed values from 14 cancer registries in sub-Saharan Africa (listed in the table's footnotes). The statistical test used for this comparison is described in Parkin & Plummer (2002).

For the registries with access to death certificates as a source of information on new cancer cases, Editorial table 4 also lists the percentage of death-certificate-only cases (DCO%): cases for which no information source (i.e. hospital or pathology records) other than a death certificate mentioning cancer could be found. As indicated in the subsections of Chapter 4 (p. 13) that discuss the individual registry results, only a few of the participating registries use death certificates to identify new cancer cases, and of those that do, not all include death-certificate-only cases in their databases. A high DCO% may indicate incomplete registration, since it could be a result of cancer cases not being registered before patients die. However, DCO% values must be interpreted in the context of the local circumstances. In some countries, the quality of death certificates can be very poor, with many deaths erroneously attributed to cancer, and registries may have difficulty tracing these cases back to a hospital capable of confirming (or contradicting) the information on the death certificate.

The population pyramid: Editorial table 5

Editorial table 5 (p. 12) uses a population pyramid to illustrate the population at risk (usually the average annual person-years) during the period selected for analysis. The nature of the estimates and the sources of the population data are described in a footnote below the pyramid.

MORTALITY-TO-INCIDENCE (M:I) RATIOS

M:I ratios are an important indicator of completeness, and their use for this purpose is an example of the independent case ascertainment method of evaluating registry completeness (Parkin & Bray, 2009). An M:I ratio compares the number of deaths due to a specific type of cancer over a specific period of time (obtained from a source that is independent of the registry – usually the vital statistics system) with the number of new cases of that type of cancer registered during the same period. When the quality of the mortality data is good (especially in terms of the accuracy of cause of death) and incidence and survival are in steady state, the M:I ratio is approximated by 1 minus the 5-year survival probability.

Very few countries in sub-Saharan Africa have comprehensive registration of death with cause of death medically certified. For the four countries that do – Mauritius, France (Réunion), Seychelles, and South Africa – we include tables listing the numbers of deaths due to cancer and the M:I ratios (expressed as percentages) by anatomical site. These tables are included in the subsections of Chapter 4 (p. 13) that discuss the individual registry results.

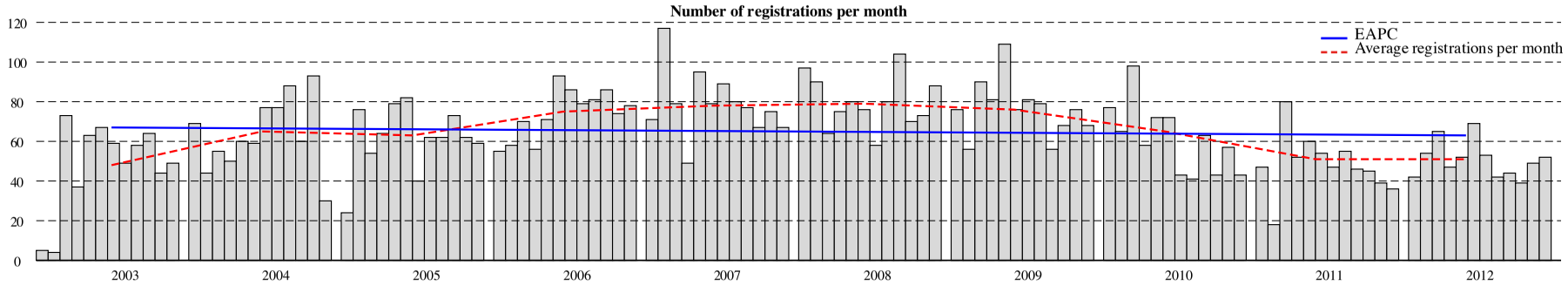
M:I ratios that are higher than expected raise suspicion of incompleteness (i.e. incident cancers missed by the registry), especially if the values are high for several different sites. However, under- or overreporting of tumours on the death certificates distorts this relationship, as does a lack of constancy in incidence and case fatality (the rate of death among incident cases) over time. In none of the four countries mentioned above is death registration considered to be of high quality (Mathers et al., 2005), and in South Africa it is considered to be of low quality. Nevertheless, the tables may give an indication of completeness when the M:I ratios are compared with those estimated for the same geographical region reported in GLOBOCAN 2012 (Ferlay et al., 2013).

Editorial table 1. Stability of the incidence rates (the number of new cases) over time

Registry X (2003-2012)

Number of cases in major diagnosis groups in single calendar years of observation

Site	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total	EAPC
Males												
Lip, oral cavity, and pharynx (C00–14)	12 (5.6)	20 (6.3)	12 (4.3)	21 (5.5)	14 (3.4)	25 (6.4)	13 (3.6)	9 (3.2)	14 (5.6)	7 (3.0)	147 (4.7)	–5.68
Digestive organs (C15–26)	39 (18.1)	64 (20.3)	65 (23.0)	91 (23.8)	95 (23.2)	92 (23.5)	87 (23.8)	68 (23.9)	63 (25.1)	62 (26.2)	726 (23.2)	2.53
Respiratory organs (C30–39)	15 (6.9)	17 (5.4)	21 (7.4)	23 (6.0)	29 (7.1)	29 (7.4)	29 (7.9)	13 (4.6)	16 (6.4)	17 (7.2)	209 (6.7)	–0.60
Bone, cartilage, melanoma (C40–43)	7 (3.2)	8 (2.5)	8 (2.8)	19 (5.0)	19 (4.6)	16 (4.1)	15 (4.1)	6 (2.1)	4 (1.6)	5 (2.1)	107 (3.4)	–5.99
Kaposi sarcoma (C46)	1 (0.5)	2 (0.6)	0 (0.0)	0 (0.0)	2 (0.5)	4 (1.0)	5 (1.4)	3 (1.1)	2 (0.8)	3 (1.3)	22 (0.7)	–
Male genital organs (C60–63)	84 (38.9)	112 (35.6)	104 (36.9)	115 (30.0)	125 (30.6)	110 (28.1)	96 (26.3)	94 (33.1)	75 (29.9)	67 (28.3)	982 (31.3)	–3.58
Urinary organs (C64–68)	9 (4.2)	18 (5.7)	6 (2.1)	8 (2.1)	16 (3.9)	11 (2.8)	11 (3.0)	9 (3.2)	6 (2.4)	10 (4.2)	104 (3.3)	–2.47
Eye, brain, thyroid etc. (C69–75)	6 (2.8)	12 (3.8)	18 (6.4)	22 (5.7)	25 (6.1)	25 (6.4)	13 (3.6)	12 (4.2)	9 (3.6)	15 (6.3)	157 (5.0)	1.61
Haematopoietic tissues (C81–96)	26 (12.0)	38 (12.1)	29 (10.3)	49 (12.8)	49 (12.0)	50 (12.8)	59 (16.2)	47 (16.5)	43 (17.1)	33 (13.9)	423 (13.5)	3.70
Other and unspecified	17 (7.9)	24 (7.6)	19 (6.7)	35 (9.1)	35 (8.6)	29 (7.4)	37 (10.1)	23 (8.1)	19 (7.6)	18 (7.6)	256 (8.2)	–0.11
All sites except skin (C00–96 exc. C44)	216 (100.0)	315 (100.0)	282 (100.0)	383 (100.0)	409 (100.0)	391 (100.0)	365 (100.0)	284 (100.0)	251 (100.0)	237 (100.0)	3133 (100.0)	–0.55
Site	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**	**EAPC**
Females												
Lip, oral cavity, and pharynx (C00–14)	7 (1.9)	13 (2.8)	12 (2.5)	9 (1.7)	17 (3.2)	8 (1.4)	10 (1.8)	8 (1.6)	13 (3.6)	3 (0.8)	100 (2.1)	–5.93
Digestive organs (C15–26)	39 (10.5)	39 (8.4)	42 (8.8)	49 (9.4)	43 (8.0)	59 (10.4)	66 (12.0)	45 (9.0)	41 (11.2)	48 (12.6)	471 (9.9)	2.31
Respiratory organs (C30–39)	9 (2.4)	8 (1.7)	9 (1.9)	13 (2.5)	13 (2.4)	19 (3.4)	15 (2.7)	11 (2.2)	9 (2.5)	8 (2.1)	114 (2.4)	0.96
Bone, cartilage, melanoma (C40–43)	9 (2.4)	7 (1.5)	5 (1.0)	24 (4.6)	13 (2.4)	18 (3.2)	8 (1.5)	11 (2.2)	7 (1.9)	8 (2.1)	110 (2.3)	–0.05
Kaposi sarcoma (C46)	0 (0.0)	1 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	3 (0.5)	4 (0.7)	2 (0.4)	1 (0.3)	1 (0.3)	12 (0.3)	–
Breast (C50)	137 (36.9)	196 (42.2)	165 (34.5)	181 (34.7)	174 (32.5)	191 (33.7)	201 (36.5)	204 (40.7)	142 (38.8)	147 (38.7)	1738 (36.7)	–0.09
Female genital organs (C51–58)	128 (34.5)	146 (31.4)	170 (35.6)	165 (31.6)	189 (35.3)	145 (25.6)	142 (25.8)	147 (29.3)	93 (25.4)	107 (28.2)	1432 (30.2)	–3.69
Urinary organs (C64–68)	10 (2.7)	8 (1.7)	10 (2.1)	8 (1.5)	8 (1.5)	6 (1.1)	10 (1.8)	11 (2.2)	4 (1.1)	5 (1.3)	80 (1.7)	–6.01
Eye, brain, thyroid etc. (C69–75)	13 (3.5)	8 (1.7)	20 (4.2)	22 (4.2)	27 (5.0)	42 (7.4)	26 (4.7)	18 (3.6)	15 (4.1)	15 (3.9)	206 (4.3)	3.77
Haematopoietic tissues (C81–96)	13 (3.5)	23 (4.9)	30 (6.3)	37 (7.1)	34 (6.3)	37 (6.5)	29 (5.3)	29 (5.8)	23 (6.3)	26 (6.8)	281 (5.9)	3.34
Other and unspecified	6 (1.6)	16 (3.4)	15 (3.1)	14 (2.7)	18 (3.4)	39 (6.9)	40 (7.3)	15 (3.0)	18 (4.9)	12 (3.2)	193 (4.1)	6.88
All sites except skin (C00–96 exc. C44)	371 (100.0)	465 (100.0)	478 (100.0)	522 (100.0)	536 (100.0)	567 (100.0)	551 (100.0)	501 (100.0)	366 (100.0)	380 (100.0)	4737 (100.0)	–0.61
Site	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**	**EAPC**
Both sexes												
Lip, oral cavity, and pharynx (C00–14)	19 (3.2)	33 (4.2)	24 (3.2)	30 (3.3)	31 (3.3)	33 (3.4)	23 (2.5)	17 (2.2)	27 (4.4)	10 (1.6)	247 (3.1)	–5.68
Digestive organs (C15–26)	78 (13.3)	103 (13.2)	107 (14.1)	140 (15.5)	138 (14.6)	151 (15.8)	153 (16.7)	113 (14.4)	104 (16.9)	110 (17.8)	1197 (15.2)	2.32
Respiratory organs (C30–39)	24 (4.1)	25 (3.2)	30 (3.9)	36 (4.0)	42 (4.4)	48 (5.0)	44 (4.8)	24 (3.1)	25 (4.1)	25 (4.1)	323 (4.1)	–0.01
Bone, cartilage, melanoma (C40–43)	16 (2.7)	15 (1.9)	13 (1.7)	43 (4.8)	32 (3.4)	34 (3.5)	23 (2.5)	17 (2.2)	11 (1.8)	13 (2.1)	217 (2.8)	–2.70
Kaposi sarcoma (C46)	1 (0.2)	3 (0.4)	0 (0.0)	0 (0.0)	2 (0.2)	7 (0.7)	9 (1.0)	5 (0.6)	3 (0.5)	4 (0.6)	34 (0.4)	–
Breast (C50)	137 (23.3)	196 (25.1)	165 (21.7)	181 (20.0)	174 (18.4)	191 (19.9)	201 (21.9)	204 (26.0)	142 (23.0)	147 (23.8)	1738 (22.1)	–0.09
Female genital organs (C51–58)	128 (21.8)	146 (18.7)	170 (22.4)	165 (18.2)	189 (20.0)	145 (15.1)	142 (15.5)	147 (18.7)	93 (15.1)	107 (17.3)	1432 (18.2)	–3.69
Male genital organs (C60–63)	84 (14.3)	112 (14.4)	104 (13.7)	115 (12.7)	125 (13.2)	110 (11.5)	96 (10.5)	94 (12.0)	75 (12.2)	67 (10.9)	982 (12.5)	–3.58
Urinary organs (C64–68)	19 (3.2)	26 (3.3)	16 (2.1)	16 (1.8)	24 (2.5)	17 (1.8)	21 (2.3)	20 (2.5)	10 (1.6)	15 (2.4)	184 (2.3)	–4.29
Eye, brain, thyroid etc. (C69–75)	19 (3.2)	20 (2.6)	38 (5.0)	44 (4.9)	52 (5.5)	67 (7.0)	39 (4.3)	30 (3.8)	24 (3.9)	30 (4.9)	363 (4.6)	2.51
Haematopoietic tissues (C81–96)	39 (6.6)	61 (7.8)	59 (7.8)	86 (9.5)	83 (8.8)	87 (9.1)	88 (9.6)	76 (9.7)	66 (10.7)	59 (9.6)	704 (8.9)	3.49
Other and unspecified	23 (3.9)	40 (5.1)	34 (4.5)	49 (5.4)	53 (5.6)	68 (7.1)	77 (8.4)	38 (4.8)	37 (6.0)	30 (4.9)	449 (5.7)	2.46
All sites except skin (C00–96 exc. C44)	587 (100.0)	780 (100.0)	760 (100.0)	905 (100.0)	945 (100.0)	958 (100.0)	916 (100.0)	785 (100.0)	617 (100.0)	617 (100.0)	7870 (100.0)	**-0.59**
Average registrations per month	**49**	**65**	**63**	**75**	**79**	**80**	**76**	**65**	**51**	**51**		



EAPC, estimated annual percentage change.

Editorial table 2. Annual incidence by age group

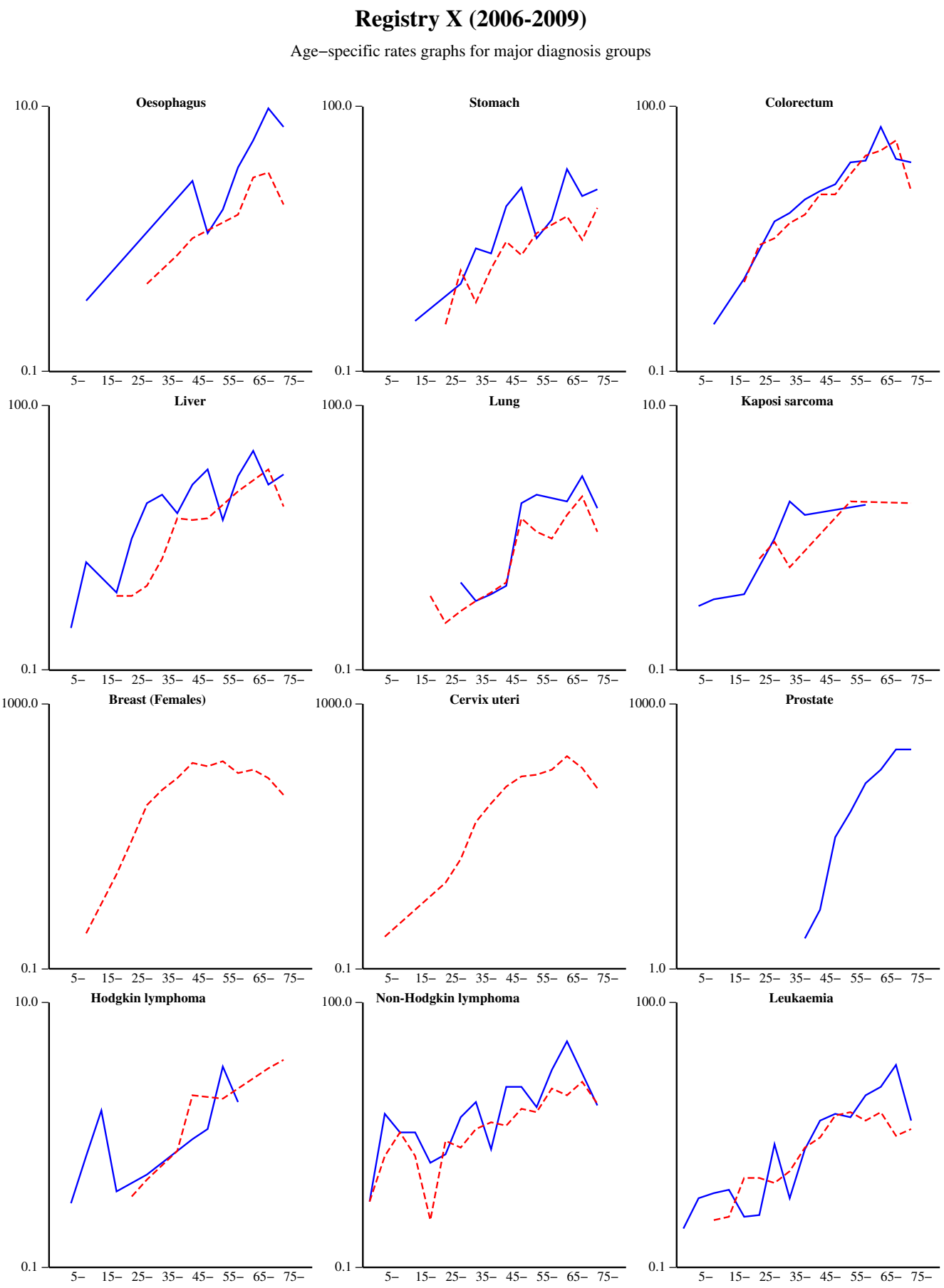
Registry X (2006-2009)

Annual incidence per 100 000 person–years by age group: males

Site	All ages	Age unk	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	MV%	ASR (W)	ICD-10
Lip	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.4	0.0	0.1	100	**0.0**	*C00*
Tongue	6	0	–	–	–	–	–	0.4	–	–	–	–	1.1	1.7	1.8	–	3.3	2.4	0.2	0.4	100	**0.3**	*C01-02*
Mouth	9	1	–	–	–	–	–	0.4	–	–	0.8	1.9	–	1.7	1.8	2.8	3.3	–	0.3	0.6	56	**0.5**	*C03-06*
Salivary gland	13	0	–	–	0.3	–	0.8	0.4	–	–	0.8	0.9	1.1	1.7	1.8	8.4	3.3	–	0.5	0.8	85	**0.7**	*C07-08*
Tonsil	3	0	–	–	–	–	0.4	–	–	0.6	–	0.9	–	–	–	–	–	–	0.1	0.2	67	**0.1**	*C09*
Other oropharynx	2	0	–	–	–	–	–	–	–	–	0.8	–	–	1.7	–	–	–	–	0.1	0.1	50	**0.1**	*C10*
Nasopharynx	37	0	–	–	0.3	1.9	1.5	2.8	1.0	1.9	3.8	–	3.4	1.7	7.1	2.8	–	2.4	1.4	2.4	86	**1.6**	*C11*
Hypopharynx	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	2.8	–	–	0.0	0.1	100	**0.1**	*C12-13*
Pharynx unspecified	1	0	–	–	–	–	–	–	–	–	–	–	–	1.7	–	–	–	–	0.0	0.1	100	**0.1**	*C14*
Oesophagus	16	0	–	–	0.3	–	–	–	–	–	–	2.8	1.1	1.7	3.6	5.6	9.8	7.1	0.6	1.0	56	**1.0**	*C15*
Stomach	49	0	–	–	–	0.4	–	–	1.0	2.5	2.3	7.5	12.5	3.4	5.3	19.7	9.8	11.8	1.9	3.2	59	**2.8**	*C16*
Small intestine	2	0	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	2.4	0.1	0.1	100	**0.1**	*C17*
Colon	51	0	–	–	0.3	–	0.4	1.2	3.0	1.9	0.8	1.9	7.9	3.4	5.3	36.6	16.4	9.5	1.9	3.3	82	**3.0**	*C18*
Rectum	69	0	–	–	–	–	0.8	0.8	1.5	3.2	6.8	9.3	5.7	20.3	10.7	16.9	9.8	14.2	2.6	4.5	70	**3.9**	*C19-20*
Anus	13	0	–	–	–	–	–	0.4	0.5	1.3	1.5	–	–	–	8.9	5.6	–	–	0.5	0.8	69	**0.8**	*C21*
Liver	122	1	–	0.3	1.7	–	0.8	3.2	8.1	10.1	6.0	13.1	19.3	5.1	16.0	31.0	13.1	16.6	4.6	7.9	16	**6.1**	*C22*
Gallbladder etc.	6	0	–	–	–	–	–	–	–	–	–	0.9	–	–	3.6	–	6.6	2.4	0.2	0.4	17	**0.4**	*C23-24*
Pancreas	34	0	–	–	–	–	–	–	1.0	0.6	1.5	0.9	2.3	8.4	12.5	19.7	19.7	2.4	1.3	2.2	15	**2.2**	*C25*
Nose, sinuses etc.	27	0	0.3	0.3	–	1.2	1.2	0.4	1.0	1.9	3.8	2.8	2.3	–	1.8	5.6	–	–	1.0	1.7	96	**1.2**	*C30-31*
Larynx	39	0	0.3	–	–	–	–	–	–	0.6	2.3	2.8	10.2	11.8	7.1	8.4	19.7	4.7	1.5	2.5	87	**2.4**	*C32*
Trachea, bronchus, and lung	35	1	–	–	–	–	–	–	1.0	0.6	0.8	0.9	7.9	10.1	8.9	8.4	16.4	7.1	1.3	2.3	60	**2.1**	*C33-34*
Other thoracic organs	9	0	0.3	0.3	–	–	–	–	–	–	–	0.9	–	5.1	3.6	–	–	2.4	0.3	0.6	100	**0.5**	*C37-38*
Bone	61	1	0.3	0.3	2.4	1.2	1.5	4.4	1.0	1.3	2.3	0.9	7.9	6.8	3.6	5.6	16.4	11.8	2.3	3.9	80	**2.8**	*C40-41*
Melanoma of skin	8	0	–	–	–	–	–	–	–	–	–	1.9	–	1.7	1.8	5.6	–	4.7	0.3	0.5	88	**0.5**	*C43*
Other skin	89	0	0.6	0.3	0.3	1.9	1.5	2.4	2.0	5.1	8.3	6.5	13.6	6.8	10.7	25.3	13.1	11.8	3.4	5.7	87	**4.6**	*C44*
Mesothelioma	1	0	0.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	0.1	100	**0.0**	*C45*
Kaposi sarcoma	11	0	–	0.3	0.3	–	0.4	–	1.0	1.9	1.5	–	–	–	1.8	–	–	–	0.4	0.7	82	**0.4**	*C46*
Connective and soft tissue	64	0	0.8	0.3	1.4	1.6	3.5	3.6	1.5	4.4	2.3	4.7	3.4	1.7	5.3	8.4	6.6	9.5	2.4	4.1	66	**2.8**	*C47, C49*
Breast	23	0	–	–	–	–	–	–	–	0.6	0.8	2.8	3.4	1.7	10.7	2.8	3.3	14.2	0.9	1.5	48	**1.4**	*C50*
Penis	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	0.0	–	**0.0**	*C60*
Prostate	438	0	–	–	–	–	–	–	–	–	2.3	4.7	31.7	60.8	129.9	182.9	314.9	312.8	16.5	28.3	79	**27.7**	*C61*
Testis	5	0	–	0.3	–	0.8	0.4	0.4	–	–	–	–	–	–	–	–	–	–	0.2	0.3	40	**0.2**	*C62*
Other male genital organs	3	0	–	–	–	–	–	–	–	–	–	–	1.1	1.7	–	2.8	–	–	0.1	0.2	67	**0.2**	*C63*
Kidney	14	0	0.8	0.3	0.7	0.4	–	–	0.5	–	–	1.9	1.1	–	5.3	–	–	–	0.5	0.9	71	**0.6**	*C64*
Renal pelvis	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	0.0	–	**0.0**	*C65*
Ureter	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	0.0	–	**0.0**	*C66*
Bladder	31	0	0.3	–	–	–	0.4	–	–	–	2.3	2.8	1.1	6.8	3.6	8.4	19.7	16.6	1.2	2.0	84	**1.8**	*C67*
Other urinary organs	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.3	–	0.0	0.1	100	**0.1**	*C68*
Eye	30	0	4.2	1.8	0.3	0.4	–	–	0.5	0.6	0.8	–	2.3	–	1.8	–	–	2.4	1.1	1.9	83	**1.1**	*C69*
Brain and nervous system	39	0	1.1	0.9	0.7	0.8	1.2	0.4	2.0	1.9	4.5	4.7	1.1	6.8	–	2.8	–	–	1.5	2.5	82	**1.7**	*C70-72*
Thyroid	12	0	–	–	–	–	0.8	0.4	0.5	1.3	–	2.8	1.1	–	–	2.8	–	2.4	0.5	0.8	75	**0.6**	*C73*
Adrenal gland	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	0.0	–	**0.0**	*C74*
Other endocrine glands	4	0	–	–	0.3	–	–	–	–	–	–	1.9	1.1	–	–	–	–	–	0.2	0.3	75	**0.2**	*C75*
Hodgkin lymphoma	15	0	–	0.3	0.7	1.6	0.4	–	0.5	0.6	–	0.9	1.1	3.4	1.8	–	–	–	0.6	1.0	47	**0.7**	*C81*
Non–Hodgkin lymphoma	130	0	0.6	5.5	3.5	3.5	1.5	2.0	5.1	7.6	2.3	11.2	11.3	6.8	17.8	36.6	16.4	7.1	4.9	8.4	59	**6.2**	*C82-85, C96*
Immunoproliferative diseases	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	0.0	–	**0.0**	*C88*
Multiple myeloma	14	0	–	–	–	–	–	–	–	–	2.3	0.9	1.1	1.7	3.6	11.3	3.3	2.4	0.5	0.9	21	**0.9**	*C90*
Lymphoid leukaemia	19	0	–	0.3	–	0.4	–	–	–	–	–	0.9	3.4	3.4	3.6	5.6	16.4	4.7	0.7	1.2	21	**1.2**	*C91*
Myeloid leukaemia	25	0	–	0.3	0.3	0.4	0.4	0.4	2.5	0.6	2.3	3.7	1.1	1.7	3.6	5.6	3.3	–	0.9	1.6	8	**1.2**	*C92-94*
Leukaemia unspecified	4	0	0.3	–	0.3	–	–	–	–	–	–	–	1.1	–	1.8	–	–	–	0.2	0.3	0	**0.2**	*C95*
Other and unspecified	51	0	0.3	1.2	–	1.6	1.2	1.6	1.0	3.2	1.5	3.7	5.7	–	8.9	5.6	16.4	11.8	1.9	3.3	92	**2.5**	*O&U*
All sites	1637	4	10.4	13.1	14.6	17.9	18.8	25.5	36.9	54.5	64.6	104.6	168.9	190.9	314.9	486.9	564.2	500.0	61.8	105.7	68	**89.5**	*C00-96*
All sites except C44	1548	4	9.8	12.8	14.3	16.0	17.3	23.1	34.9	49.4	56.3	98.1	155.3	184.1	304.2	461.6	551.0	488.1	58.5	100.0	67	**84.9**	*C00-96 exc. C44*

Reference values for incidence rates (all sites), per 100 000 person-years: age 0–4 years: < 10.4; age 5–9 years: < 13.0; age 10–14 years: < 15.4.
For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2: *Processing and presentation of the data* (p. 3).

Editorial table 3. Age-specific incidence (per 100 000 person-years) curves for major diagnosis groups in males (solid blue lines) and females (dashed red lines)



Editorial table 4. Comparison of observed values versus expected (reference) values from registries in the same region

Registry X (2006-2009)

International comparison

Males

Site	Cases	ASR (se)	O/E	MV%	DCO%	ICD-10
Lip, oral cavity, and pharynx	73	3.7 (0.46)	1.23	82.2	–	C00–14
Oesophagus	16	1.0 (0.25)	1.17	56.2	–	C15
Stomach	49	2.8 (0.42)	0.85	59.2	–	C16
Colorectum and anus	133	**7.6 (0.69) >**	**1.68**	74.4	–	C18–21
Liver	122	**6.1 (0.59) <**	**0.37**	15.6	–	C22
Pancreas	34	2.2 (0.39)	1.12	14.7	–	C25
Larynx	39	**2.4 (0.39) >**	**1.75**	87.2	–	C32
Lung (including trachea)	35	2.1 (0.38)	1.23	60.0	–	C33–34
Melanoma of skin	8	0.5 (0.19)	0.80	87.5	–	C43
Kaposi sarcoma	11	**0.4 (0.13) <**	**0.46**	81.8	–	C46
Prostate	438	27.7 (1.35)	1.10	79.2	–	C61
Testis	5	0.2 (0.07)	0.56	40.0	–	C62
Kidney etc.	15	0.7 (0.19)	0.94	73.3	–	C64–66
Bladder	31	1.8 (0.33)	0.87	83.9	–	C67
Brain and central nervous system	39	**1.7 (0.28) >**	**4.10**	82.1	–	C70–72
Thyroid	12	0.6 (0.17)	1.59	75.0	–	C73
Lymphoma	159	**7.8 (0.66) >**	**1.62**	54.7	–	C81–88,C90
Leukaemia	48	**2.6 (0.39) >**	**1.87**	**12.5 <**	–	C91–95
Ill–defined (2.6% of total)	41	2.0 (0.33)		90.2	–	C76–80
All sites except non–melanoma skin	1548	**84.9 (2.26) >**	**1.07**	66.5	–	C00–96 exc. C44

Females

Site	Cases	ASR (se)	O/E	MV%	DCO%	ICD-10
Lip, oral cavity, and pharynx	44	2.2 (0.35)	1.12	97.7	–	C00–14
Oesophagus	7	0.4 (0.16)	1.02	71.4	–	C15
Stomach	24	**1.3 (0.27) <**	**0.48**	62.5	–	C16
Colorectum and anus	112	**6.2 (0.62) >**	**1.63**	75.9	–	C18–21
Liver	47	**2.4 (0.37) <**	**0.30**	29.8	–	C22
Pancreas	21	1.2 (0.26)	0.92	28.6	–	C25
Larynx	7	0.5 (0.18)	3.26	100.0	–	C32
Lung (including trachea)	23	1.2 (0.27)	1.12	73.9	–	C33–34
Melanoma of skin	14	0.8 (0.23)	1.24	50.0	–	C43
Kaposi sarcoma	7	**0.3 (0.11) <**	**0.46**	100.0	–	C46
Breast	747	39.6 (1.52)	1.01	73.8	–	C50
Cervix uteri	455	27.0 (1.32)	0.92	79.8	–	C53
O&U part of uterus	66	4.0 (0.51)	1.21	84.8	–	C54–55
Ovary	96	**4.7 (0.51) >**	**1.30**	87.5	–	C56
Kidney etc.	19	0.9 (0.21)	1.26	73.7	–	C64–66
Bladder	13	**0.7 (0.21) <**	**0.58**	76.9	–	C67
Brain and central nervous system	35	**1.5 (0.26) >**	**4.47**	82.9	–	C70–72
Thyroid	46	**2.3 (0.36) >**	**2.19**	78.3	–	C73
Lymphoma	103	**4.9 (0.52) >**	**1.49**	54.4	–	C81–88,C90
Leukaemia	34	1.7 (0.31)	1.42	**5.9 <**	–	C91–95
Ill–defined (2.7% of total)	59	3.1 (0.43)		74.6	–	C76–80
All sites except non–melanoma skin	2176	115.6 (2.62)	1.02	74.0	–	C00–96 exc. C44

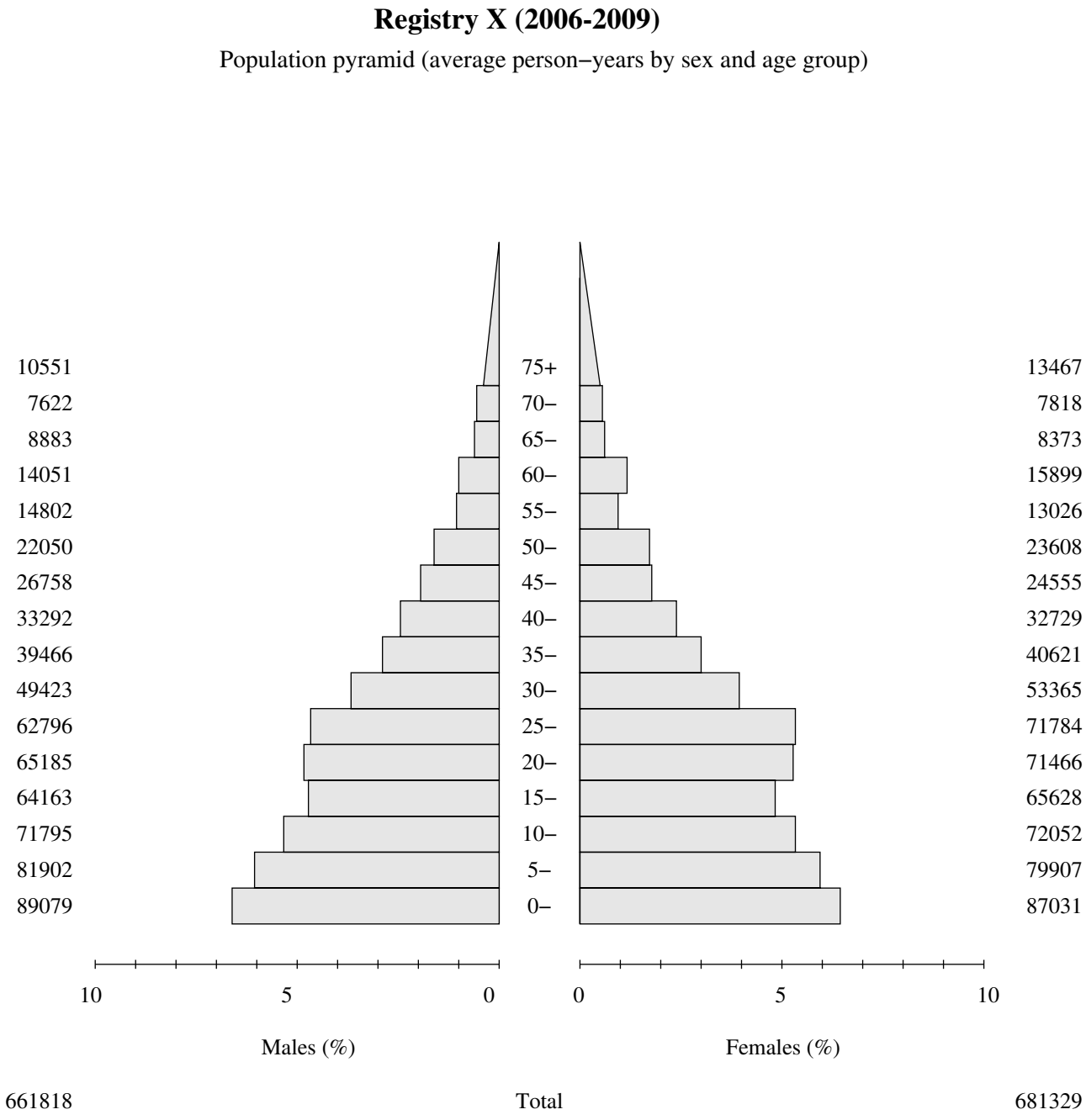
Significantly lower (<) or higher (>) observed values are marked in bold.

ASR (se): the observed age-standardized incidence rates (and their standard errors); O&U: other and unspecified; O/E: the ratio of the observed rates to the estimated rates reported in GLOBOCAN 2012 (Ferlay et al., 2013) for the same region of Africa (eastern, central, southern, or western).

MV%: The percentage of microscopically verified cases; these values are compared against the mean observed values from 14 cancer registries in sub-Saharan Africa: Congo, Brazzaville (2006–2010); The Gambia (2003–2007); Guinea, Conakry (2005–2009); Kenya, Eldoret (2008–2011) and Nairobi (2004–2008); Malawi, Blantyre (2006–2010); Mali, Bamako (2003–2007); Mauritius (2007–2011); Niger, Niamey (2006–2009); Nigeria, Abuja Federal Capital Territory (2009–2012) and Ibadan (2006–2009); South Africa, PROMEC (2003–2007); Uganda, Kyadondo County (2003–2007); and Zimbabwe, Harare: African (2003–2006).

For further definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in this chapter and in Chapter 2: *Processing and presentation of the data* (p. 3).

Editorial table 5. Average annual population at risk during the period selected



CHAPTER 4
Results by registry (by region)

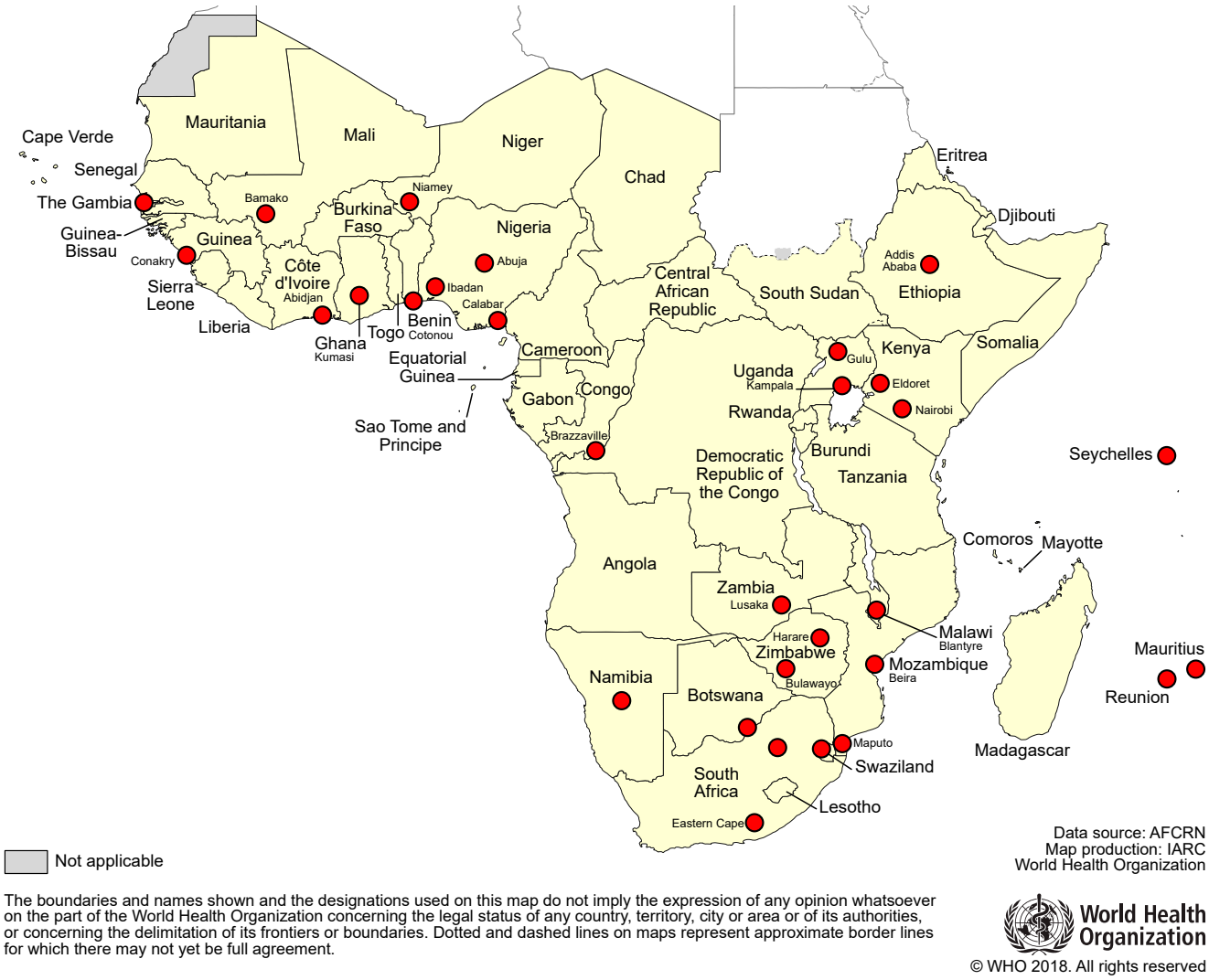


Fig. 4.01. The members of the African Cancer Registry Network (AFCRN) as of spring 2018, with the location of the cancer registries marked

Congo, Brazzaville

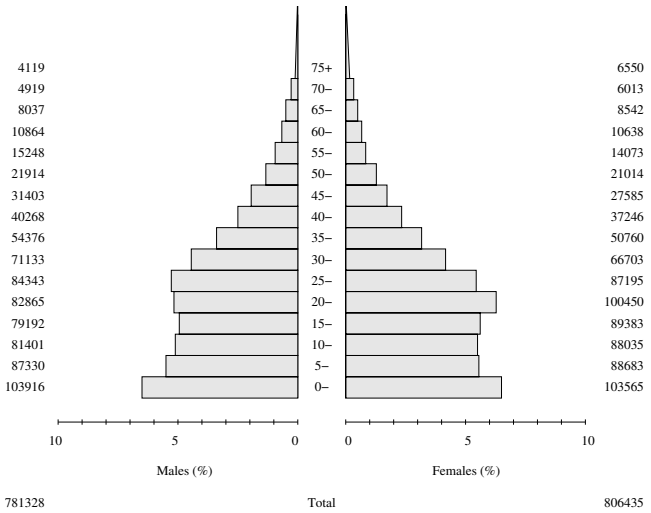
The Registre des Cancers de Brazzaville was created in 1995 under an agreement between Marien Ngouabi University and IARC. The registry is located in the records section of the oncology and radiotherapy service of the University Hospital Centre (CHU) of Brazzaville, the largest hospital in the capital. Before 1995, a register of cases in patients visiting the medical oncology service had been maintained. The outbreak of civil war in 1997 caused major disruption to medical and laboratory services. Registry activity was temporarily suspended but resumed towards the end of that year.

The registry is led by a management committee and has one full-time cancer registrar. It is financed by the Congolese Ministry of Public Health; Marien Ngouabi University; and a generous donation from the First Lady of the Congo, Antoinette Sassou Nguesso.

The Registre des Cancers de Brazzaville data presented in this volume cover the entire city of Brazzaville. The city has nine districts (Makélékélé, Bacongo, Poto-Poto, Moungali, Ouenzé, Talangaï, Mfilou, Madibou, and Djiri). Cases in non-residents are registered separately.

The population of Brazzaville is estimated to have been 1 376 382 in 2007 (at the most recent census) and 1 549 693 in 2011. The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Congo, Brazzaville (2009–2013)
Population pyramid (average annual person-years by sex and age group)



Source: Centre National de la Statistique et des Etudes Economiques (CNSEE) of the Congo, Recensement Général de la Population et de l'Habitat (RGPH), 2007 (Brazzaville, July 2010), with support from the United Nations Population Fund (UNFPA)

The CHU of Brazzaville's oncology and radiotherapy service, together with the hospital's histopathology laboratory and other radiotherapy services, is the most important source of information for the registry (accounting for 43% of all registrations in 2011). The CHU's other clinical departments (medicine, surgery, maternity, paediatrics, and medical analysis) provide most of the remaining cases. Only 7% of cases were provided by the registry's other sources (the Makélékélé Hospital, the Pierre Mobengo Central Military Hospital, the Talangaï Hospital, and four private clinics where patients can be hospitalized).

Registration is active. Cases are identified in the records of the oncology and radiotherapy service or by visits to the other departments of the CHU, where cases are traced from admission and discharge records. The other hospitals are also visited periodically, and all pathology reports mentioning cancer are collected. Information on deaths is obtained from a hospital registry and from municipal services. Death certification is available, but the quality of information is poor, so death certificates are not used for regular registration.

The registry uses IARC's CanReg5 software for data entry, management, and duplication checks.

YEARS PRESENTED

2009–2013 (a 5-year period)

NOTES

The rate of registration has remained relatively constant over the past 10 years, at 41–53 cases per month. The most recent complete 5-year period (2009–2013) was selected for analysis.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 73.2 cases per 100 000 person-years in males and 68.5 cases per 100 000 person-years in females. These values are somewhat lower than the values for central Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of 0.80 for males and 0.60 for females. The incidence of cancer at most anatomical sites is low, with the exception of cancer of the prostate.

The percentage of microscopically verified cases (MV%) is somewhat low (54% in males and 68% in females).

SUMMARY

The overall pattern of cancer occurrence (i.e. the relative distribution by anatomical site, sex, and age) in this population was recently reported for the 12-year period of 1998–2009 (Nsondé Malanda et al., 2013). The results for 2009–2013 are similar, except that prostate cancer appears to be much more frequent in the more recent data. The incidence rates remain relatively low. This probably reflects some degree of underascertainment.

PUBLICATIONS AND ACHIEVEMENTS

The Registre des Cancers de Brazzaville became a member of the African Cancer Registry Network

(AFCRN) in 2012. It hosted the 2016 Fourth AFCRN Annual Review Meeting.

Gombé Mbalawa C, Diouf D, Nkoua Mbon JB, Minga B, Makouanzi Nsimba S, Nsondé Malanda J (2013). Arrival of patients at advanced stage: tempting to identify responsibility. Bull Cancer. 100(2):167–72. [French] PMID:23392547

Gombe Mbalawa C, Ekoundzola JR, Nkoua Mbon JB, Paraiso DI, Chali V (1987). Pathology of breast tumors occurring before the age of 30 in Brazzaville. Rev Fr Gynecol Obstet. 82(2):85–8. [French] PMID:3563290

N'koua-M'bon JB, Bambara AT, Moukassa D, Gombé-Mbalawa C (2013). Clinical and outcome characteristics of inflammatory breast cancers in Brazzaville. Bull Cancer. 100(2):147–53. [French] PMID:23392567

Nkoua-Mbon JB, Ibara G, Moyen G, Gombe-Mbalawa C (2005). Cancer incidence in children from the cancer registry in Brazzaville. Arch Pediatr. 12(1):83–4. [French] http://dx.doi.org/10.1016/j.arcped.2004.10.021 PMID:15653060

Nsondé Malanda J, Nkoua Mbon JB, Bambara AT, Ibara G, Minga B, Nkoua Epala B, et al. (2013). Twelve years of working of Brazzaville cancer registry. Bull Cancer. 100(2):135–9. [French] PMID:23406573

Congo, Brazzaville (2009–2013)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	9	0	67		-	-	-	-	-	-	-	-	-	3	2	-	-	1	2	1	0.2	0.7	0.07	**0.5**	C00-06
Salivary gland	10	0	80		-	-	-	-	-	-	1	-	-	2	-	-	3	1	-	3	0.3	0.8	0.05	**0.7**	C07-08
Nasopharynx	6	0	83		-	-	2	-	-	-	-	-	-	-	-	1	1	2	-	-	0.2	0.5	0.04	**0.3**	C11
Other pharynx	2	0	100		-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	0.1	0.2	0.01	**0.1**	C09-10, C12-14
Oesophagus	7	0	43		-	-	-	-	-	-	-	-	-	-	2	1	-	2	1	1	0.2	0.6	0.06	**0.5**	C15
Stomach	39	0	56		-	-	-	-	-	-	-	2	6	6	6	8	4	4	1	2	1.0	3.2	0.22	**2.0**	C16
Colon	33	0	67		-	-	-	-	3	1	2	2	3	3	5	4	2	4	3	1	0.8	2.7	0.21	**1.6**	C18
Rectum	35	0	43		-	-	-	-	-	-	3	2	5	2	8	7	4	2	1	1	0.9	2.9	0.19	**1.7**	C19-20
Anus	6	0	83		-	-	-	-	-	-	1	1	-	1	-	1	1	1	-	-	0.2	0.5	0.03	**0.3**	C21
Liver	165	0	36		-	-	2	4	6	8	25	22	25	18	17	9	10	8	10	1	4.2	13.6	0.75	**6.2**	C22
Gallbladder etc.	1	0	0		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.0	0.1	0.01	**0.1**	C23-24
Pancreas	18	0	17		-	1	-	-	-	-	-	2	3	1	3	2	2	3	-	1	0.5	1.5	0.10	**0.9**	C25
Larynx	21	0	95		-	-	1	-	-	-	-	-	1	2	5	4	2	3	2	1	0.5	1.7	0.16	**1.2**	C32
Trachea, bronchus, and lung	14	0	57		-	-	-	-	-	-	-	-	2	-	-	2	1	6	2	1	0.4	1.2	0.14	**0.9**	C33-34
Bone	13	0	69		-	-	4	1	1	-	-	1	3	-	2	1	-	-	-	-	0.3	1.1	0.03	**0.4**	C40-41
Melanoma of skin	21	0	38		-	-	-	-	-	-	1	-	-	-	3	-	3	10	3	1	0.5	1.7	0.23	**1.5**	C43
Non-melanoma skin	18	0	44		-	-	1	1	1	3	1	2	-	2	2	1	1	2	-	1	0.5		0.07	**0.7**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	14	0	36		-	-	-	-	-	-	1	-	-	8	2	2	1	-	-	-	0.4	1.2	0.06	**0.6**	C46
Connective and soft tissue	24	0	38		-	1	2	2	-	-	3	1	3	2	4	2	1	1	2	-	0.6	2.0	0.12	**0.9**	C47, C49
Breast	22	0	77		-	-	-	-	1	-	1	3	-	1	1	5	2	1	4	3	0.6	1.8	0.16	**1.3**	C50
Penis	2	0	50		-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	0.1	0.2	0.01	**0.1**	C60
Prostate	527	0	51		-	-	-	-	-	-	-	-	-	1	13	26	79	118	136	154	13.5	43.6	5.19	**42.6**	C61
Testis	5	0	40		-	-	-	1	-	-	3	1	-	-	-	-	-	-	-	-	0.1	0.4	0.01	**0.1**	C62
Kidney and renal pelvis	29	0	31		7	3	2	1	1	2	1	1	2	3	1	3	-	-	2	-	0.7	2.4	0.10	**0.9**	C64-65
Bladder	12	0	50		-	-	1	1	-	-	-	-	-	1	1	-	2	1	2	3	0.3	1.0	0.08	**0.8**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	14	0	36		11	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	0.4	1.2	0.02	**0.4**	C69
Brain and nervous system	7	0	14		-	-	-	-	-	1	2	-	-	2	2	-	-	-	-	-	0.2	0.6	0.02	**0.2**	C70-72
Thyroid	2	0	50		-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	0.1	0.2	0.02	**0.1**	C73
Hodgkin lymphoma	1	0	100		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C81
Non-Hodgkin lymphoma	31	0	94		-	2	3	1	1	1	1	3	1	1	2	7	4	3	1	-	0.8	2.6	0.17	**1.4**	C82-85, C96
Multiple myeloma	24	0	100		-	-	-	-	-	-	-	-	2	4	-	3	3	6	5	1	0.6	2.0	0.24	**1.5**	C90
Lymphoid leukaemia	32	0	100		3	5	4	3	3	3	2	-	1	2	2	-	-	4	-	-	0.8	2.6	0.10	**1.0**	C91
Myeloid leukaemia	20	0	100		-	-	1	2	3	3	2	2	-	2	2	1	1	-	-	1	0.5	1.7	0.05	**0.7**	C92-94
Leukaemia, unspecified	21	0	100		3	8	1	-	1	2	1	1	-	2	-	1	-	-	1	-	0.5	1.7	0.05	**0.6**	C95
Other and unspecified	22	0	45		1	1	-	-	1	-	1	2	2	3	2	2	2	2	2	1	0.6	1.8	0.13	**1.1**	O&U
All sites	1227	0	54		26	21	24	17	22	24	52	49	61	72	90	94	130	187	180	178	31.4		8.91	**73.9**	C00-96
All sites except C44	1209	0	54		26	21	23	16	21	21	51	47	61	70	88	93	129	185	180	177	30.9	100.0	8.84	**73.2**	C00-96 exc. C44
Average annual population					103916	87330	81401	79192	82865	84343	71133	54376	40268	31403	21914	15248	10864	8037	4919	4119	781329				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Congo, Brazzaville (2009–2013)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	9	0	89		-	-	-	-	-	1	-	-	3	2	-	1	2	-	-	-	0.2	0.6	0.04	**0.4**	C00-06
Salivary gland	5	0	60		-	-	-	-	-	-	1	1	-	-	-	-	1	2	-	-	0.1	0.3	0.04	**0.3**	C07-08
Nasopharynx	4	0	75		-	1	-	-	-	-	1	-	1	-	-	-	1	-	-	-	0.1	0.3	0.01	**0.1**	C11
Other pharynx	1	0	100		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C09-10, C12-14
Oesophagus	2	0	50		-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	0.0	0.1	0.02	**0.1**	C15
Stomach	28	0	50		-	-	-	-	-	-	2	2	1	4	1	6	2	4	5	1	0.7	1.9	0.22	**1.5**	C16
Colon	27	0	63		-	-	-	-	-	-	3	3	3	2	4	2	4	-	3	3	0.7	1.8	0.15	**1.3**	C18
Rectum	32	0	59		-	-	-	-	1	1	-	3	3	2	7	2	5	4	3	1	0.8	2.1	0.21	**1.7**	C19-20
Anus	13	0	62		-	-	-	-	-	1	-	1	1	-	-	4	2	1	1	2	0.3	0.9	0.08	**0.7**	C21
Liver	70	0	33		-	-	-	2	1	8	8	13	10	5	5	3	3	4	4	4	1.7	4.7	0.28	**2.6**	C22
Gallbladder etc.	6	0	17		-	-	-	-	-	-	-	-	1	1	-	-	1	2	1	-	0.1	0.4	0.06	**0.4**	C23-24
Pancreas	22	0	18		-	-	-	-	-	-	1	1	3	1	3	3	4	2	-	4	0.5	1.5	0.11	**1.2**	C25
Larynx	5	0	80		-	-	-	-	-	-	-	-	-	-	1	1	1	-	1	1	0.1	0.3	0.04	**0.3**	C32
Trachea, bronchus, and lung	17	0	53		-	-	-	-	-	-	-	-	-	1	2	2	2	2	3	5	0.4	1.1	0.12	**1.0**	C33-34
Bone	25	0	60		-	1	11	2	3	1	-	1	2	-	2	1	-	-	-	1	0.6	1.7	0.04	**0.7**	C40-41
Melanoma of skin	23	0	43		-	-	-	-	-	-	-	-	1	1	5	1	3	4	2	6	0.6	1.5	0.15	**1.4**	C43
Non-melanoma skin	12	0	58		-	1	-	-	1	1	2	-	1	3	-	1	-	1	1	-	0.3		0.06	**0.4**	C44
Mesothelioma	2	0	50		-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	0.0	0.1	0.02	**0.1**	C45
Kaposi sarcoma	13	0	38		-	-	-	-	-	1	5	1	1	-	4	1	-	-	-	-	0.3	0.9	0.04	**0.4**	C46
Connective and soft tissue	24	0	50		1	-	-	2	3	3	2	3	2	2	-	-	3	2	1	-	0.6	1.6	0.10	**0.9**	C47, C49
Breast	491	0	86		-	-	-	1	10	26	36	59	70	84	67	56	27	26	14	15	12.2	32.9	2.21	**20.7**	C50
Vulva	6	0	67		-	-	-	-	-	-	-	-	2	-	-	-	1	2	1	-	0.1	0.4	0.05	**0.3**	C51
Vagina	4	0	100		-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	2	0.1	0.3	0.01	**0.2**	C52
Cervix uteri	331	0	70		-	-	-	-	3	4	7	23	31	44	41	50	48	31	23	26	8.2	22.2	2.05	**17.4**	C53
Uterus	40	0	48		-	-	-	-	-	1	-	1	3	4	6	4	7	2	4	8	1.0	2.7	0.24	**2.2**	C54-55
Ovary	88	0	42		-	-	-	4	1	1	5	7	8	15	13	11	8	6	4	5	2.2	5.9	0.46	**4.1**	C56
Placenta	7	0	57		-	-	-	1	-	1	2	-	2	1	-	-	-	-	-	-	0.2	0.5	0.01	**0.2**	C58
Kidney and renal pelvis	10	0	10		3	1	1	-	1	-	1	-	1	2	-	-	-	-	-	-	0.2	0.7	0.02	**0.3**	C64-65
Bladder	21	0	48		-	-	-	-	-	-	-	2	1	1	5	5	2	4	-	1	0.5	1.4	0.14	**1.1**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	19	0	21		13	-	-	-	-	-	2	-	2	1	1	-	-	-	-	-	0.5	1.3	0.03	**0.5**	C69
Brain and nervous system	10	0	20		-	-	-	1	-	-	1	-	1	1	2	1	2	-	-	1	0.2	0.7	0.04	**0.5**	C70-72
Thyroid	10	0	60		-	-	-	-	1	1	2	-	-	1	1	1	2	1	-	-	0.2	0.7	0.05	**0.4**	C73
Hodgkin lymphoma	1	0	100		-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C81
Non-Hodgkin lymphoma	35	0	83		-	1	1	4	1	3	2	3	-	2	6	3	1	5	2	1	0.9	2.3	0.18	**1.5**	C82-85, C96
Multiple myeloma	21	0	100		-	-	-	-	-	-	-	-	1	2	3	4	3	4	3	1	0.5	1.4	0.18	**1.3**	C90
Lymphoid leukaemia	22	0	100		3	1	3	2	1	-	-	-	-	1	1	3	5	1	-	1	0.5	1.5	0.10	**1.0**	C91
Myeloid leukaemia	24	0	100		-	-	-	2	4	3	4	1	1	1	2	1	-	1	3	1	0.6	1.6	0.10	**0.8**	C92-94
Leukaemia, unspecified	11	0	100		-	1	1	1	2	1	1	1	1	-	1	-	-	1	-	-	0.3	0.7	0.03	**0.3**	C95
Other and unspecified	14	0	64		-	-	-	-	1	3	-	2	-	2	2	-	-	2	1	1	0.3	0.9	0.07	**0.6**	O&U
All sites	1505	0	68		20	7	17	23	34	61	88	129	157	187	186	168	141	115	81	91	37.3		7.76	**68.9**	C00-96
All sites except C44	1493	0	68		20	6	17	23	33	60	86	129	156	184	186	167	141	114	80	91	37.0	100.0	7.70	**68.5**	C00-96 exc. C44
Average annual population					103565	88683	88035	89383	100450	87195	66703	50760	37246	27585	21014	14073	10638	8542	6013	6550	806436				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

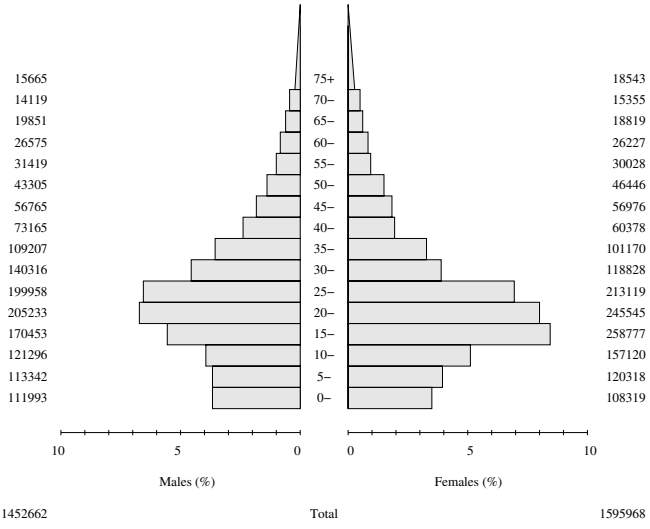
Ethiopia, Addis Ababa

The Addis Ababa City Cancer Registry (AACCR) is the first population-based cancer registry in Ethiopia. It was established in September 2011 within the Radiotherapy Centre of Tikur Anbessa Specialized Hospital, the teaching hospital of Addis Ababa University's School of Medicine. Registration is overseen by the head of the Radiotherapy Centre. The AACCR is run by four full-time employees, who receive assistance with data collection from 22 staff members at selected hospitals. Support for registry activities has been provided by the German Federal Ministry of Education and Research, through research collaborations with Martin Luther University Halle-Wittenberg (Germany) and the American Cancer Society, by the WHO national coordinating office, and by the Ethiopian government.

The AACCR data presented in this volume are for the registry's entire covered population: the residents of Addis Ababa (as defined by ≥ 6 months of residence in the city). Administratively, Addis Ababa is divided into 10 subcities: Addis Ketema, Akaky Kaliti, Arada, Bole, Gullele, Kirkos, Kolfe Keranio, Lideta, Nifas Silk-Lafto, and Yeka.

The population of Addis Ababa was projected by the Central Statistics Office (CSA) to be 3.05 million in 2012. The average annual population-at-risk estimates corresponding to the AACCR data presented in this volume are shown in the population pyramid.

Ethiopia, Addis Ababa (2012–2013)
Population pyramid (average annual person-years by sex and age group)



Estimates for 2012 and 2013 based on population census of 2007

The main sources of registry information are Tikur Anbessa Specialized Hospital, the United Vision Higher Clinic, and the Hallelujah Higher Medical Clinic (together accounting for 57% of 2014 registrations). The new St. Paul's Hospital will become another significant source of data, due to its specializations in cancer diagnosis and treatment. The city's two major teaching hospitals, Tikur Anbessa Specialized Hospital and St. Paul's Hospital, offer specialized medical services such as computed tomography (CT), radiotherapy, histopathology, and magnetic resonance imaging (MRI) services.

Given the large registration area of Addis Ababa, the AACCR aims to eventually use both active and passive data collection mechanisms; currently, only active procedures are in use. The 22 staff members at selected hospitals register all new cases from their respective institutions, and AACCR staff members pay scheduled visits to these focal-point personnel on a regular basis. The major items of information are collected using the standard cancer registry data formats. Most vital statistics records for the population contain inadequate information. Death certificate information is collected for deaths caused by cancer.

The registry uses IARC's CanReg5 software for data entry, analysis, and management.

YEARS PRESENTED

2012–2013 (a 2-year period)

NOTES

The registry started activity during the fourth quarter of 2011. By 2012, the number of cases registered per month was already fairly consistent.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 64.7 cases per 100 000 person-years in males and 123.8 cases per 100 000 person-years in females. These values are somewhat lower than the values for eastern Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of about 0.53 for males and 0.79 for females.

In males, it is notable that the ASR of prostate cancer is low, as are – relative to the estimates for eastern Africa – the ASRs of oesophageal cancer. In contrast, the most common cancers registered (leukaemia, lymphoma, and colorectal cancer) have relatively high ASRs in males, which is a very unusual pattern. In females, the ASR of breast cancer (39.1 cases per 100 000 person-years) is about 140% of the estimate for eastern Africa; as in males, the ASRs of leukaemia, lymphoma, and colorectal cancer are relatively high.

SUMMARY

This relatively new registry covers a very large population, with many hospitals and clinics in the catchment area. The registry was unable to collect data from all possible sources of information in these early years of operation, so there is likely a moderate level of underregistration. However, it is unclear whether this underregistration has resulted in any significant bias of the overall profile (i.e. the relative frequencies) of the various cancer types, which could possibly have contributed to the somewhat unusual observed cancer patterns.

PUBLICATIONS AND ACHIEVEMENTS

The AACCR became a member of the African Cancer Registry Network (AFCRN) in 2012.

Kantelhardt EJ, Mathewos A, Aynalem A, Wondemagegnehu T, Jemal A, Vetter M, et al. (2014). The prevalence of estrogen receptor-negative breast cancer in Ethiopia. BMC Cancer. 14:895. http://dx.doi.org/10.1186/1471-2407-14-895 PMID:25433805

Kantelhardt EJ, Moelle U, Begoihn M, Addissie A, Trocchi P, Yonas B, et al. (2014). Cervical cancer in Ethiopia: survival of 1,059 patients who received oncologic therapy. Oncologist. 19(7):727–34. http://dx.doi.org/10.1634/theoncologist.2013-0326 PMID:24951611

Kantelhardt EJ, Zerche P, Mathewos A, Trocchi P, Addissie A, Aynalem A, et al. (2014). Breast cancer survival in Ethiopia: a cohort study of 1,070 women. Int J Cancer. 135(3):702–9. http://dx.doi.org/10.1002/ijc.28691 PMID:24375396

Ethiopia, Addis Ababa (2012–2013)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	24	0	92		1	-	1	-	-	-	1	4	1	2	2	1	5	2	2	2	0.8	1.9	0.15	**1.3**	C00-06
Salivary gland	11	0	91		-	-	-	-	1	1	-	-	3	1	1	-	2	-	1	1	0.4	0.9	0.06	**0.6**	C07-08
Nasopharynx	23	0	96		-	-	-	4	2	1	-	2	1	3	2	1	3	2	2	-	0.8	1.9	0.14	**1.1**	C11
Other pharynx	3	0	100		-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	0.1	0.2	0.01	**0.1**	C09-10, C12-14
Oesophagus	39	0	87		-	-	-	-	-	4	-	2	6	3	2	6	9	2	2	3	1.3	3.1	0.25	**2.2**	C15
Stomach	51	0	69		-	-	-	-	-	1	2	2	4	7	5	5	4	8	6	7	1.8	4.1	0.37	**3.0**	C16
Colon	83	0	82		-	-	-	-	2	5	4	7	4	7	2	15	12	11	7	7	2.9	6.7	0.58	**4.7**	C18
Rectum	54	1	89		-	-	-	-	-	7	4	6	2	3	8	7	3	5	4	4	1.9	4.4	0.32	**2.7**	C19-20
Anus	6	0	83		-	-	-	-	1	-	1	1	2	-	-	-	-	-	1	-	0.2	0.5	0.03	**0.2**	C21
Liver	46	0	54		-	-	-	1	-	1	3	4	3	2	8	7	3	3	3	8	1.6	3.7	0.26	**2.5**	C22
Gallbladder etc.	8	0	38		-	-	-	-	-	1	-	-	2	1	1	1	1	-	-	1	0.3	0.6	0.04	**0.4**	C23-24
Pancreas	13	0	38		-	-	-	-	-	-	-	-	2	1	2	5	-	-	1	2	0.4	1.0	0.08	**0.8**	C25
Larynx	9	0	89		-	-	-	-	-	-	1	-	1	-	1	-	1	2	2	1	0.3	0.7	0.08	**0.6**	C32
Trachea, bronchus, and lung	59	0	63		-	-	-	-	1	2	-	4	5	7	6	7	10	8	5	4	2.0	4.8	0.43	**3.5**	C33-34
Bone	21	0	86		-	-	3	3	3	3	1	2	2	-	1	1	-	-	1	1	0.7	1.7	0.06	**0.7**	C40-41
Melanoma of skin	9	0	100		-	-	-	-	1	2	-	-	-	-	2	-	-	3	1	-	0.3	0.7	0.07	**0.5**	C43
Non-melanoma skin	42	0	100		-	-	-	1	1	1	2	8	3	3	5	-	5	5	3	5	1.4		0.24	**2.2**	C44
Mesothelioma	1	0	100		-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C45
Kaposi sarcoma	17	0	82		-	-	1	-	1	3	1	7	-	-	1	1	-	2	-	-	0.6	1.4	0.06	**0.6**	C46
Connective and soft tissue	56	0	88		-	3	4	2	4	10	7	2	3	4	-	7	2	4	1	3	1.9	4.5	0.22	**2.3**	C47, C49
Breast	49	0	92		-	-	-	-	-	4	1	3	-	6	7	10	4	6	3	5	1.7	4.0	0.33	**2.8**	C50
Penis	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.0	0.1	0.01	**0.1**	C60
Prostate	84	1	77		-	-	-	-	-	1	-	1	1	1	2	4	10	11	28	24	2.9	6.8	0.79	**5.7**	C61
Testis	10	0	90		-	-	-	-	2	-	1	6	-	-	-	1	-	-	-	-	0.3	0.8	0.03	**0.3**	C62
Kidney and renal pelvis	26	0	81		6	1	-	-	-	-	-	2	3	2	2	-	4	3	1	2	0.9	2.1	0.14	**1.5**	C64-65
Bladder	57	0	77		-	-	-	-	-	1	1	3	1	6	8	11	3	7	7	9	2.0	4.6	0.41	**3.5**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	18	0	94		1	1	-	-	1	-	3	2	4	2	2	1	-	-	-	1	0.6	1.5	0.06	**0.7**	C69
Brain and nervous system	29	1	69		2	-	1	1	2	3	1	5	2	2	1	2	3	2	1	-	1.0	2.3	0.14	**1.3**	C70-72
Thyroid	37	0	86		-	-	1	-	2	1	4	4	7	2	4	3	4	2	2	1	1.3	3.0	0.20	**1.8**	C73
Hodgkin lymphoma	26	0	100		1	2	4	2	2	6	1	3	1	2	1	-	1	-	-	-	0.9	2.1	0.06	**0.9**	C81
Non-Hodgkin lymphoma	121	0	89		5	3	2	8	3	2	6	14	15	11	20	8	8	8	3	5	4.2	9.8	0.59	**5.9**	C82-85, C96
Multiple myeloma	16	0	94		-	-	-	2	-	-	-	-	1	2	-	1	3	6	1	-	0.6	1.3	0.14	**1.0**	C90
Lymphoid leukaemia	67	0	93		5	12	2	6	2	5	-	2	3	3	2	3	9	5	3	5	2.3	5.4	0.32	**3.4**	C91
Myeloid leukaemia	59	0	98		2	-	2	3	7	8	6	8	7	3	1	3	4	3	-	2	2.0	4.8	0.20	**2.3**	C92-94
Leukaemia, unspecified	1	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C95
Other and unspecified	106	0	93		2	4	-	3	2	1	10	6	13	9	5	13	19	4	9	6	3.6	8.5	0.66	**5.7**	O&U
All sites	1282	3	84		25	27	21	36	40	74	62	111	102	96	105	125	132	114	100	109	44.1		7.56	**66.9**	C00-96
All sites except C44	1240	3	84		25	27	21	35	39	73	60	103	99	93	100	125	127	109	97	104	42.7	100.0	7.31	**64.7**	C00-96 exc. C44
Average annual population					111993	113342	121296	170453	205233	199958	140316	109207	73165	56765	43305	31419	26575	19851	14119	15665	1452662				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Ethiopia, Addis Ababa (2012–2013)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	27	0	96		-	-	-	-	-	-	1	8	5	1	1	2	3	1	2	3	0.8	1.1	0.14	**1.4**	C00-06
Salivary gland	8	0	100		-	-	-	1	-	-	1	2	1	-	-	2	1	-	-	-	0.3	0.3	0.04	**0.4**	C07-08
Nasopharynx	16	0	88		-	-	-	2	1	1	3	-	2	1	-	3	-	3	-	-	0.5	0.6	0.09	**0.7**	C11
Other pharynx	3	0	67		-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1	0.1	0.1	0.01	**0.2**	C09-10, C12-14
Oesophagus	61	0	75		-	-	-	-	2	-	1	1	5	2	7	10	12	7	8	6	1.9	2.4	0.49	**3.8**	C15
Stomach	38	1	79		-	-	-	-	-	2	1	5	1	4	5	2	6	6	3	2	1.2	1.5	0.28	**2.2**	C16
Colon	92	0	70		-	-	-	1	-	7	9	10	5	13	10	11	7	13	3	3	2.9	3.6	0.56	**4.8**	C18
Rectum	46	0	83		-	-	-	-	1	6	1	4	8	4	7	5	3	3	3	1	1.4	1.8	0.27	**2.3**	C19-20
Anus	8	0	100		-	-	-	-	-	2	-	3	1	-	-	-	1	-	-	1	0.3	0.3	0.02	**0.3**	C21
Liver	47	0	43		-	-	-	-	-	4	1	5	5	4	1	13	7	3	4	-	1.5	1.8	0.34	**2.7**	C22
Gallbladder etc.	26	0	81		-	-	-	-	-	1	-	3	2	3	4	3	5	1	1	3	0.8	1.0	0.15	**1.5**	C23-24
Pancreas	18	0	61		-	-	-	-	-	2	-	2	2	-	3	3	-	2	1	3	0.6	0.7	0.10	**0.9**	C25
Larynx	1	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.0	0.0	0.00	**0.1**	C32
Trachea, bronchus, and lung	43	0	70		-	-	-	1	-	1	1	2	3	5	8	7	5	3	5	2	1.3	1.7	0.31	**2.5**	C33-34
Bone	32	0	88		-	1	-	4	6	2	-	3	2	2	3	3	2	2	1	1	1.0	1.3	0.14	**1.3**	C40-41
Melanoma of skin	2	0	100		-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	0.1	0.1	0.01	**0.1**	C43
Non-melanoma skin	81	0	98		-	-	1	1	1	6	10	7	9	6	11	5	10	7	3	4	2.5		0.45	**4.1**	C44
Mesothelioma	2	0	100		-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	0.1	0.1	0.01	**0.1**	C45
Kaposi sarcoma	9	0	67		-	-	-	-	2	1	1	2	2	1	-	-	-	-	-	-	0.3	0.4	0.02	**0.3**	C46
Connective and soft tissue	53	0	89		4	1	1	2	2	10	3	7	5	1	4	2	4	-	4	3	1.7	2.1	0.22	**2.2**	C47, C49
Breast	849	1	92		-	-	1	-	7	61	116	136	126	82	110	69	58	27	17	38	26.6	33.4	3.90	**39.1**	C50
Vulva	28	0	100		-	-	-	-	-	2	3	6	2	1	3	2	2	4	1	2	0.9	1.1	0.16	**1.4**	C51
Vagina	13	0	100		1	-	-	-	-	1	1	2	1	1	3	-	-	3	-	-	0.4	0.5	0.08	**0.7**	C52
Cervix uteri	340	0	94		-	-	-	-	3	10	21	38	36	35	74	34	33	24	22	10	10.7	13.4	2.13	**18.2**	C53
Uterus	56	0	88		-	-	-	-	3	4	8	4	6	1	6	6	6	2	5	5	1.8	2.2	0.31	**2.7**	C54-55
Ovary	166	0	69		-	-	2	2	7	9	23	15	16	21	13	13	15	10	9	11	5.2	6.5	0.87	**8.0**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	35	0	71		6	-	2	1	-	1	2	3	3	1	8	2	4	1	1	-	1.1	1.4	0.18	**1.8**	C64-65
Bladder	23	0	74		-	-	-	-	-	-	1	-	1	-	1	3	5	2	6	4	0.7	0.9	0.21	**1.5**	C67
Ureter and other urinary	2	0	100		-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	0.1	0.1	0.01	**0.1**	C66, C68
Eye	20	0	90		4	1	-	-	3	1	1	3	1	2	-	-	1	1	1	1	0.6	0.8	0.08	**0.9**	C69
Brain and nervous system	20	0	30		-	1	1	1	1	5	-	3	-	2	1	1	1	1	2	-	0.6	0.8	0.10	**0.8**	C70-72
Thyroid	92	0	91		-	-	-	4	10	10	11	5	6	8	10	6	12	6	1	3	2.9	3.6	0.44	**4.1**	C73
Hodgkin lymphoma	20	0	100		-	4	3	2	3	3	-	2	1	-	1	-	1	-	-	-	0.6	0.8	0.05	**0.6**	C81
Non-Hodgkin lymphoma	80	0	92		1	1	1	3	4	6	5	13	12	8	9	6	3	5	2	1	2.5	3.1	0.37	**3.6**	C82-85, C96
Multiple myeloma	6	0	50		-	-	-	-	-	-	-	-	2	-	1	1	1	-	1	-	0.2	0.2	0.05	**0.4**	C90
Lymphoid leukaemia	53	0	98		4	1	6	2	3	5	-	-	1	5	5	2	6	3	5	5	1.7	2.1	0.28	**2.6**	C91
Myeloid leukaemia	72	0	94		1	-	3	4	8	9	6	9	2	3	4	6	5	4	4	4	2.3	2.8	0.32	**3.0**	C92-94
Leukaemia, unspecified	1	0	100		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C95
Other and unspecified	133	0	88		2	1	3	1	5	8	15	13	14	8	10	10	15	14	6	8	4.2	5.2	0.75	**6.7**	O&U
All sites	2622	2	87		23	11	24	32	72	181	246	316	290	227	324	234	236	158	121	125	82.1		13.95	**127.8**	C00-96
All sites except C44	2541	2	86		23	11	23	31	71	175	236	309	281	221	313	229	226	151	118	121	79.6	100.0	13.50	**123.8**	C00-96 exc. C44
Average annual population					108319	120318	157120	258777	245545	213119	118828	101170	60378	56976	46446	30028	26227	18819	15355	18543	1595968				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

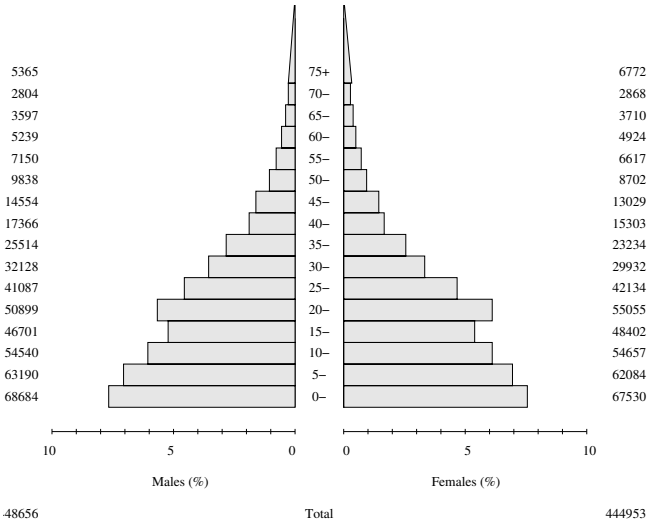
Kenya, Eldoret

The Eldoret Cancer Registry (ECR) was established in 1999. It is located within the Department of Haematology and Blood Transfusion of the Moi University School of Medicine. The registry has largely relied on donor support since it was founded in 1999. The main contributors have been IARC and Brown University in the USA. The Moi University School of Medicine supports the registry by providing a work space and general office supplies. The Haemato-Oncology Department of the Moi Teaching and Referral Hospital (MTRH) provides salaries for one full-time and one part-time registrar and has equipped the registry with a computer and other office supplies. The African Cancer Registry Network (AFCRN) has provided financial support for staff training and research projects. The ECR is headed by a director and staffed by three trained cancer registrars (2 full-time equivalents) and three volunteers (2.1 full-time equivalents). Medical students on placement occasionally help with data collection.

The ECR covers Uasin Gishu County and its neighbouring districts in the western region of Kenya.

The population of Uasin Gishu County is estimated to have been 894 179 in 2009 (at the national census). The average annual population-at-risk estimates corresponding to the ECR data presented in this volume are shown in the population pyramid.

Kenya, Uasin Gishu County (2008–2011)
Population pyramid (average annual person-years by sex and age group)



Source: 2009 national census

The ECR collects data on all cancer cases diagnosed at, or referred to, MTRH, regardless of whether the patients reside in Uasin Gishu. MTRH is the second largest hospital in Kenya and sees patients from all of the western part of the country and beyond.

The ECR also collects data from other public and private hospitals and cancer centres, as well as from Eldoret Hospice, the registrar of births and deaths, and private physicians' clinics.

Public and private hospitals and cancer centres: The registrars collect data from various units within the collaborating hospitals. The sources in these hospitals include medical records departments, radiotherapy units, haematology and histopathology laboratories, outpatient clinics, medical wards, imaging units, and autopsy reports. In the medical records departments, disease index cards and patient-care registers are used to identify cancer cases. Each facility has its own filing system, as well as specific procedures for the diagnosis and management of cancer patients; the registrars must thoroughly understand these procedures in order to perform effective case finding. Most of the filing systems are completely paper-based, although a few are partly digital. Hospital staff members are actively involved in case finding by providing file numbers and case files.

Eldoret Hospice: Data are also captured at Eldoret Hospice. Often, these cases have already been captured from hospital sources, but the hospice provides updated information on patient status. Checks are performed to prevent duplicate registration.

Registrar of births and deaths (death certificates office) – vital statistics: The ECR has access to cancer-specific mortality data from death certificates via the civil registration office. These data are not entered as primary data but are used to update patient status. Death certificates listing cancer as the cause of death are compared against the registry database. For cases that are already registered, the status at last contact is updated and the cause of death specified. Unmatched cases are traced back to the hospital where the death occurred, and an attempt is made to trace the patient record to confirm that the individual had cancer. Cases that cannot be traced back are registered as death-certificate-only (DCO) cases.

Private physicians' clinics: The ECR liaises with private clinics to collect cases that may have been missed at the hospital level. Physicians in private practice keep most of their patients' records on site at their clinics, to facilitate follow-up. Although a corresponding patient file also exists at the hospital, the information there is often limited. To date, the ECR has not been able to take full advantage of private physicians' clinics as a data source, due to staffing limitations at the registry.

Case finding is performed as an active, systematic process. The files of patients who reside in the ECR catchment area and all hospital-based cases are identified, and those of patients with malignant tumours are retained for data abstraction. The relevant information is abstracted onto case notification forms, which are then submitted to the registry office for further checks of completeness and accuracy before being passed on for data entry.

The registry uses IARC's CanReg5 software for data management and analysis.

YEARS PRESENTED

2008–2011 (a 4-year period)

NOTES

During the 4-year period analysed, the rate of registration was relatively constant, increasing from an average of 58 cases per month in 2008 to 73 cases per month in 2011.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is higher than the values for eastern Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of about 1.25 for both sexes. The ASRs of cancers of the lung, prostate, cervix, and breast are lower than the estimates for eastern Africa. This is also the case for Kaposi sarcoma, although the ASR of this cancer within the registry's covered population (7.0 and 4.7 cases per 100 000 person-years in males and females, respectively) is relatively high by global standards. The ASRs of cancers of the oesophagus and nasopharynx, of leukaemia, and of non-Hodgkin lymphoma are also high.

DCO cases account for about 13% and 16% of the registered cases in males and females, respectively. The percentage of DCO cases (DCO%) is particularly high for cancers of the lung and cancers coded as occurring at "other and unspecified" anatomical sites. DCO cases are identified from death certificates issued for deaths occurring outside of hospital; the validity of the cause-of-death statements included on such certificates is questionable, especially when the cause of death is recorded simply as "cancer".

SUMMARY

The percentage of cases diagnosed by clinical/radiological means is slightly less than 10%, which is lower than in the Nairobi Cancer Registry data and may suggest slight underregistration. However, the overall results seem convincing.

PUBLICATIONS AND ACHIEVEMENTS

The ECR is a founding member of the AFCRN. The registry regularly hosts CanReg training courses.

Tenge CN, Kuremu RT, Buziba NG, Patel K, Were PA (2009). Burden and pattern of cancer in Western Kenya. East Afr Med J. 86(1):7–10. http://dx.doi.org/10.4314/eamj.v86i1.46921 PMID:19530542

Were EO, Buziba NG (2001). Presentation and health care seeking behaviour of patients with cervical cancer seen at Moi Teaching and Referral Hospital, Eldoret, Kenya. East Afr Med J. 78(2):55–9. http://dx.doi.org/10.4314/eamj.v78i2.9088 PMID:11682945

Kenya, Eldoret (2008–2011)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
					Age group (years)																				
Mouth	20	1	95	5	-	1	-	-	-	1	-	1	1	4	1	2	3	-	2	3	1.1	1.4	0.27	**2.4**	C00-06
Salivary gland	3	0	100	0	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	0.2	0.2	0.03	**0.4**	C07-08
Nasopharynx	62	2	90	6	1	1	2	11	5	3	2	7	7	2	6	4	4	1	-	4	3.5	4.4	0.46	**5.2**	C11
Other pharynx	13	0	85	15	-	-	-	-	1	-	1	-	-	2	1	-	4	2	1	1	0.7	0.9	0.25	**1.9**	C09-10, C12-14
Oesophagus	223	3	81	9	1	-	-	2	1	5	7	15	11	18	27	33	29	16	21	34	12.4	15.8	3.51	**28.7**	C15
Stomach	74	0	88	5	-	-	-	1	3	-	1	1	2	1	7	6	8	11	7	26	4.1	5.2	1.12	**9.8**	C16
Colon	31	0	74	6	-	-	-	1	-	-	5	1	1	1	4	5	5	2	3	3	1.7	2.2	0.50	**3.9**	C18
Rectum	21	0	86	0	-	-	-	-	-	1	2	-	4	3	1	1	2	2	3	2	1.2	1.5	0.35	**2.6**	C19-20
Anus	3	0	100	0	-	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-	0.2	0.2	0.01	**0.2**	C21
Liver	52	0	67	21	1	-	-	1	4	2	5	4	3	4	4	6	5	4	5	4	2.9	3.7	0.75	**5.9**	C22
Gallbladder etc.	2	0	50	0	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	0.1	0.1	0.06	**0.3**	C23-24
Pancreas	17	0	65	6	-	-	-	-	-	-	-	1	1	2	1	1	3	3	4	1	0.9	1.2	0.41	**2.6**	C25
Larynx	13	0	92	0	-	-	-	-	-	-	-	-	-	1	1	3	2	2	3	1	0.7	0.9	0.32	**2.1**	C32
Trachea, bronchus, and lung	21	0	48	43	-	-	-	-	2	1	-	1	-	3	1	3	2	-	2	6	1.2	1.5	0.24	**2.3**	C33-34
Bone	36	0	86	0	-	2	3	7	4	3	3	3	1	-	2	1	1	1	2	3	2.0	2.5	0.27	**2.7**	C40-41
Melanoma of skin	5	0	100	0	-	1	-	1	-	-	-	1	-	-	1	1	-	-	-	-	0.3	0.4	0.04	**0.4**	C43
Non-melanoma skin	25	0	100	0	-	2	-	1	-	-	2	2	3	-	3	2	-	2	1	7	1.4		0.23	**2.5**	C44
Mesothelioma	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.1	0.1	0.03	**0.2**	C45
Kaposi sarcoma	98	0	82	8	1	4	4	1	4	5	19	28	9	9	5	4	1	2	-	2	5.5	6.9	0.63	**7.0**	C46
Connective and soft tissue	36	0	92	6	2	3	5	6	4	1	3	2	-	3	2	2	-	1	2	-	2.0	2.5	0.28	**2.6**	C47, C49
Breast	13	0	85	0	-	-	-	-	-	-	-	1	1	-	3	-	2	2	1	3	0.7	0.9	0.21	**1.8**	C50
Penis	4	0	100	0	-	-	-	-	-	-	-	2	-	-	-	-	2	-	-	-	0.2	0.3	0.06	**0.5**	C60
Prostate	114	2	73	15	-	-	-	1	1	-	1	-	-	2	3	3	11	15	25	50	6.4	8.1	2.05	**15.8**	C61
Testis	4	0	100	0	-	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	0.2	0.3	0.06	**0.6**	C62
Kidney and renal pelvis	16	1	94	0	3	8	-	1	-	-	-	-	-	-	-	-	-	2	-	1	0.9	1.1	0.10	**1.1**	C64-65
Bladder	16	0	100	0	1	-	-	-	-	-	2	-	3	3	2	-	2	-	2	1	0.9	1.1	0.22	**1.8**	C67
Ureter and other urinary	1	0	100	0	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.0**	C66, C68
Eye	35	1	91	3	10	2	1	-	-	3	2	5	4	2	2	2	1	-	-	-	2.0	2.5	0.20	**2.4**	C69
Brain and nervous system	28	2	82	7	2	1	1	1	2	2	-	2	1	2	3	3	2	1	2	1	1.6	2.0	0.34	**2.8**	C70-72
Thyroid	8	0	75	12	-	-	-	-	-	-	1	-	-	1	1	1	1	-	1	2	0.4	0.6	0.11	**1.0**	C73
Hodgkin lymphoma	27	2	96	4	-	1	5	1	8	2	-	2	1	2	-	-	1	-	1	1	1.5	1.9	0.16	**1.7**	C81
Non-Hodgkin lymphoma	100	0	86	4	14	17	10	7	4	4	2	4	6	8	8	4	5	2	3	2	5.6	7.1	0.76	**7.7**	C82-85, C96
Multiple myeloma	20	0	75	25	1	1	-	-	-	-	-	-	2	1	4	2	1	-	4	4	1.1	1.4	0.31	**2.4**	C90
Lymphoid leukaemia	46	0	93	7	8	7	6	2	3	2	2	1	1	-	3	1	2	-	4	4	2.6	3.3	0.36	**3.4**	C91
Myeloid leukaemia	38	0	92	5	1	1	1	2	3	6	9	2	1	2	2	3	-	1	1	3	2.1	2.7	0.26	**2.8**	C92-94
Leukaemia, unspecified	4	0	50	50	1	1	-	-	-	1	-	-	-	1	-	-	-	-	-	-	0.2	0.3	0.02	**0.2**	C95
Other and unspecified	207	2	33	63	6	2	3	6	6	1	6	6	11	11	14	9	22	23	21	58	11.5	14.7	2.91	**25.2**	O&U
All sites	1437	16	76	16	53	55	41	54	55	44	76	92	75	89	114	105	122	96	122	228	80.1		17.93	**154.9**	C00-96
All sites except C44	1412	16	76	16	53	53	41	53	55	44	74	90	72	89	111	103	122	94	121	221	78.7	100.0	17.70	**152.4**	C00-96 exc. C44
Average annual population					68684	63190	54540	46701	50899	41087	32128	25514	17366	14554	9838	7150	5239	3597	2804	5365	448656				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Kenya, Eldoret (2008–2011)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	14	0	86	14	-	-	-	-	1	-	-	-	-	1	1	1	3	1	3	3	0.8	1.0	0.29	**2.0**	C00-06
Salivary gland	2	0	0	0	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C07-08
Nasopharynx	28	0	96	0	-	-	1	4	7	1	1	4	1	4	-	-	1	3	-	1	1.6	1.9	0.23	**2.3**	C11
Other pharynx	4	0	100	0	-	-	-	-	-	-	-	-	1	1	-	-	1	-	1	-	0.2	0.3	0.09	**0.6**	C09-10, C12-14
Oesophagus	123	3	87	7	-	-	-	1	1	3	4	5	11	6	11	12	15	18	16	17	6.9	8.4	2.33	**17.1**	C15
Stomach	59	0	80	7	-	-	-	-	-	-	4	2	1	4	8	6	4	10	6	14	3.3	4.1	1.00	**7.9**	C16
Colon	23	0	78	17	-	-	-	-	2	1	-	-	3	2	3	2	2	1	2	5	1.3	1.6	0.30	**2.7**	C18
Rectum	12	0	75	8	-	-	-	-	-	-	4	-	2	1	-	2	1	1	-	1	0.7	0.8	0.14	**1.3**	C19-20
Anus	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C21
Liver	32	1	78	6	-	-	-	-	1	-	-	3	4	2	2	4	4	1	4	6	1.8	2.2	0.50	**4.0**	C22
Gallbladder etc.	8	0	50	12	-	-	-	-	-	-	1	1	1	-	-	2	-	2	-	1	0.4	0.5	0.12	**1.0**	C23-24
Pancreas	21	2	29	33	-	-	-	-	-	-	1	-	3	3	1	1	3	3	-	4	1.2	1.4	0.30	**2.8**	C25
Larynx	4	1	100	0	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	-	0.2	0.3	0.09	**0.7**	C32
Trachea, bronchus, and lung	6	0	33	67	-	-	-	-	-	-	-	-	1	-	1	1	2	-	1	-	0.3	0.4	0.14	**1.0**	C33-34
Bone	22	0	82	0	-	-	4	7	3	-	1	-	3	-	2	1	-	1	-	-	1.2	1.5	0.14	**1.6**	C40-41
Melanoma of skin	16	0	100	0	-	-	-	-	-	-	-	-	1	-	2	3	2	1	3	4	0.9	1.1	0.31	**2.3**	C43
Non-melanoma skin	30	0	100	0	1	-	1	1	-	1	1	4	2	5	2	2	4	-	4	2	1.7		0.44	**3.5**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	65	0	71	8	-	1	1	2	6	9	12	15	8	5	2	2	1	-	1	-	3.7	4.5	0.43	**4.7**	C46
Connective and soft tissue	34	1	91	3	7	1	2	3	1	2	4	1	5	2	2	1	1	1	-	-	1.9	2.3	0.23	**2.6**	C47, C49
Breast	187	11	87	5	-	-	1	1	4	6	14	20	15	33	26	13	18	8	5	12	10.5	12.8	2.34	**21.8**	C50
Vulva	4	0	100	0	-	-	-	-	-	-	2	1	-	-	-	-	1	-	-	-	0.2	0.3	0.04	**0.4**	C51
Vagina	4	0	100	0	-	-	-	-	-	-	-	2	1	-	-	-	1	-	-	-	0.2	0.3	0.04	**0.4**	C52
Cervix uteri	237	8	84	3	-	-	-	2	3	7	21	27	35	36	27	21	15	11	9	15	13.3	16.3	2.92	**26.8**	C53
Uterus	36	0	86	6	-	-	-	-	-	3	1	1	2	3	-	6	4	8	3	5	2.0	2.5	0.68	**5.0**	C54-55
Ovary	41	2	73	10	-	-	-	3	-	2	5	7	5	4	3	4	-	1	1	4	2.3	2.8	0.37	**3.8**	C56
Placenta	4	0	0	25	-	-	-	-	1	1	-	-	2	-	-	-	-	-	-	-	0.2	0.3	0.02	**0.3**	C58
Kidney and renal pelvis	13	0	92	0	2	4	1	1	-	-	-	-	-	3	-	-	1	-	-	1	0.7	0.9	0.07	**1.0**	C64-65
Bladder	11	1	91	0	-	-	-	-	-	-	1	-	1	1	1	2	-	-	3	1	0.6	0.8	0.23	**1.4**	C67
Ureter and other urinary	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.1	0.1	0.03	**0.2**	C66, C68
Eye	35	1	100	0	13	-	-	-	1	2	6	4	2	2	2	-	-	1	-	1	2.0	2.4	0.18	**2.3**	C69
Brain and nervous system	18	0	72	17	2	5	2	1	-	1	-	-	-	1	-	2	-	2	2	-	1.0	1.2	0.23	**1.6**	C70-72
Thyroid	19	1	95	0	-	-	-	2	-	1	3	1	4	2	-	3	-	1	1	-	1.1	1.3	0.22	**1.9**	C73
Hodgkin lymphoma	11	0	82	0	-	-	4	1	-	-	1	-	1	1	2	-	1	-	-	-	0.6	0.8	0.09	**1.0**	C81
Non-Hodgkin lymphoma	68	1	88	3	4	4	8	1	10	7	6	5	5	3	4	3	3	1	2	1	3.8	4.7	0.52	**5.2**	C82-85, C96
Multiple myeloma	16	1	100	0	-	-	-	-	-	-	1	1	-	3	4	1	2	1	1	1	0.9	1.1	0.26	**2.2**	C90
Lymphoid leukaemia	24	0	100	0	1	2	2	2	3	-	1	3	-	2	2	3	-	2	1	-	1.3	1.6	0.26	**2.2**	C91
Myeloid leukaemia	37	0	97	0	1	3	3	2	4	2	4	6	2	1	3	1	1	1	3	-	2.1	2.5	0.36	**3.0**	C92-94
Leukaemia, unspecified	7	0	57	43	1	-	3	1	-	-	1	-	-	-	-	-	-	-	-	1	0.4	0.5	0.02	**0.3**	C95
Other and unspecified	210	5	39	58	4	3	4	4	6	5	13	19	14	10	15	19	18	19	17	35	11.8	14.4	2.91	**24.2**	O&U
All sites	1486	39	78	13	36	23	37	40	54	54	114	132	136	141	127	119	110	100	89	135	83.5		18.84	**162.8**	C00-96
All sites except C44	1456	39	77	13	35	23	36	39	54	53	113	128	134	136	125	117	106	100	85	133	81.8	100.0	18.40	**159.3**	C00-96 exc. C44
Average annual population					67530	62084	54657	48402	55055	42134	29932	23234	15303	13029	8702	6617	4924	3710	2868	6772	444953				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Kenya, Nairobi

The Nairobi Cancer Registry (NCR) was established in 2001 after consultations between the Office of International Affairs of the United States National Cancer Institute (NCI), IARC, the Kenyan Ministry of Health (MOH), and the Kenya Medical Research Institute (KEMRI). The registry is located within the Centre for Clinical Research (CCR) at the KEMRI headquarters in Nairobi.

Since the NCR's inception, data collection has included all cases, irrespective of place of residence, diagnosed in the hospitals within the registration area. The volume of data to be processed is high, and the associated workload is heavy.

In 2009, recognizing the problems of recording large numbers of cases with a limited staff, a grant was received from the International Network for Cancer Treatment and Research to support case finding for Nairobi residents only. There is currently provision for one full-time staff member and three full-time contractual registrars supported by the institute. There are six data collectors undertaking case finding and abstraction in six major hospitals and more than 10 smaller facilities. Two of the three full-time contractual staff undertake data entry, checks for consistency and accuracy, analysis, and report generation. Funding is sourced from partners and collaborators to support staffing needs of the registry.

The NCR data presented in this volume are for the registry's catchment area, which comprises the city of Nairobi, a large cosmopolitan centre located in Kenya's Central Highlands. Although the region is predominantly occupied by Bantu peoples, the city's population is diverse, with residents from most of the ethnic groups found across the country. Nairobi has eight main administrative divisions: Central, Dagoretti, Embakasi, Kasarani, Kibera, Makadara, Pumwani, and Westlands.

The population of Nairobi County is estimated to have been 3 138 369 in 2009 (at the national census). The average annual population-at-risk estimates corresponding to the NCR data presented in this volume are shown in the population pyramid.

The NCR collects data from public and private hospitals, as well as from medical laboratories, radiotherapy treatment centres, Nairobi Hospice, and the registrar of births and deaths.

Public and private hospitals: The registrars collect data from medical records departments. They use disease index cards and patient-care registers to identify cancer cases in both inpatient and outpatient facilities. A few hospitals have established digital disease indices, which can also be used to identify cancer cases.

Medical laboratories: Most of the public and private hospitals have various specialty laboratories, including histology, haematology, and cytology laboratories. NCR staff members regularly visit the laboratories that are probable sources of cancer incidence data.

Radiotherapy treatment centres: NCR registrars regularly visit the radiotherapy units at Kenyatta National Hospital (KNH) and the Nairobi Hospital to carry out active case abstraction.

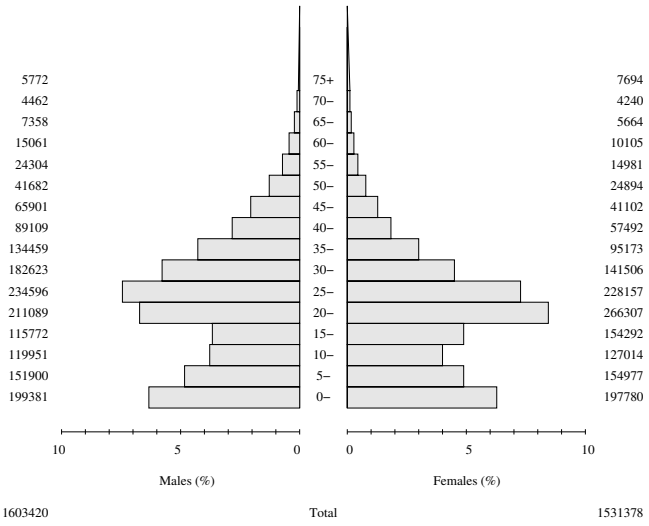
Nairobi Hospice: The hospice submits data to NCR; most patients have been referred to the hospice from KNH or other health care facilities within or outside of Nairobi. The hospice provides updated information on patient status, which is important for follow-up and case assessment.

Registrar of births and deaths (death certificates office) – vital statistics: The NCR established a link with the vital statistics system in 2006, to access cancer-specific mortality data from the registrar of births and deaths office. Trace-back of cancer deaths to obtain the corresponding hospital records has shown that the quality of diagnostic information on cancer cases is poor. Deaths due to cancer that occurred during the 3-year period of 2009–2011, and that could not be matched with the registry database or traced back to hospital records, were registered as death-certificate-only cases in the NCR database if the patient had a confirmed Nairobi address.

Private stand-alone pathology laboratories were not used as primary sources, because the demographic information on cancer cases that is available from such laboratories is limited.

For case finding, the NCR initially attempted to enlist the help of employees of medical records services, including at hospitals, oncology clinics, laboratories, death registers, and clinical services. Unfortunately, this strategy proved ineffective, because the employees were too busy with their primary duties to give the necessary attention to cancer registry activities. The registry therefore recruited its own staff, with the basic qualification of a diploma in health information management or any health-related

Kenya, Nairobi (2007–2011)
Population pyramid (average annual person-years by sex and age group)



Source: 2009 national census

field. The staff members were trained at KEMRI and then deployed to various hospitals to perform case finding, abstraction, and coding. The registrars work full-time on site from Monday to Thursday; on Friday they submit the week's identified cases to the registry supervisor and a meeting is held to consider each case and take note of any issues or difficulties faced. After physical checks are carried out, the data are entered into the registry database.

The registry uses IARC's CanReg5 software for data management and analysis.

YEARS PRESENTED

2007–2011 (a 5-year period)

NOTES

The registry was founded in 2001 and has published results for 2000–2002 and 2004–2008. The results presented here are for a slightly more recent period (2007–2011). The rate of registration during the period analysed was relatively constant, at 156–163 cases per month.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is higher than the values for eastern Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of 1.31 for males and 1.41 for females. The ASRs recorded for 2007–2011 are very similar to those recorded for 2004–2008 (Korir et al., 2015), with a small increase in the ASR of breast cancer in females (from 51.7 to 59.7 cases per 100 000 person-years) and a decrease for cancer of the cervix (from 46.1 to 43.3 cases per 100 000 person-years).

Compared with the Eldoret Cancer Registry, whose data are also presented in this volume, the ASR of leukaemia is fairly low, and the ASRs of nasopharyngeal cancer are relatively high in both populations. Also of note are the relatively high rates of cancers of the oral cavity and pharynx, colorectum, and breast. The ASR of breast cancer in females, at 59.7 cases per 100 000 person-years, is the highest recorded in sub-Saharan Africa.

The percentage of cases with a non-morphological diagnosis is about 21%, with 6.3% of cases registered as death-certificate-only (DCO) cases.

SUMMARY

The results appear to be an accurate reflection of the true cancer profile in this population.

PUBLICATIONS AND ACHIEVEMENTS

The NCR is a founding member of the African Cancer Registry Network (AFCRN). It hosted the 2013 First AFCRN Annual Review Meeting.

Cheng ML, Zhang L, Borok M, Chokunonga E, Dzamamala C, Korir A, et al. (2015). The incidence of oesophageal cancer in Eastern Africa: identification of a new geographic hot spot? Cancer Epidemiol. 39(2):143–9. http://dx.doi.org/10.1016/j.canep.2015.01.001 PMID:25662402

Gathere S, Mutuma G, Korir A, Musibi A (2011). Head and neck cancers four year trend at the Nairobi Cancer Registry. Afr J Health Sci. 19:30–5.

Korir A, Mauti N, Moats P, Gurka MJ, Mutuma G, Metheny C, et al. (2014). Developing clinical strength-of-evidence approach to define HIV-associated malignancies for cancer registration in Kenya. PLoS One. 9(1):e85881. http://dx.doi.org/10.1371/journal.pone.0085881 PMID:24465764

Korir A, Okerosi N, Ronoh V, Mutuma G, Parkin M (2015). Incidence of cancer in Nairobi, Kenya (2004-2008). Int J Cancer. 137(9):2053–9. http://dx.doi.org/10.1002/ijc.29674 PMID:26139540

Nairobi Cancer Registry (2006). Cancer Incidence Report Nairobi 2000–2002. Nairobi: Nairobi Cancer Registry and Kenya Medical Research Institute. Available from: https://www.healthresearchweb.org/files/CancerIncidenceReportKEMRI.pdf.

Kenya, Nairobi (2007–2011)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
					Age group (years)																				
Mouth	212	0	89	0	-	9	4	6	6	2	12	11	15	22	29	27	26	15	12	16	2.6	5.2	0.91	**7.5**	C00-06
Salivary gland	25	0	80	4	-	-	1	-	1	-	1	3	2	5	2	-	2	2	4	2	0.3	0.6	0.15	**1.0**	C07-08
Nasopharynx	203	0	91	1	-	-	13	17	24	16	9	21	21	32	16	11	11	9	2	1	2.5	5.0	0.46	**4.2**	C11
Other pharynx	53	0	57	26	-	-	-	2	1	-	3	5	3	5	6	3	11	4	3	7	0.7	1.3	0.24	**2.1**	C09-10, C12-14
Oesophagus	319	0	77	7	-	-	-	3	2	5	13	22	30	18	44	34	31	39	28	50	4.0	7.9	1.70	**14.1**	C15
Stomach	225	0	71	12	1	1	1	2	1	6	8	6	27	28	30	24	23	28	19	20	2.8	5.6	1.22	**9.2**	C16
Colon	223	0	68	9	-	1	1	1	4	7	16	12	18	33	18	31	26	20	13	22	2.8	5.5	1.00	**8.3**	C18
Rectum	136	0	79	1	-	-	1	1	1	6	4	19	8	15	16	12	20	12	11	10	1.7	3.4	0.68	**5.2**	C19-20
Anus	7	0	100	0	-	-	-	-	-	-	-	-	1	1	-	-	2	1	-	2	0.1	0.2	0.03	**0.4**	C21
Liver	196	0	72	17	1	-	3	6	1	4	16	15	15	25	18	22	23	13	16	18	2.4	4.8	0.91	**7.2**	C22
Gallbladder etc.	35	0	77	9	-	-	-	-	-	-	1	2	1	-	6	2	5	6	7	5	0.4	0.9	0.30	**2.0**	C23-24
Pancreas	85	0	55	9	-	-	1	-	-	-	3	3	3	9	7	15	12	7	8	17	1.1	2.1	0.45	**4.0**	C25
Larynx	81	0	83	1	-	-	-	-	-	-	-	3	4	10	8	14	11	10	8	13	1.0	2.0	0.49	**3.9**	C32
Trachea, bronchus, and lung	116	0	72	9	-	-	-	-	1	3	2	3	6	14	11	16	17	16	12	15	1.4	2.9	0.72	**5.5**	C33-34
Bone	123	0	73	2	2	5	12	22	16	11	5	6	5	7	8	5	10	4	3	2	1.5	3.0	0.30	**2.7**	C40-41
Melanoma of skin	18	0	94	6	-	-	-	-	1	-	-	1	1	3	3	1	-	4	2	2	0.2	0.4	0.12	**0.8**	C43
Non-melanoma skin	112	0	90	4	1	2	1	3	5	6	11	11	10	9	14	8	10	6	8	7	1.4		0.44	**3.5**	C44
Mesothelioma	1	0	100	0	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	175	0	85	15	1	5	5	2	2	15	27	31	31	24	9	7	4	4	2	6	2.2	4.3	0.30	**3.2**	C46
Connective and soft tissue	83	0	82	5	6	10	6	5	11	8	5	5	5	5	3	3	6	1	3	1	1.0	2.0	0.19	**1.7**	C47, C49
Breast	72	0	74	8	-	1	-	2	-	-	4	2	8	12	6	5	15	5	5	7	0.9	1.8	0.35	**2.9**	C50
Penis	11	0	91	0	-	1	-	-	-	1	-	1	2	2	-	-	1	-	-	3	0.1	0.3	0.01	**0.4**	C60
Prostate	683	0	75	6	-	-	-	-	1	-	4	1	5	15	44	66	101	111	133	202	8.5	16.8	5.57	**43.9**	C61
Testis	10	0	80	0	1	1	-	1	-	3	1	1	-	-	1	-	-	-	-	1	0.1	0.2	0.01	**0.2**	C62
Kidney and renal pelvis	43	0	84	7	8	2	-	-	3	-	2	2	3	5	2	6	1	-	7	2	0.5	1.1	0.21	**1.4**	C64-65
Bladder	70	0	79	9	1	-	1	-	-	-	-	-	3	5	4	11	9	7	17	12	0.9	1.7	0.60	**4.0**	C67
Ureter and other urinary	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	136	0	90	1	28	7	3	3	7	7	10	7	23	14	6	4	4	4	4	5	1.7	3.4	0.29	**2.8**	C69
Brain and nervous system	94	0	66	7	7	3	5	7	3	5	8	3	5	6	8	5	8	9	4	8	1.2	2.3	0.35	**3.0**	C70-72
Thyroid	20	0	85	0	-	-	-	-	1	-	4	1	3	2	1	2	1	2	2	1	0.2	0.5	0.10	**0.7**	C73
Hodgkin lymphoma	56	0	100	0	2	15	6	8	2	4	3	2	6	2	2	1	-	-	1	2	0.7	1.4	0.07	**0.9**	C81
Non-Hodgkin lymphoma	208	0	94	4	7	14	14	13	5	10	16	18	20	21	20	9	16	10	8	7	2.6	5.1	0.63	**5.3**	C82-85, C96
Multiple myeloma	54	0	93	7	-	-	-	1	-	-	1	4	3	9	10	5	10	4	4	3	0.7	1.3	0.28	**2.1**	C90
Lymphoid leukaemia	65	0	100	0	12	17	11	2	-	1	1	2	3	2	2	1	8	2	1	-	0.8	1.6	0.15	**1.4**	C91
Myeloid leukaemia	43	0	98	2	3	5	4	2	3	2	3	2	4	5	3	-	2	1	2	2	0.5	1.1	0.11	**1.0**	C92-94
Leukaemia, unspecified	29	0	69	31	1	1	4	1	3	2	2	-	1	3	3	1	3	-	1	3	0.4	0.7	0.07	**0.8**	C95
Other and unspecified	144	0	56	17	4	5	7	3	7	1	4	12	10	6	14	23	11	10	12	15	1.8	3.6	0.66	**5.3**	O&U
All sites	4166	0	78	7	86	105	104	113	112	125	199	237	305	374	375	374	440	366	362	489	52.0		20.05	**162.6**	C00-96
All sites except C44	4054	0	78	7	85	103	103	110	107	119	188	226	295	365	361	366	430	360	354	482	50.6	100.0	19.60	**159.2**	C00-96 exc. C44
Average annual population					199381	151900	119951	115772	211089	234596	182623	134459	89109	65901	41682	24304	15061	7358	4462	5772	1603420				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Kenya, Nairobi (2007–2011)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	125	0	92	2	-	2	2	2	3	7	5	9	7	12	13	11	14	8	17	13	1.6	2.3	0.87	**6.1**	C00-06
Salivary gland	26	0	96	0	-	-	-	2	1	5	1	2	2	2	3	2	2	3	-	1	0.3	0.5	0.11	**1.0**	C07-08
Nasopharynx	62	0	85	3	-	-	3	6	6	6	6	2	2	8	6	5	2	2	3	5	0.8	1.1	0.22	**2.0**	C11
Other pharynx	41	0	63	27	-	-	-	-	1	1	3	4	5	4	10	5	1	2	3	2	0.5	0.7	0.22	**1.7**	C09-10, C12-14
Oesophagus	250	0	73	6	-	-	-	-	6	6	6	6	15	33	29	31	19	33	30	36	3.3	4.5	1.92	**14.0**	C15
Stomach	174	0	69	13	-	-	-	-	3	3	4	11	8	18	16	22	20	20	18	31	2.3	3.1	1.26	**9.7**	C16
Colon	158	0	77	7	-	-	-	-	4	8	14	8	19	14	23	22	16	6	7	17	2.1	2.9	0.76	**6.7**	C18
Rectum	96	0	82	5	1	-	1	-	1	5	5	4	13	10	9	15	12	7	7	6	1.3	1.7	0.60	**4.5**	C19-20
Anus	22	0	91	0	-	-	-	-	1	-	2	3	2	3	5	1	1	2	1	1	0.3	0.4	0.11	**0.9**	C21
Liver	106	0	64	20	-	-	-	-	1	4	6	10	10	9	16	9	10	9	8	14	1.4	1.9	0.63	**5.0**	C22
Gallbladder etc.	36	0	78	3	-	-	-	-	-	1	2	-	1	6	1	8	2	6	4	5	0.5	0.6	0.30	**2.1**	C23-24
Pancreas	78	0	47	6	-	-	-	-	2	2	2	3	7	9	13	9	10	10	5	6	1.0	1.4	0.55	**4.1**	C25
Larynx	25	0	80	16	-	-	-	-	-	2	-	1	1	3	5	2	3	3	2	3	0.3	0.5	0.17	**1.3**	C32
Trachea, bronchus, and lung	74	0	70	11	-	-	1	-	-	2	3	3	5	8	9	4	15	5	8	11	1.0	1.3	0.52	**4.0**	C33-34
Bone	93	0	70	3	3	1	9	20	5	8	6	14	3	1	5	4	4	4	1	5	1.2	1.7	0.23	**2.3**	C40-41
Melanoma of skin	19	0	95	5	-	-	-	-	1	1	1	1	2	-	4	2	1	4	-	2	0.2	0.3	0.12	**1.0**	C43
Non-melanoma skin	117	0	93	0	-	-	2	4	1	6	9	8	14	13	15	6	7	9	9	14	1.5		0.62	**5.0**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	102	0	81	17	-	-	2	-	9	20	17	21	16	8	3	1	1	-	3	1	1.3	1.8	0.19	**1.8**	C46
Connective and soft tissue	69	0	86	3	8	3	6	6	6	6	9	5	2	8	2	1	2	1	1	3	0.9	1.2	0.13	**1.4**	C47, C49
Breast	1529	0	82	4	-	-	-	5	27	51	132	194	191	237	185	166	125	86	62	68	20.0	27.6	7.31	**59.7**	C50
Vulva	31	0	81	3	-	-	-	-	2	2	2	1	8	3	1	5	2	2	1	2	0.4	0.6	0.14	**1.2**	C51
Vagina	13	0	62	15	-	-	-	-	-	1	1	3	1	-	1	2	-	2	-	2	0.2	0.2	0.06	**0.5**	C52
Cervix uteri	1139	0	80	4	-	-	1	1	12	34	86	156	187	163	144	120	90	57	40	48	14.9	20.5	5.19	**43.3**	C53
Uterus	154	0	86	2	-	-	-	1	1	4	5	14	12	19	18	20	19	20	10	11	2.0	2.8	1.07	**8.0**	C54-55
Ovary	195	0	65	7	-	1	-	2	2	10	13	15	17	27	23	23	16	15	14	17	2.5	3.5	1.13	**8.8**	C56
Placenta	6	0	83	0	-	-	-	1	3	-	1	1	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.1**	C58
Kidney and renal pelvis	58	0	69	7	22	4	2	1	-	3	1	3	1	2	5	1	4	4	3	2	0.8	1.0	0.24	**1.9**	C64-65
Bladder	35	0	83	11	-	-	-	-	-	-	2	2	1	3	6	9	6	2	1	3	0.5	0.6	0.22	**1.8**	C67
Ureter and other urinary	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.0	0.0	0.01	**0.1**	C66, C68
Eye	144	0	94	1	20	2	1	2	2	12	16	26	27	11	9	7	3	-	2	4	1.9	2.6	0.29	**3.1**	C69
Brain and nervous system	110	0	71	5	4	12	9	8	3	6	6	8	9	12	11	4	6	6	3	3	1.4	2.0	0.39	**3.4**	C70-72
Thyroid	84	0	87	2	-	-	-	2	7	5	4	9	12	7	11	11	3	8	2	3	1.1	1.5	0.39	**3.2**	C73
Hodgkin lymphoma	49	0	100	0	1	4	4	6	9	4	9	1	5	4	1	-	-	-	1	-	0.6	0.9	0.07	**0.7**	C81
Non-Hodgkin lymphoma	158	0	93	3	4	4	10	4	4	14	17	22	13	15	12	13	5	3	11	7	2.1	2.9	0.61	**4.8**	C82-85, C96
Multiple myeloma	41	0	100	0	-	-	-	-	-	-	-	2	2	5	5	10	5	4	5	3	0.5	0.7	0.34	**2.4**	C90
Lymphoid leukaemia	41	0	98	2	13	7	4	-	-	2	-	-	2	3	1	3	2	2	-	2	0.5	0.7	0.11	**1.1**	C91
Myeloid leukaemia	41	0	95	5	2	2	4	2	4	5	-	5	3	2	4	2	-	3	-	3	0.5	0.7	0.11	**1.1**	C92-94
Leukaemia, unspecified	23	0	52	48	1	3	-	-	2	2	1	2	3	1	-	-	3	1	-	4	0.3	0.4	0.06	**0.8**	C95
Other and unspecified	135	0	61	16	1	1	2	6	4	5	8	11	17	13	15	9	14	8	10	11	1.8	2.4	0.72	**5.7**	O&U
All sites	5660	0	80	5	80	46	63	81	133	253	405	590	645	696	639	566	445	357	292	369	73.9		27.99	**226.3**	C00-96
All sites except C44	5543	0	80	6	80	46	61	77	132	247	396	582	631	683	624	560	438	348	283	355	72.4	100.0	27.37	**221.3**	C00-96 exc. C44
Average annual population					197780	154977	127014	154292	266307	228157	141506	95173	57492	41102	24894	14981	10105	5664	4240	7694	1531378				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

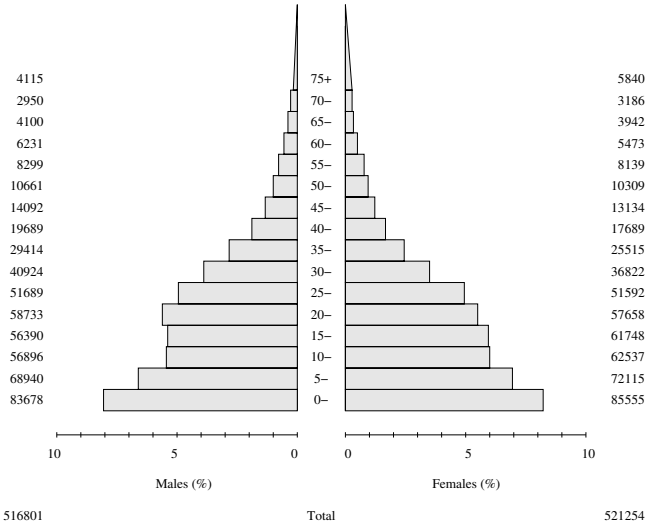
Malawi, Blantyre

The Malawi National Cancer Registry (MCR) was established in 1989. It was initially a histopathology-based registry, recording data on cancer cases diagnosed in the pathology laboratory of Queen Elizabeth Central Hospital in Blantyre, which received specimens from hospitals throughout the country. In 1993, the registry began to record cases from all hospitals and clinics serving the population of Blantyre District (urban and rural), regardless of the basis of diagnosis. The MCR is a founding member of the Malawi Cancer Consortium, and the core activities of the registry are currently funded through the programme. The registry is staffed by a pathologist (the registry director), an oncologist (the deputy director), a cancer registrar, a data manager/analyst, and four data collection clerks.

The MCR data presented in this volume are for the registry's entire covered population: the residents of Blantyre District (as defined by ≥ 6 months of residence in the area). The population of Blantyre is diverse, with residents from various ethnic groups from across the country and no one tribe predominating. There is a substantial population of immigrants from neighbouring countries (the United Republic of Tanzania, Zambia, and Mozambique), as well as small numbers of Zimbabweans, Asians (predominantly Indians), and Europeans.

Population estimates for Blantyre District for 1999–2005 were available by sex and age from the tables of national population projections for 1999–2025 produced by the National Statistical Office (NSO) of Malawi. The population of Blantyre District (which includes the city of Blantyre and some adjacent rural areas) is estimated to have been slightly more than 1 million in 2008. The average annual population-at-risk estimates corresponding to the MCR data presented in this volume are shown in the population pyramid.

Malawi, Blantyre (2009–2010)
Population pyramid (average annual person-years by sex and age group)



Estimates based on the population and housing censuses of 1998 and 2008

Registration is carried out through regular visits by the cancer registrars and data clerks to all hospitals in Blantyre District, with data recorded from hospital records departments and from clinical services where cancer cases are diagnosed or treated. Queen Elizabeth Central Hospital is by far the most important source of data for the registry. Other sources include Blantyre Adventist Hospital, Mwaiwathu Private Hospital, Chitawira Private Hospital, Mtengo Umodzi Private Hospital, Mlambe Mission Hospital, Malamulo Hospital, Welmatt Private Hospital, Malmed Private Clinic and Laboratory, MASM Medi Clinic Kanjedza (formerly Admarc Clinic), Nguludi Mission Hospital, Chiradzulu District Hospital, Malamulo Adventist Hospital, Thyolo District Hospital, and Zomba Central Hospital.

There is no comprehensive system of death registration in Malawi, so death certificates are not routinely used as a source of information.

A recent completeness/validity study conducted by a researcher from the University of Michigan estimated the completeness of registration to be 86%.

The MCR adheres to the confidentiality guidelines of the African Cancer Registry Network (AFCRN), which are adapted from the IARC/IACR guidelines (IARC, 2004a). Only registry personnel have access to electronic data (through the use of passwords). Physical access to records is limited (the office is locked), and cancer notification forms are safely disposed of (incinerated). Institutional review board approval must be granted before any data are released to researchers.

Cases are coded according to ICD-O-3. The registry uses IARC's CanReg software for case recording; this includes checks at the time of data entry for potential duplicates and for impossible or unlikely codes and combinations of codes. CanReg also provides automatic code conversion to ICD-10.

YEARS PRESENTED

2009–2010 (a 2-year period)

NOTES

During the decade from 2001 to 2010, there were large fluctuations in the monthly and annual numbers of registrations, with the highest rate of registration (an average of 113 cases per month) in 2003–2007; results for this period were published in Volume X of *Cancer Incidence in Five Continents*. The number of registrations in 2008 was somewhat low. During 2009–2010, the period analysed here, there was an average of 98 registrations per month.

The incidence rate of cancer at all sites is relatively high, although lower than the published figures for 2003–2007. This is due to the very high rates of oesophageal cancer (30.3 per 100 000 in males and 19.4 per 100 000 in females), Kaposi sarcoma (55.5 per 100 000 in males and 28.9 per 100 000 in females), and cervical cancer (89.3 per 100 000 in

females). In contrast, the rates of leukaemia (1.0 cases per 100 000 person-years in males and 0.4 cases per 100 000 person-years in females) and cancers of the nervous system are very low. The incidence of Kaposi sarcoma is 35% less than that reported for 2003–2007, whereas the incidence of cervical cancer is 17% higher.

The overall percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer) is low (34% in males and 47% in females), but this is in large part due to the high incidence of oesophageal cancer and Kaposi sarcoma, most cases of which are diagnosed clinically or radiologically. There are no death-certificate-only registrations.

SUMMARY

There is probably some degree of underregistration, as suggested by the annual fluctuation in the number of registrations, and possibly some misallocation of cases by place of residence, as suggested by rapid changes in the calculated incidence rates. However, the most striking findings within the registry data (i.e. the high rates of oesophageal cancer, Kaposi sarcoma, and cervical cancer) are unlikely to be artefactual.

PUBLICATIONS AND ACHIEVEMENTS

The MCR is a founding member of AFCRN. It hosted the first AFCRN advanced training course, in 2012.

Banda LT, Parkin DM, Dzamalala CP, Liomba NG (2001). Cancer incidence in Blantyre, Malawi 1994-1998. Trop Med Int Health. 6(4):296–304. http://dx.doi.org/10.1046/j.1365-3156.2001.00707.x PMID:11348520

Mlombe Y, Dzamalala C, Chisi J, Othieno-Abinya N (2009). Oesophageal cancer and Kaposi's sarcoma in Malawi: a comparative analysis. Malawi Med J. 21(2):66–8. http://dx.doi.org/10.4314/mmj.v21i2.44562 PMID:20345007

Mlombe Y, Othieno-Abinya N, Dzamalala C, Chisi J (2008). The need for a national cancer policy in Malawi. Malawi Med J. 20(4):124–7. http://dx.doi.org/10.4314/mmj.v20i4.10976 PMID:19537394

Msyamboza KP, Dzamalala C, Mdokwe C, Kamiza S, Lemerani M, Dzowela T, et al. (2012). Burden of cancer in Malawi; common types, incidence and trends: national population-based cancer registry. BMC Res Notes. 5:149. http://dx.doi.org/10.1186/1756-0500-5-149 PMID:22424105

Malawi, Blantyre (2009–2010)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	6	0	100		-	1	-	-	-	-	-	-	1	-	2	-	-	1	-	1	0.6	0.6	0.12	**1.3**	C00-06
Salivary gland	6	0	67		1	-	1	1	1	-	1	-	-	1	-	-	-	-	-	-	0.6	0.6	0.04	**0.6**	C07-08
Nasopharynx	4	0	75		-	-	1	-	-	-	1	-	-	2	-	-	-	-	-	-	0.4	0.4	0.05	**0.6**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	153	10	19		-	-	-	-	1	5	26	15	16	10	16	9	17	10	5	13	14.8	14.9	3.27	**30.3**	C15
Stomach	18	0	78		-	-	-	-	-	2	-	1	-	-	2	3	5	-	1	4	1.7	1.7	0.44	**4.4**	C16
Colon	14	0	64		-	-	-	-	-	1	2	1	1	-	2	1	3	2	-	1	1.4	1.4	0.36	**3.1**	C18
Rectum	8	0	50		-	-	-	-	-	1	1	-	-	2	-	-	1	1	2	-	0.8	0.8	0.32	**1.9**	C19-20
Anus	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C21
Liver	18	0	56		1	4	1	-	2	1	3	1	2	-	2	-	-	-	-	1	1.7	1.7	0.13	**2.0**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	3	0	0		-	-	-	-	-	-	1	-	-	-	-	-	-	1	1	-	0.3	0.3	0.15	**0.8**	C25
Larynx	6	1	100		-	1	-	-	-	-	-	-	-	-	-	1	-	3	-	-	0.6	0.6	0.26	**1.7**	C32
Trachea, bronchus, and lung	8	0	38		-	-	-	-	-	-	-	-	1	1	2	2	-	1	-	1	0.8	0.8	0.20	**1.9**	C33-34
Bone	20	0	55		2	1	1	2	1	3	4	3	-	-	-	-	1	1	1	-	1.9	1.9	0.28	**2.4**	C40-41
Melanoma of skin	5	0	60		-	-	-	-	1	-	-	-	-	-	1	-	2	-	-	1	0.5	0.5	0.11	**1.2**	C43
Non-melanoma skin	16	1	88		-	-	-	-	-	2	2	1	2	2	1	2	1	-	1	1	1.5		0.32	**2.9**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	453	10	12		2	3	5	9	27	74	109	82	44	27	29	10	11	7	2	2	43.8	44.0	5.08	**55.5**	C46
Connective and soft tissue	17	2	94		2	4	3	2	-	1	-	-	1	-	-	-	1	1	-	-	1.6	1.7	0.18	**2.0**	C47, C49
Breast	2	0	50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0.2	0.2	0.08	**0.6**	C50
Penis	17	1	71		-	-	-	-	-	-	2	2	3	3	2	-	1	-	3	-	1.6	1.7	0.49	**3.5**	C60
Prostate	41	1	41		-	-	-	-	1	-	2	-	2	-	1	2	6	4	13	9	4.0	4.0	1.75	**11.5**	C61
Testis	4	0	75		2	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	0.4	0.4	0.10	**0.6**	C62
Kidney and renal pelvis	8	0	88		5	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	0.8	0.8	0.03	**0.6**	C64-65
Bladder	35	2	23		-	-	-	1	-	2	-	4	5	5	4	1	2	1	5	3	3.4	3.4	0.94	**7.5**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	31	1	81		3	1	-	-	-	6	3	8	5	3	-	-	1	-	-	-	3.0	3.0	0.29	**3.6**	C69
Brain and nervous system	2	0	100		1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.01	**0.1**	C70-72
Thyroid	1	0	0		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.1**	C73
Hodgkin lymphoma	8	0	88		-	2	3	1	-	1	1	-	-	-	-	-	-	-	-	-	0.8	0.8	0.04	**0.6**	C81
Non-Hodgkin lymphoma	93	3	85		7	31	17	2	1	5	8	5	3	3	4	1	3	-	-	-	9.0	9.0	0.69	**9.3**	C82-85, C96
Multiple myeloma	1	1	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.0**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	5	1	40		1	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-	0.5	0.5	0.11	**1.0**	C95
Other and unspecified	42	2	43		2	3	1	1	-	4	6	2	6	3	3	2	2	3	-	2	4.1	4.1	0.65	**6.8**	O&U
All sites	1045	36	35		29	53	34	19	36	109	172	127	92	62	71	34	59	36	36	40	101.1		16.46	**158.1**	C00-96
All sites except C44	1029	35	34		29	53	34	19	36	107	170	126	90	60	70	32	58	36	35	39	99.6	100.0	16.14	**155.2**	C00-96 exc. C44
Average annual population					83678	68940	56896	56390	58733	51689	40924	29414	19688	14092	10660	8298	6231	4100	2950	4114	516796				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Malawi, Blantyre (2009–2010)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	3	1	100		-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	0.3	0.2	0.02	**0.3**	C00-06
Salivary gland	7	0	57		-	-	-	-	1	1	-	-	1	-	1	-	2	1	-	-	0.7	0.5	0.20	**1.7**	C07-08
Nasopharynx	1	0	0		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.1	0.1	0.05	**0.4**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	91	2	16		-	-	-	-	2	8	9	6	8	14	4	6	11	5	8	8	8.7	6.9	2.33	**19.4**	C15
Stomach	15	0	53		-	-	-	-	-	1	2	-	2	2	1	2	2	1	2	-	1.4	1.1	0.48	**3.5**	C16
Colon	10	0	60		-	-	-	-	-	-	2	2	-	1	1	-	1	1	2	-	1.0	0.8	0.34	**2.2**	C18
Rectum	7	0	57		-	-	-	-	1	-	-	1	2	1	-	1	1	-	-	-	0.7	0.5	0.14	**1.4**	C19-20
Anus	3	0	100		-	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	0.3	0.2	0.05	**0.5**	C21
Liver	18	0	44		1	2	-	1	1	1	3	2	1	1	-	1	-	-	2	2	1.7	1.4	0.28	**2.5**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	1	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C25
Larynx	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.1	0.02	**0.2**	C32
Trachea, bronchus, and lung	4	0	25		-	-	-	-	-	1	-	-	-	-	-	-	1	1	1	-	0.4	0.3	0.19	**1.1**	C33-34
Bone	24	0	46		1	1	2	6	-	3	2	1	4	1	-	-	-	1	1	1	2.3	1.8	0.29	**3.0**	C40-41
Melanoma of skin	6	0	100		-	-	-	-	-	1	2	-	-	-	1	1	-	-	1	-	0.6	0.5	0.15	**1.0**	C43
Non-melanoma skin	27	1	89		3	-	1	-	1	2	4	2	3	3	3	2	-	-	-	2	2.6		0.32	**4.0**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	223	5	13		-	2	4	4	24	47	34	37	27	11	14	4	9	1	-	-	21.4	16.9	2.55	**28.9**	C46
Connective and soft tissue	17	0	100		3	3	2	1	2	-	1	-	2	1	1	-	-	-	-	1	1.6	1.3	0.12	**1.8**	C47, C49
Breast	96	1	42		-	-	-	1	2	4	12	12	14	15	9	4	8	5	4	5	9.2	7.3	2.07	**19.0**	C50
Vulva	2	0	100		-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	0.2	0.2	0.03	**0.4**	C51
Vagina	4	0	100		-	-	-	-	-	1	-	1	-	-	1	-	-	-	1	-	0.4	0.3	0.12	**0.8**	C52
Cervix uteri	489	8	45		-	-	-	-	10	40	67	85	75	42	64	26	37	15	12	8	46.9	37.0	9.47	**89.3**	C53
Uterus	19	0	89		-	-	-	-	-	-	1	5	6	2	1	-	3	-	1	-	1.8	1.4	0.42	**3.8**	C54-55
Ovary	22	0	91		1	2	1	1	2	2	1	3	3	2	2	-	-	1	1	-	2.1	1.7	0.34	**3.2**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	13	0	92		4	6	-	-	-	-	-	-	3	-	-	-	-	-	-	-	1.2	1.0	0.07	**1.2**	C64-65
Bladder	37	3	68		-	-	-	1	1	4	3	4	7	4	3	-	2	2	2	1	3.5	2.8	0.77	**6.8**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	48	0	90		3	-	-	1	2	11	6	7	7	4	3	2	-	1	1	-	4.6	3.6	0.64	**6.6**	C69
Brain and nervous system	3	0	100		1	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.3	0.2	0.03	**0.4**	C70-72
Thyroid	8	1	88		-	-	-	-	-	-	-	-	-	1	5	-	1	-	-	-	0.8	0.6	0.21	**2.1**	C73
Hodgkin lymphoma	9	1	89		-	1	1	1	-	1	1	2	-	-	1	-	-	-	-	-	0.9	0.7	0.08	**1.0**	C81
Non-Hodgkin lymphoma	68	0	76		3	15	16	2	2	7	4	5	2	6	5	-	-	-	1	-	6.5	5.1	0.59	**7.4**	C82-85, C96
Multiple myeloma	1	0	100		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.1	0.1	0.03	**0.2**	C90
Lymphoid leukaemia	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.1	0.02	**0.2**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	3	0	0		-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	0.3	0.2	0.02	**0.2**	C95
Other and unspecified	67	2	63		3	3	5	-	2	4	7	5	8	1	11	2	3	5	5	1	6.4	5.1	1.52	**12.2**	O&U
All sites	1348	25	47		23	36	32	20	53	140	164	182	177	114	134	52	82	40	45	29	129.3		23.98	**227.0**	C00-96
All sites except C44	1321	24	47		20	36	31	20	52	138	160	180	174	111	131	50	82	40	45	27	126.7	100.0	23.66	**223.0**	C00-96 exc. C44
Average annual population					85555	72114	62536	61748	57658	51592	36822	25515	17688	13134	10309	8139	5473	3942	3186	5840	521250				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Mozambique, Beira

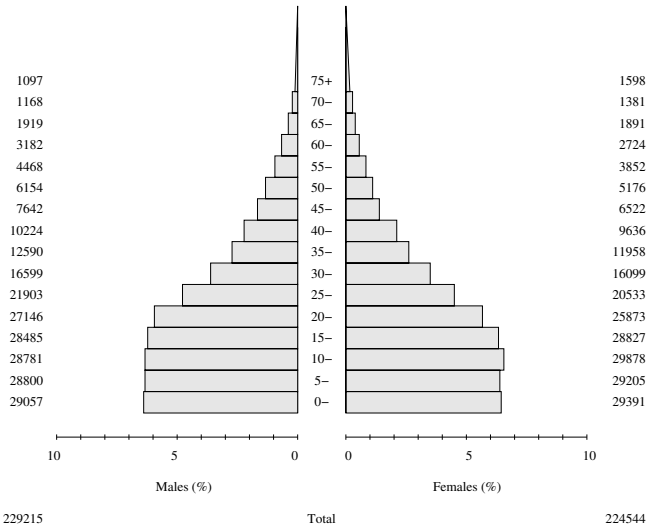
The Registro de Cancro de Beira was founded in 2005 by a pathologist based in Beira since 2003. The purpose was to record the incidence of cancer in the city and to provide information to the Ministry of Health and for research and teaching.

The registry is located in the pathology department of the Hospital Central da Beira (HCB); the pathologist directs the registry activities. There is currently only one full-time registrar. In the past, the registry has benefited from staff positions funded by the HCB. In 2008, an IARC grant provided funds for the registry salaries and operational expenses. There have also been some government contributions to cover indirect costs, office supplies, and Internet access.

The registry covers all 23 barrios of the district of Beira in the Sofala Province of Mozambique. The predominant ethnic group is the Bangwe, who originated from the Machanga, Matewe, and Podzo peoples of the Zambezi Valley. The majority of the population is Christian, with a minority of Muslim and Hindu residents.

The population of Beira is estimated to have been 443 369 in 2007 (at the most recent census) and 457 799 in 2013. The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Mozambique, Beira (2009–2013)
Population pyramid (average annual person-years by sex and age group)



Source: National Institute of Statistics of Mozambique, annual population projections for the districts of Sofala Province, 2007–2040

The HCB is the only public hospital in Beira. It is the referral hospital for the provinces of Sofala, Manica, Tete, and Zambezia. The hospital has 733 beds and offers services in a wide range of specialties, but there is no specialist oncology service. The HCB's pathology laboratory is the only one in Beira. Its three pathologists evaluate about 2500 biopsies and 2200 cytology specimens per year. The hospital has one non-permanent haematologist, although blood smears and bone marrow biopsies are not done; diagnoses of leukaemia and other haematological neoplasms are made only on a clinical basis.

The hospital's archive service is only a repository for medical records; there is no patient index. The register of patients is arranged in chronological sequence, so tracing the records of returning patients requires the patients to recall when they were last at the hospital. The HCB's statistics department compiles only the numbers of admissions and deaths, by department.

The cancer registrar makes daily visits to the HCB's various services (all clinical services, the pathology department, and the mortuary), according to case yield, and completes a registration form for each case collected.

Death registration is mandatory. The body of anyone who dies in the Beira District is brought to the mortuary at the HCB. For deaths that occur in hospital, a physician at the hospital completes the death certificate, which is submitted to the mortuary and contains all relevant details about the deceased, including the direct and underlying causes of death. For non-suspicious/non-violent deaths that occur at home, the certificate is completed by the statistical office in the mortuary; details about the cause of death are obtained from documentation provided by the family and/or by interviewing family members (a verbal autopsy). Violent deaths are investigated by autopsy, and the forensic pathologist completes the death certificate. In all cases, the original copy of the death certificate is submitted to the national vital statistics office; a copy is sent to the statistics department of the HCB, and another copy is retained by the issuing hospital department, the mortuary, or the legal medicine (forensic medicine) department.

The HCB's statistics department maintains an electronic record of all deaths that have occurred at the hospital since 2011. The department can produce some standard tables and a spreadsheet file of all variables, including patient names, but access is limited (coded). In terms of geographical information, the statistics department database records only the province of residence.

The cancer registrar visits the mortuary registry and the vital statistics office to check for death certificates that mention cancer. Although it is possible to generate a list of cancer deaths from the database in the statistics department, it is also necessary to trace the relevant certificates.

For cancer registration, the registrar uses the printed report forms on cancer cases, sorted by the pathologists. Unfortunately, the request/report forms do not include information about place of residence. The registrar must therefore collect additional biographical information, including the place and duration of residence.

At the time of analysis, the registry had no procedures in place to trace back deaths registered as being caused by cancer, or to identify any cases that may have been missed by the registration

process; therefore, there are no death-certificate-only registrations.

Cases are coded according to ICD-O-3. The data were originally recorded using simple Excel spreadsheets, one for each year. Since 2014, the registry has used IARC's CanReg5 software to perform quality control and duplication checks. Access to registry data is limited to registry staff; confidential materials are stored in locked cabinets, and electronic records are password-protected.

YEARS PRESENTED

2009–2013 (a 5-year period)

NOTES

The average rate of registration is 30–40 cases per month, but the number of registrations per month varies widely, from 3 to 100.

The age-standardized incidence rate (ASR) of cancer at all sites is low compared with the values for eastern Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of 0.25 for males and 0.35 for females, and this is despite the very high ASRs of Kaposi sarcoma, which accounts for 66% of all registered cases in males and 26% in females. Incidence rates for almost all other cancers (except for cervical cancer and lymphoma) are low. Only 2 cases of leukaemia, 3 cases of central nervous system cancer, and 8 cases of prostate cancer were registered during the period analysed.

The overall percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer) is very high: 98% in males and 97% in females – higher than the values reported by almost all centres in Europe.

SUMMARY

The calculated incidence rates are almost certainly too low due to underregistration, which is likely to be more marked for cancers not usually diagnosed by pathology.

PUBLICATIONS AND ACHIEVEMENTS

The Registro de Cancro de Beira became a member of the African Cancer Registry Network (AFCRN) in 2013.

Carreira H, Lorenzoni C, Carrilho C, Ferro J, Sultane T, Garcia C, et al. (2014). Spectrum of pediatric cancers in Mozambique: an analysis of hospital and population-based data. Pediatr Hematol Oncol. 31(6):498–508. http://dx.doi.org/10.3109/08880018.2014.909547 PMID:24852201

Carrilho C, Ferro J, Lorenzoni C, Sultane T, Silva-Matos C, Lunet N (2013). A contribution for a more accurate estimation of the incidence of Kaposi sarcoma in Mozambique. Int J Cancer. 132(4):988–9. http://dx.doi.org/10.1002/ijc.27714 PMID:22777539

Carrilho C, Gouveia P, Yokohama H, Lopes JM, Lunet N, Ferro J, et al. (2013). Human papillomaviruses in intraepithelial neoplasia and squamous cell carcinoma of the conjunctiva: a study from Mozambique. Eur J Cancer Prev. 22(6):566–8. http://dx.doi.org/10.1097/CEJ.0b013e328363005d PMID:23752127

Meireles P, Albuquerque G, Vieira M, Foia S, Ferro J, Carrilho C, et al. (2015). Kaposi sarcoma incidence in Mozambique: national and regional estimates. Eur J Cancer Prev. 24(6):529–34. http://dx.doi.org/10.1097/CEJ.0000000000000108 PMID:25494288

Mozambique, Beira (2009–2013)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	12	0	100		-	-	-	-	-	-	-	-	2	2	2	1	1	1	1	2	1.0	1.3	0.27	**2.7**	C00-06
Salivary gland	11	0	100		-	-	-	-	-	1	-	-	2	-	3	1	3	-	1	-	1.0	1.2	0.28	**2.1**	C07-08
Nasopharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C11
Other pharynx	5	0	100		-	-	-	-	-	-	1	1	-	1	-	-	2	-	-	-	0.4	0.5	0.09	**0.8**	C09-10, C12-14
Oesophagus	28	0	86		-	-	-	1	-	2	1	1	3	1	5	4	4	2	1	3	2.4	3.0	0.56	**5.5**	C15
Stomach	4	0	100		-	-	-	-	-	-	-	-	-	1	-	1	2	-	-	-	0.3	0.4	0.10	**0.8**	C16
Colon	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C18
Rectum	3	0	100		-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	0.3	0.3	0.14	**0.9**	C19-20
Anus	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C21
Liver	17	0	94		-	-	1	-	1	-	3	2	-	1	3	1	3	1	1	-	1.5	1.8	0.36	**2.8**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	1	0	0		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.1	0.1	0.03	**0.3**	C25
Larynx	4	0	100		-	-	-	-	-	1	-	-	-	-	-	1	1	-	1	-	0.3	0.4	0.14	**0.8**	C32
Trachea, bronchus, and lung	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.1	0.02	**0.2**	C33-34
Bone	3	0	100		-	-	-	1	-	1	-	-	1	-	-	-	-	-	-	-	0.3	0.3	0.02	**0.3**	C40-41
Melanoma of skin	4	0	100		-	-	-	-	1	-	-	-	-	-	-	-	3	-	-	-	0.3	0.4	0.10	**0.8**	C43
Non-melanoma skin	49	0	100		1	1	-	3	2	4	4	4	2	9	6	4	4	2	1	2	4.3		0.74	**7.5**	C44
Mesothelioma	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.1	0.02	**0.2**	C45
Kaposi sarcoma	613	0	100		9	4	11	8	50	127	125	97	51	49	35	21	12	6	1	7	53.5	66.5	5.35	**63.6**	C46
Connective and soft tissue	12	0	100		-	1	1	1	1	1	-	1	2	-	1	1	2	-	-	-	1.0	1.3	0.15	**1.5**	C47, C49
Breast	6	0	100		-	-	-	-	-	1	-	-	-	2	-	2	-	1	-	-	0.5	0.7	0.13	**1.1**	C50
Penis	5	0	100		-	-	-	-	-	1	1	-	-	-	-	1	-	1	-	1	0.4	0.5	0.09	**1.0**	C60
Prostate	8	0	75		-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	1	0.7	0.9	0.42	**2.5**	C61
Testis	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C62
Kidney and renal pelvis	2	0	100		2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.01	**0.2**	C64-65
Bladder	15	0	73		-	-	1	1	-	1	1	-	1	1	2	1	2	3	1	-	1.3	1.6	0.40	**2.8**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	43	0	98		4	1	3	-	-	3	12	3	5	4	4	3	-	1	-	-	3.8	4.7	0.42	**4.7**	C69
Brain and nervous system	2	0	100		-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.01	**0.1**	C70-72
Thyroid	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C73
Hodgkin lymphoma	16	0	100		1	2	6	-	1	3	-	-	1	1	-	-	-	1	-	-	1.4	1.7	0.12	**1.5**	C81
Non-Hodgkin lymphoma	63	0	100		2	12	5	4	4	4	4	6	5	4	5	4	1	1	1	1	5.5	6.8	0.63	**7.0**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	1	0	0		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.1**	C95
Other and unspecified	42	0	90		1	4	1	3	-	-	7	4	2	2	4	4	7	1	1	1	3.7	4.6	0.66	**6.2**	O&U
All sites	971	0	98		21	26	30	22	60	150	159	119	77	78	72	50	51	25	13	18	84.7		11.24	**117.7**	C00-96
All sites except C44	922	0	98		20	25	30	19	58	146	155	115	75	69	66	46	47	23	12	16	80.4	100.0	10.50	**110.3**	C00-96 exc. C44
Average annual population					29057	28800	28781	28485	27146	21903	16599	12590	10224	7642	6154	4468	3182	1919	1168	1097	229214				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Mozambique, Beira (2009–2013)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	7	0	100		-	-	-	-	-	1	-	1	3	1	-	-	1	-	-	-	0.6	0.7	0.10	**1.0**	C00-06
Salivary gland	6	0	100		-	1	-	2	1	-	-	1	-	-	1	-	-	-	-	-	0.5	0.6	0.04	**0.5**	C07-08
Nasopharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	16	0	56		-	-	-	-	1	1	1	-	1	4	-	-	3	-	2	3	1.4	1.7	0.34	**3.3**	C15
Stomach	2	0	100		-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	0.2	0.2	0.05	**0.4**	C16
Colon	2	0	100		-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0.2	0.2	0.02	**0.3**	C18
Rectum	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.1	0.1	0.05	**0.3**	C19-20
Anus	1	0	100		-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.1**	C21
Liver	13	0	85		-	-	-	-	1	2	1	-	2	4	1	1	-	-	-	1	1.2	1.4	0.15	**1.9**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	1	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.1	0.1	0.02	**0.2**	C25
Larynx	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0.1	0.1	0.07	**0.3**	C32
Trachea, bronchus, and lung	1	0	100		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.1**	C33-34
Bone	4	0	100		-	-	2	-	-	-	-	-	-	-	-	-	-	1	1	-	0.4	0.4	0.13	**0.7**	C40-41
Melanoma of skin	10	0	100		-	-	1	2	-	-	1	1	-	-	2	1	1	1	-	-	0.9	1.1	0.18	**1.6**	C43
Non-melanoma skin	52	0	92		-	-	2	-	5	3	-	8	8	8	2	6	4	4	1	1	4.6		0.94	**8.6**	C44
Mesothelioma	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.1	0.1	0.00	**0.3**	C45
Kaposi sarcoma	293	0	100		3	1	5	14	46	71	64	40	21	9	8	2	6	2	-	1	26.1	30.8	2.22	**27.5**	C46
Connective and soft tissue	10	0	100		-	-	-	1	-	-	2	2	1	2	-	-	1	-	1	-	0.9	1.1	0.18	**1.5**	C47, C49
Breast	81	0	98		-	-	-	2	-	6	8	7	5	17	9	7	12	5	1	2	7.2	8.5	1.59	**14.7**	C50
Vulva	21	0	100		-	-	-	-	-	2	1	10	4	1	-	-	-	3	-	-	1.9	2.2	0.32	**2.9**	C51
Vagina	3	0	100		-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	1	0.3	0.3	0.02	**0.5**	C52
Cervix uteri	302	0	96		-	-	1	-	8	33	39	41	46	30	25	28	21	12	5	13	26.9	31.7	4.69	**46.7**	C53
Uterus	10	0	100		-	-	-	-	-	-	2	-	2	1	-	2	-	-	1	2	0.9	1.1	0.17	**1.8**	C54-55
Ovary	10	0	100		-	-	1	-	1	4	1	1	-	-	-	-	2	-	-	-	0.9	1.1	0.11	**1.2**	C56
Placenta	6	0	100		-	-	-	1	2	-	1	1	-	1	-	-	-	-	-	-	0.5	0.6	0.04	**0.5**	C58
Kidney and renal pelvis	1	0	100		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.1**	C64-65
Bladder	14	0	100		-	-	-	-	-	-	1	4	1	2	3	1	-	-	1	1	1.2	1.5	0.24	**2.3**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	48	0	94		3	-	-	4	5	9	13	9	1	2	2	-	-	-	-	-	4.3	5.0	0.32	**4.3**	C69
Brain and nervous system	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.1	0.1	0.04	**0.3**	C70-72
Thyroid	7	0	86		-	-	-	-	-	1	1	1	1	-	1	1	-	-	1	-	0.6	0.7	0.15	**1.1**	C73
Hodgkin lymphoma	6	0	100		-	-	1	-	2	1	-	-	2	-	-	-	-	-	-	-	0.5	0.6	0.04	**0.5**	C81
Non-Hodgkin lymphoma	40	0	100		4	6	6	2	4	5	4	4	2	1	-	1	-	-	-	1	3.6	4.2	0.22	**3.5**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	1	0	0		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.1**	C95
Other and unspecified	32	0	84		-	4	3	-	1	2	-	2	4	3	2	2	6	2	1	-	2.9	3.4	0.63	**5.4**	O&U
All sites	1004	0	96		11	13	22	28	79	142	140	134	106	87	57	52	59	31	16	27	89.4		13.09	**134.3**	C00-96
All sites except C44	952	0	97		11	13	20	28	74	139	140	126	98	79	55	46	55	27	15	26	84.8	100.0	12.15	**125.7**	C00-96 exc. C44
Average annual population					29391	29205	29878	28827	25873	20533	16099	11958	9636	6522	5176	3852	2724	1891	1381	1598	224545				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

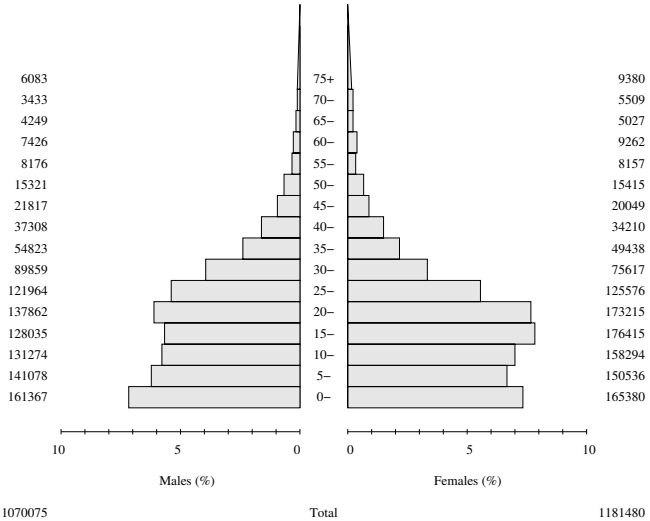
Uganda, Kampala

The Kampala Cancer Registry was established in 1951 as a population-based cancer registry with the aim of determining cancer incidence in the population of Kyadondo County. The registry is located in the Department of Pathology of the College of Health Sciences at Makerere University. It is staffed by a pathologist (the registry director), a cancer registrar, and an assistant cancer registrar, all of whom are employees of Makerere University.

The Kampala Cancer Registry data presented in this volume cover Kyadondo County, which comprises Kampala District (including the city of Kampala, Uganda's capital) and part of Wakiso District. About 50% of the county's residents are members of the Ganda ethnic group, but the population is diverse, with residents from all 31 of the ethnic groups found in Uganda. There are also many immigrants from neighbouring countries (in particular Kenya, Sudan, and Rwanda), and 1% of the residents are of European or Asian descent. About 50% of residents are Catholic, 30% are Anglican, and 15% are Muslim.

The population of Kyadondo County is estimated to have been 2 010 000 in 2009. The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Uganda, Kyadondo County (2008–2012)
Population pyramid (average annual person-years by sex and age group)



Source: Uganda Bureau of Statistics, estimates based on the censuses of 2002 and 2014 (preliminary results)

The main sources of information are health care facilities and medical laboratories.

Health care facilities: The registry collects information from Mulago National Referral Hospital (including its radiotherapy and haematology departments), the Uganda Cancer Institute, Mengo Hospital, Rubaga Hospital, St. Francis Hospital Nsambya, private clinics and nursing homes, and Hospice Africa Uganda.

Medical laboratories: Data are also collected from the Makerere University histopathology laboratory, Multisystem Clinical Laboratories, the Metromed Medical Centre histopathology laboratory, the Kampala International University Teaching Hospital pathology laboratory, the Mengo Hospital histopathology laboratory, the St. Francis Hospital Nsambya histopathology laboratory, and public and private haematology laboratories.

Certification of death is carried out only when required for specific legal reasons and is very incomplete; therefore, the registry does not use death certificates as a source of information.

The registry has recruited staff from the information services of some hospitals and medical units to assist in data collection. To collect data from other hospitals, hospices, and histopathology laboratories, the registrars carry out visits at least once a month, depending on the anticipated number of cases to be registered. During these visits, designated staff members in the records departments assist in retrieving the records of patients diagnosed with cancer, including admission and discharge registers, clinical notes, and pathology reports. For each case, demographic and cancer diagnostic data are abstracted onto a registration form. The pathology laboratories actively assist in the registration process, either by allowing the registrars access to their pathology logs and report forms or by sending copies of reports on diagnosed cancer cases directly to the registry. Almost all of the required information is provided, although information on place of residence is missing in some cases and must be traced via the referring hospital.

Patients are not interviewed in person. The place of residence is considered to be that listed on the medical record. In Kampala, specific home addresses are not used; addresses are listed simply as the district/neighbourhood of the city (or as the village, in the periurban parts of Kyadondo Country) where the individual resides.

There is no system for civil registration of deaths by cause in Uganda. However, death certificates are issued for all deaths occurring in hospital and are copied into a death register in the hospital mortuary. This source of information is used by the registry.

The registry uses IARC's CanReg4 software for data management, consistency and validity checks, and duplicate registration checks. In 2001, the completeness of registration of adult cancer cases was estimated to be about 90%. Confidentiality is maintained by using registration numbers (no patient names) during data analysis. The registry is accessible only to authorized personnel.

YEARS PRESENTED

2008–2012 (a 5-year period)

NOTES

The rate of registration has been relatively constant (with a slow increase) for the past 20 years. During the 5-year period analysed, the average rate of registration was 131 cases per month.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 183.9 cases per 100 000 person-years in males and 188.6 cases per 100 000 person-years in females. These values are higher than the values for eastern Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of 1.50 for males and 1.20 for females. The rates of several cancers are relatively high: cancer of the oesophagus, cancer of the liver, Kaposi sarcoma, and cancer of the prostate.

The overall percentage of microscopically verified cases (MV%) is relatively low (54% in males and 55% in females), but this is due to the large numbers of oesophageal and liver cancers, most of which are diagnosed without histology; similarly, only half of the reported prostate cancers were microscopically verified.

SUMMARY

The incidence rates are plausible and consistent with the results published for 2003–2007 in Volume X of *Cancer Incidence in Five Continents*.

PUBLICATIONS AND ACHIEVEMENTS

The Kampala Cancer Registry is one of the oldest cancer registries in sub-Saharan Africa. It is a founding member of the African Cancer Registry Network (AFCRN).

Davies JNP, Knowelden J, Wilson BA (1965). Incidence rates of cancer in Kyandondo County, Uganda, 1954-1960. J Natl Cancer Inst. 35(5):789–821. https://doi.org/10.1093/jnci/35.5.789 PMID:5849593

Mbulaiteye SM, Katabira ET, Wabinga H, Parkin DM, Virgo P, Ochai R, et al. (2006). Spectrum of cancers among HIV-infected persons in Africa: the Uganda AIDS-Cancer Registry Match Study. Int J Cancer. 118(4):985–90. http://dx.doi.org/10.1002/ijc.21443 PMID:16106415

Parkin DM, Wabinga H, Nambooze S (2001). Completeness in an African cancer registry. Cancer Causes Control. 12(2):147–52. http://dx.doi.org/10.1023/A:1008966225984 PMID:11246843

Wabinga H, Parkin DM, Nambooze S, Amero J (2011). Cancer survival in Kampala, Uganda, 1993–1997. In: Sankaranarayanan R, Swaminathan R, editors. Cancer survival in Africa, Asia, the Caribbean and Central America. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 162; pp. 243–7. Available from: http://publications.iarc.fr/317.

Wabinga HR, Nambooze S, Amulen PM, Okello C, Mbus L, Parkin DM (2014). Trends in the incidence of cancer in Kampala, Uganda 1991-2010. Int J Cancer. 135(2):432–9. http://dx.doi.org/10.1002/ijc.28661 PMID:24615279

Wabinga HR, Owor R, Nambooze S (1998). Kampala Cancer Registry 1992–1995. In: Parkin DM, Kramárová E, Draper GJ, Masuyer E, Michaelis J, Neglia J, et al., editors. International incidence of childhood cancer, Vol. II. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 144; pp. 31–4. Available from: http://publications.iarc.fr/299.

Uganda, Kampala (2008–2012)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	69	2	64	-	1	-	2	3	3	6	6	6	8	11	3	6	4	6	2	1.3	2.0	0.55	**4.1**	C00-06
Salivary gland	21	0	81	2	1	1	-	2	2	1	3	2	-	1	1	2	1	1	1	0.4	0.6	0.12	**1.0**	C07-08
Nasopharynx	62	0	63	-	-	1	3	9	8	6	6	4	4	9	1	3	6	-	2	1.2	1.8	0.32	**2.8**	C11
Other pharynx	21	0	38	-	-	-	-	1	-	1	1	3	3	3	5	3	-	-	1	0.4	0.6	0.15	**1.4**	C09-10, C12-14
Oesophagus	284	3	35	-	-	-	-	-	1	1	11	29	34	43	38	38	26	26	34	5.3	8.1	2.91	**22.9**	C15
Stomach	81	0	38	-	-	-	-	-	2	6	4	6	9	12	9	8	9	13	3	1.5	2.3	0.96	**6.4**	C16
Colon	62	0	47	-	-	-	2	2	3	3	3	8	6	6	6	6	8	2	7	1.2	1.8	0.50	**4.2**	C18
Rectum	60	1	45	-	-	-	3	-	3	3	4	7	6	6	10	6	5	3	3	1.1	1.7	0.52	**4.1**	C19-20
Anus	4	1	25	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-	-	0.1	0.1	0.04	**0.3**	C21
Liver	201	2	39	1	-	2	4	15	24	25	23	15	18	12	15	7	13	10	15	3.8	5.7	1.19	**10.0**	C22
Gallbladder etc.	2	0	50	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	0.0	0.1	0.00	**0.1**	C23-24
Pancreas	35	0	29	-	-	-	-	-	-	5	3	4	4	4	5	3	3	1	3	0.7	1.0	0.27	**2.3**	C25
Larynx	34	0	56	-	-	-	-	-	-	1	1	1	2	8	5	6	3	2	5	0.6	1.0	0.34	**2.8**	C32
Trachea, bronchus, and lung	43	0	19	1	-	-	1	2	-	3	2	7	6	4	4	5	3	4	1	0.8	1.2	0.39	**2.8**	C33-34
Bone	59	1	51	-	3	9	9	9	7	4	6	3	2	1	2	1	-	2	-	1.1	1.7	0.17	**1.5**	C40-41
Melanoma of skin	16	0	69	-	1	-	1	-	-	1	1	-	2	1	-	4	3	1	1	0.3	0.5	0.17	**1.3**	C43
Non-melanoma skin	61	1	69	2	2	4	-	6	7	4	3	7	3	2	5	6	3	3	3	1.1		0.38	**3.1**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	911	24	72	13	16	12	15	58	169	182	167	106	56	35	21	13	9	6	9	17.0	25.8	2.38	**25.2**	C46
Connective and soft tissue	64	0	61	4	7	5	8	5	3	9	8	4	2	1	1	1	2	1	3	1.2	1.8	0.18	**1.8**	C47, C49
Breast	30	0	43	-	-	-	-	1	2	3	-	3	3	3	3	5	3	3	1	0.6	0.9	0.31	**2.2**	C50
Penis	39	1	56	1	-	-	-	-	2	2	7	3	3	5	-	2	3	3	7	0.7	1.1	0.26	**2.3**	C60
Prostate	515	12	50	-	-	-	-	-	2	2	3	5	5	25	33	93	71	109	155	9.6	14.6	6.87	**49.5**	C61
Testis	12	0	58	-	-	1	2	2	3	1	1	-	1	1	-	-	-	-	-	0.2	0.3	0.02	**0.3**	C62
Kidney and renal pelvis	48	0	71	22	3	2	-	-	1	4	1	3	-	1	5	2	2	-	2	0.9	1.4	0.17	**1.8**	C64-65
Bladder	32	0	41	-	-	-	-	4	1	3	2	-	-	-	7	5	1	1	8	0.6	0.9	0.22	**2.2**	C67
Ureter and other urinary	4	0	75	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	2	0.1	0.1	0.01	**0.2**	C66, C68
Eye	108	5	82	15	4	3	3	1	9	13	14	21	8	3	3	-	4	-	2	2.0	3.1	0.32	**3.4**	C69
Brain and nervous system	55	0	29	4	1	3	3	5	2	7	4	4	3	6	3	5	1	1	3	1.0	1.6	0.25	**2.4**	C70-72
Thyroid	16	0	38	-	1	-	-	2	1	-	1	2	1	2	2	1	2	1	-	0.3	0.5	0.14	**1.0**	C73
Hodgkin lymphoma	67	0	75	2	6	10	11	7	4	4	8	5	3	-	1	1	3	2	-	1.3	1.9	0.23	**2.0**	C81
Non-Hodgkin lymphoma	255	1	53	23	45	29	12	17	20	19	24	16	15	15	5	4	6	3	1	4.8	7.2	0.73	**7.3**	C82-85, C96
Multiple myeloma	22	0	45	-	-	1	-	-	1	-	-	1	4	1	3	3	3	3	2	0.4	0.6	0.26	**1.9**	C90
Lymphoid leukaemia	31	0	35	5	7	4	2	3	2	1	1	-	1	3	-	-	1	1	-	0.6	0.9	0.10	**0.9**	C91
Myeloid leukaemia	33	0	42	-	6	2	2	2	5	2	4	4	-	1	-	1	4	-	-	0.6	0.9	0.15	**1.2**	C92-94
Leukaemia, unspecified	49	1	10	4	3	9	6	3	4	5	6	2	3	1	1	-	1	-	-	0.9	1.4	0.10	**1.2**	C95
Other and unspecified	180	2	37	3	1	6	7	9	13	15	21	22	16	15	8	12	10	9	11	3.4	5.1	1.08	**9.1**	O&U
All sites	3586	57	54	102	108	104	96	168	305	343	349	304	231	242	206	253	213	217	288	67.0		22.76	**187.0**	C00-96
All sites except C44	3525	56	54	100	106	100	96	162	298	339	346	297	228	240	201	247	210	214	285	65.9	100.0	22.38	**183.9**	C00-96 exc. C44
Average annual population				161367	141078	131274	128035	137862	121964	89859	54823	37308	21817	15321	8176	7426	4249	3433	6083	1070075				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Uganda, Kampala (2008–2012)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	33	0	67		-	-	1	-	1	5	1	4	2	2	2	1	3	4	3	4	0.6	0.8	0.22	**1.7**	C00-06
Salivary gland	12	0	58		-	-	-	2	1	3	-	3	1	-	1	-	1	-	-	-	0.2	0.3	0.03	**0.3**	C07-08
Nasopharynx	39	0	54		1	-	2	4	3	1	2	3	2	2	4	6	4	1	1	3	0.7	0.9	0.21	**1.9**	C11
Other pharynx	14	0	50		-	-	-	1	-	2	5	-	1	-	1	-	1	1	1	1	0.2	0.3	0.07	**0.5**	C09-10, C12-14
Oesophagus	176	4	40		-	-	-	1	-	3	2	3	8	11	16	25	22	16	23	42	3.0	4.1	1.51	**12.1**	C15
Stomach	48	0	35		-	-	-	-	-	1	1	1	4	3	5	2	8	6	8	9	0.8	1.1	0.44	**3.3**	C16
Colon	62	0	47		-	-	-	1	2	3	2	2	4	8	3	5	14	7	9	2	1.0	1.4	0.60	**4.2**	C18
Rectum	69	0	54		-	-	1	-	-	7	6	6	7	8	9	4	6	3	8	4	1.2	1.6	0.46	**3.7**	C19-20
Anus	6	0	83		-	-	-	-	-	1	1	2	-	-	1	-	-	-	-	1	0.1	0.1	0.01	**0.2**	C21
Liver	163	1	34		-	-	1	2	4	16	17	12	13	24	10	11	17	10	7	18	2.8	3.8	0.94	**8.4**	C22
Gallbladder etc.	3	0	67		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	0.1	0.1	0.00	**0.1**	C23-24
Pancreas	35	1	26		-	-	-	-	-	1	1	1	6	5	1	5	3	1	5	5	0.6	0.8	0.27	**2.1**	C25
Larynx	9	0	33		-	-	1	-	1	-	-	-	-	1	-	-	-	2	2	2	0.2	0.2	0.08	**0.5**	C32
Trachea, bronchus, and lung	50	0	28		-	-	-	1	-	2	2	2	3	6	5	5	6	5	7	6	0.8	1.2	0.43	**3.3**	C33-34
Bone	49	1	71		1	4	11	10	6	6	3	3	1	2	-	1	-	-	-	-	0.8	1.1	0.06	**0.8**	C40-41
Melanoma of skin	29	2	55		-	-	-	1	1	-	2	2	-	3	6	2	4	2	-	4	0.5	0.7	0.18	**1.7**	C43
Non-melanoma skin	52	5	67		2	-	-	2	4	6	2	9	6	6	2	2	3	-	2	1	0.9		0.20	**1.9**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	651	8	71		8	10	15	26	99	159	131	73	44	32	16	9	9	6	2	4	11.0	15.1	1.31	**14.8**	C46
Connective and soft tissue	60	1	57		2	6	5	7	6	6	5	9	2	1	6	2	2	-	-	-	1.0	1.4	0.14	**1.6**	C47, C49
Breast	619	7	53		-	-	-	1	15	45	66	86	71	91	79	39	48	23	18	30	10.5	14.4	3.30	**30.6**	C50
Vulva	28	1	57		-	-	-	1	-	4	3	2	6	1	4	-	3	-	2	1	0.5	0.6	0.13	**1.2**	C51
Vagina	11	0	82		-	-	-	-	1	-	1	1	2	5	-	-	1	-	-	-	0.2	0.3	0.05	**0.5**	C52
Cervix uteri	1057	9	55		-	-	-	1	10	62	111	176	172	132	135	56	75	35	46	37	17.9	24.5	5.67	**51.1**	C53
Uterus	87	0	66		-	-	-	1	1	1	5	10	5	9	17	4	11	7	10	6	1.5	2.0	0.69	**5.3**	C54-55
Ovary	143	4	47		-	-	2	3	10	6	11	18	10	12	18	8	17	3	14	7	2.4	3.3	0.89	**7.2**	C56
Placenta	27	0	59		-	-	-	1	9	9	4	-	2	1	1	-	-	-	-	-	0.5	0.6	0.04	**0.5**	C58
Kidney and renal pelvis	46	0	50		17	4	-	3	1	4	3	2	3	1	1	2	1	-	-	4	0.8	1.1	0.08	**1.2**	C64-65
Bladder	27	0	56		-	-	-	1	2	-	1	-	-	2	3	1	3	3	2	9	0.5	0.6	0.17	**1.6**	C67
Ureter and other urinary	2	0	50		-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	0.0	0.0	0.04	**0.2**	C66, C68
Eye	125	4	76		22	5	3	8	10	8	12	27	10	8	4	1	3	-	-	-	2.1	2.9	0.25	**3.1**	C69
Brain and nervous system	54	1	17		7	3	5	3	6	2	1	1	7	3	2	3	4	-	2	4	0.9	1.3	0.19	**1.9**	C70-72
Thyroid	44	0	75		1	-	1	1	1	3	6	8	3	7	2	6	3	-	1	1	0.7	1.0	0.21	**2.0**	C73
Hodgkin lymphoma	53	3	81		4	1	3	2	7	11	9	3	2	2	-	2	-	2	1	1	0.9	1.2	0.14	**1.4**	C81
Non-Hodgkin lymphoma	201	3	61		14	27	19	10	14	18	23	17	13	7	13	4	6	3	2	8	3.4	4.7	0.51	**5.6**	C82-85, C96
Multiple myeloma	21	0	52		-	1	-	-	-	-	2	-	4	3	1	2	3	2	1	2	0.4	0.5	0.15	**1.3**	C90
Lymphoid leukaemia	24	0	29		5	-	3	2	3	3	-	-	-	-	-	2	3	1	2	-	0.4	0.6	0.12	**0.9**	C91
Myeloid leukaemia	32	0	34		2	-	-	4	6	2	2	2	3	2	3	2	-	-	2	2	0.5	0.7	0.11	**1.1**	C92-94
Leukaemia, unspecified	36	0	11		1	3	1	4	-	3	4	5	1	1	3	4	1	-	3	2	0.6	0.8	0.16	**1.4**	C95
Other and unspecified	165	1	45		5	4	1	3	11	6	18	12	13	5	17	13	14	21	9	12	2.8	3.8	1.14	**9.0**	O&U
All sites	4362	56	55		92	68	75	107	235	409	465	505	432	406	391	229	299	166	193	234	73.8		21.25	**190.6**	C00-96
All sites except C44	4310	51	55		90	68	75	105	231	403	463	496	426	400	389	227	296	166	191	233	73.0	100.0	21.04	**188.6**	C00-96 exc. C44
Average annual population					165380	150536	158294	176415	173215	125576	75617	49438	34210	20049	15415	8157	9262	5027	5509	9380	1181480				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Zimbabwe, Bulawayo: Black population

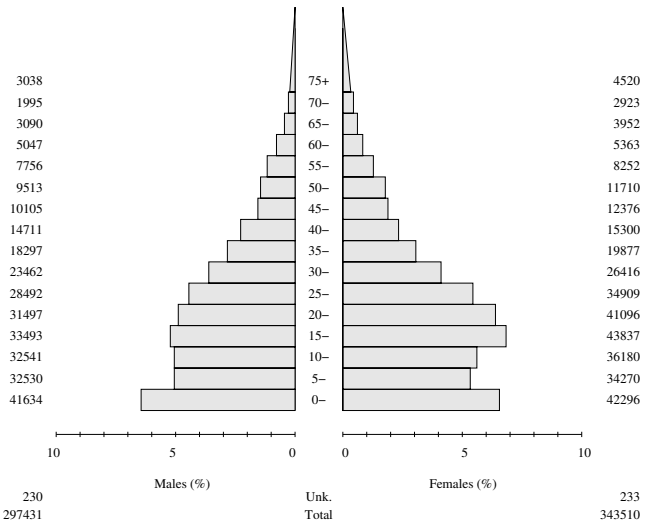
The Bulawayo Cancer Registry was founded in 1963 and functioned continuously for 15 years before ceasing activity in 1978. It was located in an office in the Department of Radiotherapy at Mpilo Central Hospital, which provided the only hospital services available to the Black population of the city of Bulawayo during that period. The hospital also acted as the referral centre for cancer cases from the south-western part of the country, including the provinces of Matabeleland North, Matabeleland South, Victoria (now Masvingo), and Midlands. New cancer cases were reported from all hospital wards and departments; case notes with a diagnosis of cancer or suspected cancer were sent to the registry upon patient discharge or death. The activity of the registry was restarted in 2013 by the Zimbabwean Ministry of Health and Child Care (MoHCC) in order to support the Zimbabwe National Cancer Registry (ZNCR) as it moves towards becoming a national population-based cancer registry, in line with the MoHCC's National Cancer Prevention and Control Strategy for Zimbabwe 2014–2018.

The registry is funded by the MoHCC as an integral part of the ZNCR and Mpilo Central Hospital. It is supervised by the head of the Radiotherapy Centre, and its two full-time staff members are employees of the ZNCR. Their salaries are paid by the MoHCC. The running costs of the registry (including transport) are covered by Mpilo Central Hospital.

The Bulawayo Cancer Registry covers the entire population of the city of Bulawayo, but the subset of registry data presented in this volume is specifically for the city's Black population.

The total population of Bulawayo is estimated to have been 653 000 in 2012 (at the census), with the Black population estimated to have been 640 490. The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Zimbabwe, Bulawayo: Black (2011–2013)
Population pyramid (average annual person-years by sex and age group)



Source: The Zimbabwe National Statistics Agency (ZIMSTAT), Bulawayo Province, 2012 census

The main sources of information are Mpilo Central Hospital (including the radiotherapy and oncology departments), the United Bulawayo Hospitals, Mater Dei Hospital, oncology and haematology clinics that provide outpatient services within the registration area, the government pathology laboratory at Mpilo Central Hospital, the Diagnostic Pathology Centre, Bulawayo Island Hospice, and the Death Registry Unit of the Department of the Registrar General within the Zimbabwean Ministry of Home Affairs.

Data collection is mainly active. In Mpilo Central Hospital, the main source is the hospital records department. A department staff member sets aside the files of discharged patients with a diagnosis of cancer, and a registry staff member visits weekly to abstract the case notes onto registration forms. Visits to other key hospital departments (gynaecology, medical, paediatrics, and the surgical ward) are also carried out, to check the discharge registers. The radiotherapy department maintains its own case records, which are abstracted directly because almost all cases are cancers. Registry staff members also carry out weekly visits to the medical records department of the United Bulawayo Hospitals; the files of recently discharged patients are examined to identify cancer cases, which are then abstracted. During their weekly visits to the two private oncology clinics in the city, registry staff members have direct access to the clinics' case records, in order to abstract all cancer cases onto forms.

Almost all deaths are registered, and death notifications (including those for deaths that occurred at home) usually come from the hospital mortuary. All deaths are medically certified, although the information recorded after deaths occurring at home is sometimes by interviewing relatives (verbal autopsy). Information from death certificates mentioning cancer is used to update the registry database. Cases that are not already recorded in the registry and that cannot be traced back via the hospitals are registered as death-certificate-only (DCO) cases.

The Bulawayo Cancer Registry uses IARC's CanReg4 software for data entry and management.

YEARS PRESENTED

2011–2013 (a 3-year period)

NOTES

The Bulawayo Cancer Registry results presented in this volume are based on data collected since the registry resumed activity in 2013, with some cases being traced retrospectively. The data presented are for the Black African population only (which accounts for 93% of the registrations).

The incidence rates are very high. The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 221.9 cases per 100 000 person-years in males and 270.9 cases per 100 000 person-years in females.

These values are slightly lower than the corresponding values reported for the Black population of Harare during a similar period (2010–2012): 265.3 and 290.5 cases per 100 000 person-years in males and females, respectively. Although there are some broad similarities between the cancer patterns in Bulawayo and Harare, there are also some striking differences. In Bulawayo, the ASRs of two major cancers are lower: prostate cancer (51.5 cases per 100 000 person-years) and breast cancer in females (37.3 cases per 100 000 person-years). But the ASRs of Kaposi sarcoma and non-Hodgkin lymphoma are considerably higher in Bulawayo than in Harare, and the ASR of cervical cancer in Bulawayo (102.4 cases per 100 000 person-years) must be one of the highest ever reported.

The percentage of death-certificate-only cases (DCO%) is 16% in males and 12% in females.

Table 4.01 shows cumulative incidence rates in 1963–1972 compared with the current data (2011–2013). There have been marked declines in the incidence of cancers of the oesophagus and liver, as well as (surprisingly) in the incidence of lung cancer in males. There have been increases in the incidence of cancers of the prostate, breast, and cervix, as well as in the incidence of cancers related to HIV/AIDS (Kaposi sarcoma and non-Hodgkin lymphoma).

Table 4.01. Cumulative incidence rates (for ages 0–59 years[a]), per 1000, of cancer in Black males (M) and Black females (F) in Bulawayo, Zimbabwe, in 1963–1972 (Parkin et al., 1994) and in 2011–2013, by anatomical site

Anatomical site (ICD-10 code)	Sex	1963–1972	2011–2013
Oesophagus (C15)	M	16.0	5.4
	F	2.3	1.9
Stomach (C16)	M	3.9	1.7
	F	1.2	2.0
Colorectum (C18–20)	M	2.5	4.7
	F	2.5	3.2
Liver (C22)	M	26.2	5.5
	F	6.7	4.9
Trachea, bronchus, and lung (C33–34)	M	12.0	1.5
Kaposi sarcoma (C46)	M	0.13	16.1
	F	0.02	8.4
Breast (C50)	F	7.3	16.3
Cervix uteri (C53)	F	13.9	63.2
Corpus uteri (C54)	F	3.3	8.0
Ovary (C56)	F	1.8	0.9
Prostate (C61)	M	0.27	2.5
Bladder (C67)	M	5.0	0.1
Non-Hodgkin lymphoma (C82–85, C96)	M	1.0	12.4
	F	0.4	11.6
All sites (C00–96)	M	90.2	75.5
	F	59.5	140.8

[a]The age range of 0–59 years was chosen for this comparison due to uncertainty of the population denominator in older age groups in 1963–1972.

SUMMARY

The incidence rates of cancer in the Black population of Bulawayo are high, similar to those in Harare. Due to the relatively high DCO%, and possibly due to misrecording of residency (resulting in the inclusion of non-residents in the database), there may be some inaccuracy in the results. But the changes in incidence rates from those 40–50 years earlier are striking, especially with respect to the very high recorded rates of cancer of the cervix.

PUBLICATIONS AND ACHIEVEMENTS

The Bulawayo Cancer Registry became a member of the African Cancer Registry Network (AFCRN) in 2015.

Parkin DM, Vizcaino AP, Skinner ME, Ndhlovu A (1994). Cancer patterns and risk factors in the African population of southwestern Zimbabwe, 1963-1977. Cancer Epidemiol Biomarkers Prev. 3(7):537–47. PMID:7827583

Skinner ME (1967). Malignant disease of the gastrointestinal tract in the Rhodesian African, with special reference to the urban population of Bulawayo. A preliminary report. Natl Cancer Inst Monogr. 25:57–71. PMID:6033061

Vizcaino AP, Parkin DM, Boffetta P, Skinner ME (1994). Bladder cancer: epidemiology and risk factors in Bulawayo, Zimbabwe. Cancer Causes Control. 5(6):517–22. http://dx.doi.org/10.1007/BF01831379 PMID:7827238

Vizcaino AP, Parkin DM, Skinner ME (1995). Risk factors associated with oesophageal cancer in Bulawayo, Zimbabwe. Br J Cancer. 72(3):769–73. http://dx.doi.org/10.1038/bjc.1995.408 PMID:7669592

Zimbabwe, Bulawayo: Black (2011–2013)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	9	0	100	0	-	-	-	-	-	1	-	-	1	-	-	1	2	-	2	2	1.0	0.8	0.27	**2.0**	C00-06
Salivary gland	7	0	86	0	-	-	-	-	1	-	-	-	1	-	1	-	2	-	1	1	0.8	0.6	0.18	**1.5**	C07-08
Nasopharynx	5	0	100	0	-	-	-	1	1	-	-	1	-	-	-	-	1	1	-	-	0.6	0.5	0.11	**0.9**	C11
Other pharynx	2	0	100	0	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	0.2	0.2	0.07	**0.5**	C09-10, C12-14
Oesophagus	104	0	44	24	-	-	-	-	-	-	1	3	7	-	7	14	11	8	15	38	11.7	9.5	2.59	**23.8**	C15
Stomach	21	0	81	10	-	-	-	-	-	-	-	-	-	3	2	4	5	1	2	4	2.4	1.9	0.56	**4.8**	C16
Colon	33	0	85	12	-	-	-	-	-	1	1	3	1	5	4	8	5	1	1	3	3.7	3.0	0.68	**6.3**	C18
Rectum	21	0	86	5	-	-	-	-	-	1	-	2	1	-	2	1	5	4	3	2	2.4	1.9	0.72	**5.0**	C19-20
Anus	7	0	86	0	-	-	-	-	-	-	-	-	1	1	2	-	-	1	2	-	0.8	0.6	0.28	**1.7**	C21
Liver	67	0	60	34	-	-	-	-	2	2	4	1	4	4	8	11	3	9	5	14	7.5	6.1	1.55	**13.9**	C22
Gallbladder etc.	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	12	0	17	58	-	-	-	-	-	-	1	-	2	-	1	2	-	2	3	1	1.3	1.1	0.45	**2.7**	C25
Larynx	9	0	100	0	-	-	-	-	-	-	-	-	-	1	-	2	2	3	-	1	1.0	0.8	0.29	**2.3**	C32
Trachea, bronchus, and lung	22	0	59	27	-	-	-	-	-	-	-	2	1	-	2	4	3	3	1	6	2.5	2.0	0.49	**4.8**	C33-34
Bone	8	0	75	25	-	-	2	1	1	-	1	-	-	-	1	-	1	1	-	-	0.9	0.7	0.13	**1.2**	C40-41
Melanoma of skin	9	0	100	0	-	-	-	-	-	1	-	1	1	1	-	1	-	-	2	2	1.0	0.8	0.23	**1.8**	C43
Non-melanoma skin	29	0	97	0	-	-	-	2	3	-	-	-	1	2	2	8	1	2	4	4	3.3		0.75	**5.8**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	184	0	21	15	1	-	3	4	6	13	29	34	30	14	16	11	9	7	4	3	20.6	16.8	2.76	**26.8**	C46
Connective and soft tissue	15	0	80	13	-	-	-	-	3	-	-	-	-	1	4	4	1	-	2	-	1.7	1.4	0.39	**2.8**	C47, C49
Breast	7	0	100	0	-	-	-	-	1	-	-	-	-	1	-	-	1	-	1	3	0.8	0.6	0.14	**1.5**	C50
Penis	20	0	90	0	-	-	-	-	-	-	1	4	-	2	3	2	4	1	1	2	2.2	1.8	0.44	**3.9**	C60
Prostate	204	0	45	25	-	-	-	-	-	-	-	-	-	1	2	9	23	26	31	112	22.9	18.6	5.00	**51.5**	C61
Testis	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C62
Kidney and renal pelvis	17	0	65	18	5	1	-	-	-	1	-	-	-	1	1	2	1	1	4	-	1.9	1.5	0.53	**3.3**	C64-65
Bladder	10	0	40	20	-	-	-	-	-	-	1	-	-	-	-	-	1	2	-	6	1.1	0.9	0.15	**2.3**	C67
Ureter and other urinary	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	33	0	94	0	1	-	-	1	1	1	4	4	8	1	3	5	3	1	-	-	3.7	3.0	0.51	**4.9**	C69
Brain and nervous system	2	0	50	50	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	0.2	0.2	0.04	**0.4**	C70-72
Thyroid	4	0	75	25	-	-	-	-	-	-	-	-	-	-	2	-	-	1	1	-	0.4	0.4	0.17	**1.0**	C73
Hodgkin lymphoma	16	0	100	0	1	1	1	2	1	3	2	1	-	1	-	-	1	1	-	1	1.8	1.5	0.17	**2.1**	C81
Non-Hodgkin lymphoma	120	0	96	2	-	1	3	2	8	6	6	14	15	9	18	15	6	11	3	3	13.4	10.9	2.28	**20.2**	C82-85, C96
Multiple myeloma	15	0	80	7	-	-	-	-	-	-	-	-	1	1	2	2	3	3	2	1	1.7	1.4	0.53	**3.7**	C90
Lymphoid leukaemia	11	0	100	0	-	3	2	-	-	-	-	2	-	1	-	1	-	-	1	1	1.2	1.0	0.17	**1.6**	C91
Myeloid leukaemia	11	0	91	9	-	-	-	4	2	1	-	2	-	-	-	1	-	-	-	1	1.2	1.0	0.08	**1.2**	C92-94
Leukaemia, unspecified	2	0	100	0	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.01	**0.2**	C95
Other and unspecified	91	0	75	18	1	2	1	-	1	1	1	6	7	7	3	7	6	18	14	16	10.2	8.3	2.83	**21.0**	O&U
All sites	1127	0	62	16	9	8	12	18	31	33	52	80	84	57	86	115	101	109	105	227	126.3		25.54	**227.7**	C00-96
All sites except C44	1098	0	61	16	9	8	12	16	28	33	52	80	83	55	84	107	100	107	101	223	123.1	100.0	24.79	**221.9**	C00-96 exc. C44
Average annual population		230			41634	32530	32541	33493	31497	28492	23462	18297	14711	10105	9513	7756	5047	3090	1995	3038	297431				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Zimbabwe, Bulawayo: Black (2011–2013)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	6	0	100	0	-	-	-	-	-	1	-	-	-	1	-	1	1	1	-	1	0.6	0.3	0.11	**1.0**	C00-06
Salivary gland	2	0	100	0	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	0.2	0.1	0.01	**0.2**	C07-08
Nasopharynx	2	0	100	0	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	0.2	0.1	0.01	**0.1**	C11
Other pharynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	56	0	45	36	-	-	-	-	-	-	2	4	-	2	1	4	10	8	6	19	5.4	3.2	1.16	**10.3**	C15
Stomach	29	0	62	21	-	-	-	-	-	-	1	-	1	1	1	1	4	8	3	9	2.8	1.7	0.70	**5.7**	C16
Colon	27	0	78	7	-	-	-	-	1	1	-	2	1	4	1	3	4	4	3	3	2.6	1.5	0.63	**4.9**	C18
Rectum	14	0	64	7	-	-	-	-	1	-	1	-	2	-	2	-	1	2	2	3	1.4	0.8	0.29	**2.3**	C19-20
Anus	6	0	83	17	-	-	-	-	-	1	-	-	2	-	1	-	-	-	1	1	0.6	0.3	0.10	**0.9**	C21
Liver	46	0	50	39	-	-	-	-	-	-	2	2	2	7	6	6	3	3	5	10	4.5	2.6	0.86	**7.7**	C22
Gallbladder etc.	4	0	75	25	-	-	-	-	-	-	-	-	2	-	-	-	-	1	1	-	0.4	0.2	0.12	**0.7**	C23-24
Pancreas	17	0	18	41	-	-	-	-	-	-	-	-	-	-	1	2	3	2	5	4	1.6	1.0	0.52	**3.4**	C25
Larynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C32
Trachea, bronchus, and lung	9	0	33	22	-	-	-	-	-	-	-	-	2	-	1	1	1	-	2	2	0.9	0.5	0.20	**1.6**	C33-34
Bone	8	0	62	25	-	-	-	-	1	-	1	3	1	1	-	-	-	-	-	1	0.8	0.5	0.06	**0.9**	C40-41
Melanoma of skin	7	0	100	0	-	-	-	-	-	-	-	-	1	2	1	-	-	-	2	1	0.7	0.4	0.17	**1.2**	C43
Non-melanoma skin	38	0	95	0	-	-	1	2	-	2	1	2	4	2	3	1	5	3	3	9	3.7		0.63	**6.1**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	100	0	28	15	-	1	1	3	5	17	15	14	14	7	7	5	8	2	-	1	9.7	5.7	1.11	**12.0**	C46
Connective and soft tissue	16	0	69	31	1	1	1	-	-	-	1	2	1	-	3	-	-	1	1	4	1.6	0.9	0.19	**2.2**	C47, C49
Breast	231	0	74	12	-	-	-	-	1	5	14	19	28	27	36	23	23	16	18	21	22.4	13.2	4.34	**37.3**	C50
Vulva	25	0	84	4	-	-	-	-	-	1	3	6	7	2	1	-	1	-	1	3	2.4	1.4	0.28	**3.2**	C51
Vagina	17	0	88	0	-	-	-	-	-	-	4	1	2	4	1	-	-	-	1	4	1.6	1.0	0.18	**2.3**	C52
Cervix uteri	657	0	70	6	-	-	-	-	5	18	43	78	86	77	79	70	54	48	40	59	63.8	37.6	11.53	**102.4**	C53
Uterus	64	0	58	11	-	-	-	-	-	-	-	2	4	7	6	6	11	6	12	10	6.2	3.7	1.64	**12.1**	C54-55
Ovary	49	0	59	18	-	-	-	2	2	4	4	2	4	3	8	6	3	5	2	4	4.8	2.8	0.81	**7.2**	C56
Placenta	7	0	43	43	-	-	-	-	1	2	2	-	-	-	1	-	1	-	-	-	0.7	0.4	0.07	**0.8**	C58
Kidney and renal pelvis	13	0	69	15	4	2	1	-	-	1	-	-	1	1	-	1	-	2	-	-	1.3	0.7	0.16	**1.7**	C64-65
Bladder	6	0	33	17	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	0.6	0.3	0.16	**1.2**	C67
Ureter and other urinary	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	37	0	95	3	3	1	-	-	3	3	3	9	4	7	-	1	-	2	-	1	3.6	2.1	0.38	**4.4**	C69
Brain and nervous system	6	0	17	67	-	-	-	1	1	-	-	-	2	-	-	-	-	-	1	1	0.6	0.3	0.09	**0.8**	C70-72
Thyroid	23	0	65	22	-	-	-	-	-	-	-	-	1	1	3	4	6	-	2	6	2.2	1.3	0.45	**4.2**	C73
Hodgkin lymphoma	9	0	100	0	-	-	-	-	2	-	3	1	2	1	-	-	-	-	-	-	0.9	0.5	0.07	**0.9**	C81
Non-Hodgkin lymphoma	137	0	95	4	1	-	1	2	8	10	12	27	19	16	10	8	7	6	5	5	13.3	7.8	1.88	**18.1**	C82-85, C96
Multiple myeloma	36	0	78	19	-	-	-	-	-	-	-	-	1	2	4	4	3	8	4	10	3.5	2.1	0.83	**6.8**	C90
Lymphoid leukaemia	2	0	50	50	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.1	0.01	**0.2**	C91
Myeloid leukaemia	13	0	92	8	-	-	3	-	4	-	2	-	-	-	-	1	1	1	-	1	1.3	0.7	0.14	**1.5**	C92-94
Leukaemia, unspecified	3	0	100	0	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	0.3	0.2	0.02	**0.3**	C95
Other and unspecified	62	0	61	27	-	-	-	-	1	2	2	1	5	5	12	6	4	5	9	10	6.0	3.6	1.30	**10.4**	O&U
All sites	1784	0	68	12	10	5	9	10	37	70	117	177	200	180	189	154	154	135	131	206	173.1		31.20	**277.0**	C00-96
All sites except C44	1746	0	68	12	10	5	8	8	37	68	116	175	196	178	186	153	149	132	128	197	169.4	100.0	30.57	**270.9**	C00-96 exc. C44
Average annual population		233			42296	34270	36180	43837	41096	34909	26416	19877	15300	12376	11710	8252	5363	3952	2923	4520	343510				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Zimbabwe, Harare: Black population

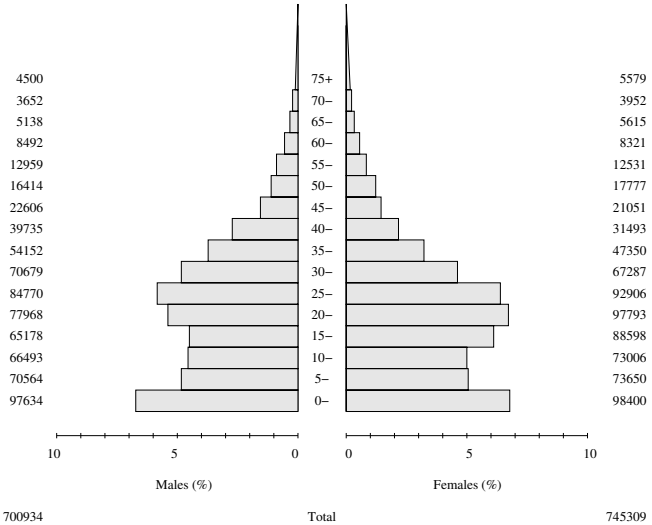
The Zimbabwe National Cancer Registry (ZNCR), formerly named the Harare Cancer Registry, was established in 1985 as a result of a collaborative research agreement between the Zimbabwe Ministry of Health and Child Care (MoHCC) and IARC. The registry initially targeted the population of the capital city of Harare but did not exclude cancer cases from other parts of the country. Since achieving complete reporting and coverage of Harare in 1990, the ZNCR has aimed to achieve complete reporting for the entire population of Zimbabwe. Great strides have been made towards this goal after the successful revival of the Bulawayo Cancer Registry in 2011. The National Cancer Prevention and Control Strategy 2014–2018 unveiled by the MoHCC in February 2014 envisages strengthening the ZNCR by extending registration to other parts of the country.

The ZNCR is located in the Parirenyatwa Group of Hospitals complex, a large public tertiary referral centre that provides most of the cancer management services for the northern part of the country and is one of the two teaching hospitals of the University of Zimbabwe's College of Health Sciences. The registry activities are overseen by a multidisciplinary advisory committee. The registry manager, supported by five health information assistants, is responsible for the day-to-day management of the registry under the guidance of the medical director. The ZNCR is financially supported by the MoHCC and other organizations.

The ZNCR covers the entire population of Zimbabwe, but the subset of registry data presented in this volume is specifically for the Black population of the city of Harare.

The average annual population-at-risk estimates corresponding to the ZNCR data presented in this volume are shown in the population pyramid.

Zimbabwe, Harare: Black (2010–2012)
Population pyramid (average annual person-years by sex and age group)



Source: The Zimbabwe National Statistics Agency (ZIMSTAT); 2003–2012 estimates assume a constant rate of growth within the age groups between census counts (performed in 2002 and 2012)

The ZNCR uses a combination of active and passive methods of case finding. To collect cases, ZNCR staff members visit institutions within the health care delivery system in Harare that are involved in the management of cancer patients. Routine visits are made to inpatient wards, outpatient oncology clinics, and the medical records departments of the three government referral hospitals: the Parirenyatwa Group of Hospitals, Harare Central Hospital, and Chitungwiza Central Hospital. Patient interviews are also conducted in order to accurately record patient demographics. Registry staff members regularly visit the city's three major private hospitals (St Anne's Hospital, the Avenues Clinic, and West End Hospital) to collect cancer registration forms prepared by the hospital staff. Registry staff members also visit the two municipal hospitals in Harare: Beatrice Road Infectious Diseases Hospital and Wilkins Infectious Diseases Hospital.

Other important sources of information are the public and private pathology laboratories in the city; the radiotherapy centre, radiology department, and haematology department of the Parirenyatwa Group of Hospitals; the University of Zimbabwe Oral Health Centre; and the Harare death registry.

Cancer notification forms are completed for each case identified at the various sources. To prevent duplicate registrations, the abstract forms are manually and electronically matched with the existing records in the database.

The death certificates for deaths occurring in greater Harare and the dormitory town of Chitungwiza are reviewed weekly to identify deaths caused by cancer.

Cases are coded according to ICD-O-3. The ZNCR follows the IARC/IACR rules on multiple primary cancers (IARC, 2004b). The registry currently uses IARC's CanReg4 software for data processing; plans are under way to migrate to CanReg5.

The ZNCR strictly follows the IARC/IACR guidelines on confidentiality (IARC, 2004a). Written requests for data must be approved by the medical director and by the data release subcommittee of the advisory committee.

YEARS PRESENTED

2010–2012 (a 3-year period)

NOTES

Results for 2003–2006 were reported in Volume X of *Cancer Incidence in Five Continents*. In the subsequent 3 years, registration was deficient due to the country's severe economic problems, which led to reduced clinical and diagnostic services (Chokunonga et al., 2013). The ZNCR results presented in this volume are for the Black African population of Harare only. The population-at-risk estimate was derived from the total population (by sex) at the census of 2012; estimates of the age distribution and the size of the White population were based on data from 2002.

The observed incidence rates are very high. The age-standardized incidence rate (ASR) of cancer at all

anatomical sites combined (excluding non-melanoma skin cancer) is 265.3 cases per 100 000 person-years in males and 290.5 cases per 100 000 person-years in females. The incidence of cervical cancer is especially high; the ASR, at 85.9 cases per 100 000 person-years, is one of the highest ever reported. The incidence rates of cancers of the stomach, pancreas, and corpus uteri; of myeloma; of non-Hodgkin lymphoma; and of cancers of the lung and prostate are also high; the rates of lung and prostate cancers are the highest reported in this volume.

The overall percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer) is 68% in males and 77% in females. These average values are lowered by the inclusion of cases of oesophageal cancer and Kaposi sarcoma, which are typically diagnosed clinically or radiologically, and by the inclusion of death-certificate-only cases, which account for 14% and 11% of the registered cases in males and females, respectively. The percentage of death-certificate-only cases (DCO%) is particularly high for cancers of the liver, lung, and central nervous system, and cancers coded as occurring at "other and unspecified" anatomical sites.

Table 4.02 shows the ASRs of the 16 most common cancers in males and females in 2003–2006 (reported in Volume X of *Cancer Incidence in Five Continents*) compared with the current data. The most striking changes are the increases in the incidence of breast cancer in females, prostate cancer, and non-Hodgkin lymphoma in both sexes. There have been decreases in the incidence of Kaposi sarcoma and cancers of the oesophagus and liver.

Table 4.02. World age-standardized incidence rates (ASRs), expressed as cases per 100 000 person-years, of the 16 most common cancers in Black males (M) and Black females (F) in Harare, Zimbabwe, in 2003–2006 (Forman et al., 2014) and in 2010–2012, by anatomical site

Anatomical site (ICD-10 code)	Sex	2003–2006	2010–2012
Lip, oral cavity, and pharynx (C00–14)	M	4.3	6.5
	F	3.3	3.9
Oesophagus (C15)	M	22.2	16.4
	F	15.3	13.1
Stomach (C16)	M	11.7	18.7
	F	14.2	16.3
Colorectum and anus (C18–21)	M	13.0	15.1
	F	11.1	12.6
Liver (C22)	M	16.7	12.6
	F	13.9	9.7
Trachea, bronchus, and lung (C33–34)	M	10.1	13.4
	F	6.4	4.6
Kaposi sarcoma (C46)	M	37.3	20.1
	F	23.5	9.7
Breast (C50)	F	33.9	42.3
Cervix uteri (C53)	F	86.7	85.9
Corpus uteri (C54)	F	10.0	10.3
Ovary (C56)	F	10.9	6.8
Prostate (C61)	M	62.4	86.0
Bladder (C67)	M	9.4	5.7
	F	6.2	4.9
Eye (C69)	M	5.5	3.9
	F	3.2	4.9
Non-Hodgkin lymphoma (C82–85, C96)	M	8.8	16.7
	F	10.0	13.0
Leukaemia (C91–95)	M	2.6	3.4
	F	3.1	2.8
All sites except C44 (C00–96 exc. C44)	M	244.5	265.3
	F	299.5	290.5

SUMMARY

The incidence rates are very high. Some distortion may be due to the relatively high DCO%; the anatomical sites of the death-certificate-only cases suggest metastases. Some of the changes since 2003–2006 may be due to changes in the estimation of the population denominators since the 2012 census results became available.

PUBLICATIONS AND ACHIEVEMENTS

The registry is a founding member of the African Cancer Registry Network (AFCRN). It hosted the 2014 Second AFCRN Annual Review Meeting.

Bassett MT, Chokunonga E, Mauchaza B, Levy L, Ferlay J, Parkin DM (1995). Cancer in the African population of Harare, Zimbabwe, 1990-1992. Int J Cancer. 63(1):29–36. http://dx.doi.org/10.1002/ijc.2910630107 PMID:7558448

Bassett MT, Levy L, Chokunonga E, Mauchaza B, Ferlay J, Parkin DM (1995). Cancer in the European population of Harare, Zimbabwe, 1990-1992. Int J Cancer. 63(1):24–8. http://dx.doi.org/10.1002/ijc.2910630106 PMID:7558447

Chokunonga E, Borok MZ, Chirenje ZM, Nyakabau AM, Parkin DM (2013). Trends in the incidence of cancer in the Black population of Harare, Zimbabwe 1991-2010. Int J Cancer. 133(3):721–9. http://dx.doi.org/10.1002/ijc.28063 PMID:23364833

Chokunonga E, Levy LM, Bassett MT, Borok MZ, Mauchaza BG, Chirenje MZ, et al. (1999). AIDS and cancer in Africa: the evolving epidemic in Zimbabwe. AIDS. 13(18):2583–8. http://dx.doi.org/10.1097/00002030-199912240-00012 PMID:10630528

Chokunonga E, Windridge P, Sasieni P, Borok M, Parkin DM (2016). Black-White differences in cancer risk in Harare, Zimbabwe, during 1991-2010. Int J Cancer. 138(6):1416–21. http://dx.doi.org/10.1002/ijc.29883 PMID:26437451

Zimbabwe, Harare: Black (2010–2012)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	23	1	100	0	-	-	-	-	1	1	-	1	1	2	3	5	1	-	3	4	1.1	1.0	0.29	**2.6**	C00-06
Salivary gland	14	0	93	7	-	-	1	1	-	2	1	1	1	-	2	-	1	1	1	2	0.7	0.6	0.14	**1.3**	C07-08
Nasopharynx	17	1	94	6	-	-	1	1	4	2	-	-	-	1	1	3	1	1	1	-	0.8	0.7	0.18	**1.4**	C11
Other pharynx	10	1	90	0	-	-	-	-	1	-	-	-	2	-	-	1	1	2	2	-	0.5	0.4	0.22	**1.3**	C09-10, C12-14
Oesophagus	126	2	58	15	-	-	-	1	-	1	5	8	10	2	8	10	13	14	19	33	6.0	5.5	1.91	**16.4**	C15
Stomach	136	0	69	18	-	-	-	-	1	-	2	3	7	10	13	14	15	18	24	29	6.5	6.0	2.40	**18.7**	C16
Colon	60	2	82	10	-	-	-	-	2	3	3	3	2	2	4	5	6	12	5	11	2.9	2.6	0.92	**7.6**	C18
Rectum	47	1	66	17	-	-	-	-	-	-	2	3	2	4	3	8	2	6	8	8	2.2	2.1	0.80	**6.0**	C19-20
Anus	13	1	100	0	-	-	-	-	-	-	1	2	-	1	3	-	-	1	3	1	0.6	0.6	0.23	**1.5**	C21
Liver	119	0	18	31	-	-	1	3	2	2	12	10	11	7	7	13	4	7	14	26	5.7	5.2	1.36	**12.6**	C22
Gallbladder etc.	14	0	93	7	-	-	-	-	-	-	-	-	1	1	-	2	-	-	2	8	0.7	0.6	0.13	**1.9**	C23-24
Pancreas	32	0	19	53	-	-	1	-	-	-	-	-	-	2	2	2	4	5	6	10	1.5	1.4	0.58	**4.8**	C25
Larynx	39	2	92	3	-	-	-	-	-	-	-	-	2	1	5	4	8	6	5	6	1.9	1.7	0.74	**5.6**	C32
Trachea, bronchus, and lung	95	0	41	32	-	-	-	-	-	1	1	-	3	7	6	11	12	10	14	30	4.5	4.2	1.47	**13.4**	C33-34
Bone	28	0	93	4	2	2	3	3	1	3	6	3	-	1	1	-	1	1	-	1	1.3	1.2	0.12	**1.5**	C40-41
Melanoma of skin	18	0	100	0	-	-	-	-	-	-	-	5	-	3	1	2	1	1	2	3	0.9	0.8	0.22	**1.9**	C43
Non-melanoma skin	65	2	100	0	-	2	-	1	2	4	3	4	6	6	4	3	5	4	5	14	3.1		0.66	**6.9**	C44
Mesothelioma	3	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	0.1	0.1	0.05	**0.5**	C45
Kaposi sarcoma	293	5	46	7	2	3	3	7	7	25	41	53	46	28	14	19	7	12	5	16	13.9	12.9	1.93	**20.1**	C46
Connective and soft tissue	28	1	96	4	4	1	-	1	3	2	2	2	1	3	2	2	1	-	-	3	1.3	1.2	0.13	**1.9**	C47, C49
Breast	14	0	86	0	-	-	-	-	-	-	-	1	-	2	2	3	-	2	1	3	0.7	0.6	0.19	**1.7**	C50
Penis	23	2	96	0	-	-	-	-	-	1	1	-	8	4	2	2	2	-	-	1	1.1	1.0	0.17	**1.8**	C60
Prostate	533	14	68	21	-	-	-	-	-	-	2	-	3	2	3	19	55	85	119	231	25.3	23.4	9.83	**86.0**	C61
Testis	3	0	33	0	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	0.1	0.1	0.07	**0.4**	C62
Kidney and renal pelvis	29	1	90	7	5	2	-	1	-	-	-	2	1	2	2	2	3	1	4	3	1.4	1.3	0.37	**3.0**	C64-65
Bladder	40	0	42	25	-	-	-	-	-	-	-	1	2	1	1	5	3	3	7	17	1.9	1.8	0.57	**5.7**	C67
Ureter and other urinary	1	0	0	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.0	0.0	0.00	**0.1**	C66, C68
Eye	61	2	100	0	6	1	-	-	1	6	6	8	10	6	8	4	1	1	1	-	2.9	2.7	0.39	**3.9**	C69
Brain and nervous system	40	0	38	32	4	3	1	5	1	1	3	8	2	2	3	1	2	1	2	1	1.9	1.8	0.29	**2.7**	C70-72
Thyroid	5	0	80	0	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	2	0.2	0.2	0.01	**0.5**	C73
Hodgkin lymphoma	15	0	100	0	-	4	1	2	3	2	1	-	2	-	-	-	-	-	-	-	0.7	0.7	0.04	**0.6**	C81
Non-Hodgkin lymphoma	201	2	99	0	2	4	2	9	4	6	11	24	44	23	17	14	10	13	9	7	9.6	8.8	1.92	**16.7**	C82-85, C96
Multiple myeloma	28	0	96	4	-	-	-	-	-	-	-	4	3	1	1	3	3	3	2	8	1.3	1.2	0.33	**3.4**	C90
Lymphoid leukaemia	10	1	100	0	3	2	1	1	-	-	-	-	-	-	-	-	1	-	-	1	0.5	0.4	0.04	**0.7**	C91
Myeloid leukaemia	16	0	94	6	2	-	-	2	-	1	-	1	1	2	1	1	2	1	1	1	0.8	0.7	0.17	**1.5**	C92-94
Leukaemia, unspecified	21	0	86	14	5	1	2	3	-	1	1	1	3	1	1	-	2	-	-	-	1.0	0.9	0.10	**1.2**	C95
Other and unspecified	124	2	80	13	1	1	1	2	2	5	1	6	16	7	12	11	15	9	13	20	5.9	5.4	1.63	**14.1**	O&U
All sites	2344	43	69	14	36	26	18	43	36	69	107	154	190	134	133	169	182	222	279	503	111.5		30.59	**272.2**	C00-96
All sites except C44	2279	41	68	14	36	24	18	42	34	65	104	150	184	128	129	166	177	218	274	489	108.4	100.0	29.93	**265.3**	C00-96 exc. C44
Average annual population					97634	70564	66493	65178	77968	84770	70679	54152	39735	22606	16414	12959	8492	5138	3652	4500	700933				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Zimbabwe, Harare: Black (2010–2012)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	15	0	93	0	-	-	-	-	-	-	-	1	3	1	-	2	2	3	-	3	0.7	0.5	0.18	**1.8**	C00-06
Salivary gland	11	0	91	0	-	-	1	-	-	1	2	-	-	1	1	3	1	-	1	-	0.5	0.4	0.13	**1.0**	C07-08
Nasopharynx	8	0	75	12	-	-	1	-	-	-	1	1	-	2	1	1	-	1	-	-	0.4	0.3	0.08	**0.7**	C11
Other pharynx	6	0	67	33	-	-	-	-	1	1	-	-	-	-	1	1	-	-	1	1	0.3	0.2	0.07	**0.5**	C09-10, C12-14
Oesophagus	108	0	43	28	-	-	-	-	-	1	2	3	3	5	17	15	10	10	13	29	4.8	3.6	1.48	**13.1**	C15
Stomach	128	0	70	17	-	-	-	-	1	1	1	6	9	5	12	10	13	16	27	27	5.7	4.3	2.23	**16.3**	C16
Colon	56	1	75	14	-	-	-	-	-	-	2	1	1	4	11	9	8	8	2	9	2.5	1.9	0.76	**6.8**	C18
Rectum	47	0	68	19	-	-	-	-	-	2	4	8	2	-	1	7	4	3	5	11	2.1	1.6	0.53	**4.8**	C19-20
Anus	12	0	83	8	-	-	-	-	-	-	3	-	-	1	5	-	1	-	-	2	0.5	0.4	0.08	**1.1**	C21
Liver	82	0	18	24	-	1	-	1	-	-	3	5	6	6	3	5	14	8	7	23	3.7	2.8	1.02	**9.7**	C22
Gallbladder etc.	13	0	77	23	-	-	-	-	-	-	-	-	-	1	1	1	1	-	2	7	0.6	0.4	0.13	**1.6**	C23-24
Pancreas	40	0	30	42	-	-	-	-	-	-	-	1	1	3	2	3	7	9	4	10	1.8	1.3	0.67	**5.5**	C25
Larynx	2	0	0	100	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	0.1	0.1	0.01	**0.2**	C32
Trachea, bronchus, and lung	37	0	46	32	1	-	-	1	-	1	1	1	-	2	3	4	3	4	8	8	1.7	1.2	0.62	**4.6**	C33-34
Bone	25	0	92	8	2	-	3	1	1	3	1	-	1	2	4	-	1	1	2	3	1.1	0.8	0.21	**2.0**	C40-41
Melanoma of skin	41	0	98	2	1	-	-	-	-	-	2	3	1	1	1	4	4	5	5	14	1.8	1.4	0.53	**5.0**	C43
Non-melanoma skin	72	1	99	1	1	-	2	-	2	5	11	3	7	3	3	4	2	4	9	15	3.2		0.75	**6.6**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	182	6	47	7	3	7	2	-	12	24	39	36	20	11	5	3	3	4	1	6	8.1	6.1	0.84	**9.7**	C46
Connective and soft tissue	42	1	100	0	1	1	-	2	1	1	5	3	1	4	6	5	6	3	-	2	1.9	1.4	0.41	**3.8**	C47, C49
Breast	427	11	87	8	-	-	-	1	1	8	18	46	70	54	45	54	35	33	26	25	19.1	14.4	5.07	**42.3**	C50
Vulva	40	1	98	0	-	-	1	-	-	1	3	7	6	5	6	3	-	2	1	4	1.8	1.3	0.31	**3.3**	C51
Vagina	7	0	100	0	-	-	-	-	-	-	1	-	2	-	2	1	1	-	-	-	0.3	0.2	0.07	**0.6**	C52
Cervix uteri	862	18	86	7	-	-	-	-	3	16	50	86	102	126	113	86	76	59	48	79	38.6	29.0	9.70	**85.9**	C53
Uterus	77	1	79	12	-	-	-	1	-	2	-	-	5	2	1	8	16	14	8	19	3.4	2.6	1.25	**10.4**	C54-55
Ovary	72	3	61	17	-	-	-	2	2	7	2	11	3	4	7	6	8	3	6	8	3.2	2.4	0.79	**6.8**	C56
Placenta	21	1	100	0	-	-	-	-	6	4	3	4	1	-	1	-	-	-	1	-	0.9	0.7	0.10	**0.9**	C58
Kidney and renal pelvis	22	0	86	9	7	3	-	-	-	-	-	4	-	1	1	3	-	-	-	3	1.0	0.7	0.09	**1.5**	C64-65
Bladder	44	0	57	27	-	-	-	-	1	-	1	3	1	3	9	6	4	4	3	9	2.0	1.5	0.53	**4.9**	C67
Ureter and other urinary	1	0	100	0	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0.0	0.0	0.01	**0.1**	C66, C68
Eye	74	0	97	0	4	-	-	-	1	6	14	8	14	9	10	2	2	2	-	2	3.3	2.5	0.45	**4.9**	C69
Brain and nervous system	45	0	40	33	4	4	4	1	-	3	4	3	3	1	5	7	2	-	-	4	2.0	1.5	0.26	**3.2**	C70-72
Thyroid	43	0	72	21	-	-	-	-	-	-	3	2	1	3	6	7	4	4	8	5	1.9	1.4	0.73	**5.1**	C73
Hodgkin lymphoma	9	1	100	0	-	-	-	1	1	-	-	1	2	-	-	1	-	1	-	1	0.4	0.3	0.07	**0.7**	C81
Non-Hodgkin lymphoma	197	3	96	3	4	1	7	6	12	16	23	32	22	25	15	11	6	4	2	8	8.8	6.6	1.20	**13.0**	C82-85, C96
Multiple myeloma	30	0	97	0	-	-	-	-	-	-	1	1	1	3	2	7	3	5	6	1	1.3	1.0	0.61	**3.9**	C90
Lymphoid leukaemia	16	0	100	0	1	3	4	-	1	-	-	-	1	-	-	2	-	-	2	2	0.7	0.5	0.14	**1.2**	C91
Myeloid leukaemia	14	0	100	0	2	1	1	-	1	1	-	-	1	2	3	1	-	1	-	-	0.6	0.5	0.10	**1.0**	C92-94
Leukaemia, unspecified	9	0	89	11	2	-	-	2	-	-	1	1	1	1	-	-	-	1	-	-	0.4	0.3	0.06	**0.6**	C95
Other and unspecified	110	0	65	22	-	1	-	2	5	5	3	8	5	7	9	12	11	12	7	23	4.9	3.7	1.26	**11.8**	O&U
All sites	3047	48	77	11	33	22	26	21	52	109	204	289	297	299	312	294	248	224	205	364	136.3		33.58	**297.1**	C00-96
All sites except C44	2975	47	77	11	32	22	24	21	50	104	193	286	290	296	309	290	246	220	196	349	133.1	100.0	32.83	**290.5**	C00-96 exc. C44
Average annual population					98400	73650	73006	88598	97793	92906	67287	47350	31493	21051	17777	12531	8321	5615	3952	5579	745308				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

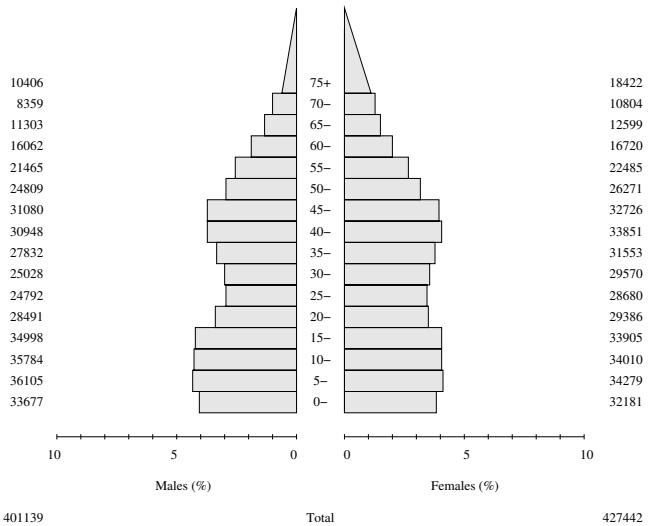
France, Réunion

The Registre des Cancers de la Réunion was founded in 1988. Since 2010, it has been managed by the public health department of the University Hospital Centre (CHU) of Réunion. The registry is run by a public health specialist and staffed by two full-time registrars. It is based in the clinical research and epidemiology unit of CHU Félix Guyon and is financed by the French Regional Health Agency for the Indian Ocean (ARS OI).

The Registre des Cancers de la Réunion covers the entire population of Réunion (one of the five overseas regions of France); since 2005, the registry has also recorded all cancer cases diagnosed in paediatric patients (i.e. aged < 18 years) in the neighbouring French island of Mayotte. The subset of registry data presented in this volume is specifically for the population of Réunion, which is cosmopolitan and diverse, with residents of mainly European, African, Malagasy, and Indian descent. The population is relatively young for a developed country.

The population of Réunion is estimated by the French National Institute of Statistics and Economic Studies (INSEE) to have been about 850 000 in 2014. The total population of Mayotte is estimated to have been about 215 000 in 2012 (at the most recent census), with an estimated 108 000 inhabitants (about 50%) aged < 18 years. The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

France, Réunion (2011)
Population pyramid (average annual person-years by sex and age group)



Source: Institut National de la Statistique et des Etudes Economiques (INSEE) of France; estimates based on the censuses of 1999, 2006, and 2012; intercensal estimates taking into account the births–deaths balance and net migration

There are two public hospitals and one private clinic that provide cancer care in Réunion; within these three facilities there are a total of three oncology/haematology units, two radiotherapy centres, one paediatric oncology unit, and one nuclear medicine unit providing scintigraphy and positron emission tomography (PET) scans. There are six pathology units, located in the cities of Saint-Denis and Saint-Pierre. There is no histopathology laboratory in Mayotte; all analyses are performed in Réunion, and all paediatric cancers that are diagnosed in Mayotte are treated in Réunion.

The registry collects cases from four public hospitals: the CHU of Réunion (which has two facilities: CHU Félix Guyon in Saint-Denis and CHU Sud Réunion in Saint-Pierre), the Centre Hospitalier Gabriel Martin in Saint-Paul, the Groupe Hospitalier Est Réunion (GHER) in Saint-Benoît, and the Centre Hospitalier de Mayotte in Mamoudzou. The registry also collects cases from five private clinics: Clinique Sainte-Clotilde in Saint-Denis, Clinique Saint-Vincent in Saint-Denis, Clinique des Orchidées in Le Port, Clinique Jeanne d'Arc in Le Port, and Clinique Durieux in Le Tampon. The other sources of information are five of the six histopathology laboratories in Réunion, the CHU of Réunion's two haematology laboratories, the regional cancer network (ONCORUN), and the social security system. Cases from the public hospitals and private clinics are registered using the Programme de Médicalisation des Systèmes d'Information (PMSI), the French equivalent of the Diagnosis-Related Groups (DRGs) used in the USA.

In France, the cause of death is not indicated on individual death certificates, so French death certificates are not useful sources of information for cancer registration.

Registration is active and is facilitated by the fact that most of the requested data are digitized at all levels. Comprehensive patient identifiers are included in all databases, facilitating record linkages.

For each case, inclusion criteria are assessed and data are collected from medical records. Cases are coded according to IARC, European Network of Cancer Registries (ENCR), and the French Network of Cancer Registries (FRANCIM) guidelines, and entered into a database. The database management software, which is customized locally, is used for all registry activities; it is installed on a server that is hosted, fully secured, and maintained by the CHU.

YEARS PRESENTED

2011 (a 1-year period)

NOTES

The registry was inactive for several years after 2006, and although retrospective data collection has since taken place, it was incomplete for the years 2009 and 2010. Therefore, only results for 2011 are presented.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 257.4 cases per 100 000 person-years in males and 178.5 cases per 100 000 person-years in females. These values are relatively high compared with the reference values for eastern Africa reported in GLOBOCAN 2012. The

patterns of cancer incidence by anatomical site are also substantially different from those seen in the mainland countries of eastern Africa, with relatively high incidence of cancers of the prostate and lung (the highest reported in this volume), oral cavity and pharynx, colorectum, and breast, as well as of leukaemia, and with relatively low rates of cancers of the oesophagus and cervix, as well as of Kaposi sarcoma (with only 1 case recorded in 2011). This is not surprising given the very different populations (in terms of ethnicity and lifestyle); indeed, the patterns of cancer incidence in Réunion more closely resemble those of metropolitan France than those of mainland eastern Africa.

Table 4.03. The number of deaths due to cancer, as reported in the WHO Mortality Database (WHO, 2017), and the corresponding mortality-to-incidence (M:I) ratios in males (M) and females (F) in Réunion, France, in 2005–2008 and 2011, by anatomical site

Anatomical site (ICD-10 code)	Sex	Deaths	M:I (%)
Lip, oral cavity, and pharynx (C00–14)	M	189	44
	F	30	35
Oesophagus (C15)	M	170	80
	F	19	68
Stomach (C16)	M	232	71
	F	139	75
Colorectum and anus (C18–21)	M	230	44
	F	196	42
Liver (C22)	M	141	121
	F	79	130
Pancreas (C25)	M	109	123
	F	101	105
Trachea, bronchus, and lung (C33–34)	M	624	92
	F	149	84
Breast (C50)	F	254	20
Cervix uteri (C53)	F	62	24
Uterus, other and unspecified (C54–55)	F	86	60
Prostate (C61)	M	288	20
Bladder (C67)	M	69	43
	F	21	52
Kidney, renal pelvis, ureter, and other urinary (C64–66, C68)	M	40	34
	F	22	33
Lymphoma (C81–88, C90)	M	103	41
	F	89	42
Leukaemia (C91–95)	M	84	45
	F	72	61
All sites (C00–97)	M	2825	53
	F	1782	45

The percentage of microscopically verified cases (MV%) is 93% in males and 96% in females. As explained above, cases are not registered on the basis of death certificate information only.

Because registration of death by cause is comprehensive in Réunion (as it is in all of France), the number of deaths due to cancer can be compared with the number of cancer cases registered for the same time period. The reported numbers of deaths due to cancer and the calculated mortality-to-incidence (M:I) ratios for the 5 years of 2005–2008 and 2011 are shown in Table 4.03.

The overall M:I ratio is reasonable, at 53.3% in males and 44.8% in females; the equivalent figures for Europe reported in GLOBOCAN 2012 are 54% in males and 49% in females. The M:I ratios for cancers at individual anatomical sites are also what would be expected (i.e. about 100% minus the survival rate), although the ratios are > 100% for cancers of the liver and pancreas. This is a typical finding in French cancer registries, due to peculiarities of the death certification practices.

SUMMARY

The incidence rates are closer to those of metropolitan France than to those of mainland eastern Africa, and the M:I ratios are consistent with accurate registration practices.

PUBLICATIONS AND ACHIEVEMENTS

The Registre des Cancers de la Réunion became a member of the African Cancer Registry Network (AFCRN) in 2015.

Caliez F, Chirpaz E, Ravault M-C (2013). Le cancer, évolution à la Réunion jusqu'en 2011. Plateforme d'Information des Etudes en Santé. Available from: http://www.arsoi-notresante.fr/actualite/le-cancer-evolution-la-reunion-jusquen-2011.

France, Réunion (2011)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	42	0	98		-	-	-	-	-	-	-	2	2	8	2	9	9	3	2	5	10.5	3.6	0.98	**8.9**	C00-06
Salivary gland	2	0	100		-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	0.5	0.2	0.03	**0.4**	C07-08
Nasopharynx	4	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	2	-	1	1.0	0.3	0.10	**0.9**	C11
Other pharynx	50	0	98		-	-	-	-	-	-	-	-	2	3	10	9	8	8	8	2	12.5	4.3	1.57	**11.1**	C09-10, C12-14
Oesophagus	32	0	97		-	-	-	-	-	-	-	-	2	2	3	7	8	3	4	3	8.0	2.8	0.91	**7.0**	C15
Stomach	77	0	96		-	-	-	-	-	-	-	1	-	2	7	13	12	9	14	19	19.2	6.6	2.10	**16.8**	C16
Colon	79	0	100		-	-	-	-	-	-	-	-	1	4	14	11	12	13	9	15	19.7	6.8	2.11	**17.3**	C18
Rectum	51	0	96		-	-	-	-	-	-	-	-	-	2	5	5	11	10	8	10	12.7	4.4	1.51	**11.6**	C19-20
Anus	2	0	100		-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	0.5	0.2	0.05	**0.4**	C21
Liver	35	0	57		-	-	-	-	-	-	-	1	3	1	2	5	6	6	4	7	8.7	3.0	0.93	**7.7**	C22
Gallbladder etc.	9	0	89		-	-	-	-	-	-	-	-	-	-	-	2	-	3	2	2	2.2	0.8	0.30	**2.0**	C23-24
Pancreas	24	0	88		-	-	-	-	-	-	1	-	1	4	2	4	-	3	4	5	6.0	2.1	0.61	**5.1**	C25
Larynx	23	0	100		-	-	-	-	-	-	-	-	1	1	6	2	8	2	3	-	5.7	2.0	0.72	**5.2**	C32
Trachea, bronchus, and lung	167	0	86		-	-	-	-	-	-	-	2	4	10	15	29	19	24	29	35	41.6	14.4	4.63	**36.3**	C33-34
Bone	5	0	100		-	1	1	1	-	-	-	-	1	-	-	1	-	-	-	-	1.2	0.4	0.08	**1.2**	C40-41
Melanoma of skin	15	0	100		-	-	-	-	-	-	2	2	1	2	3	1	-	2	1	1	3.7	1.3	0.36	**3.2**	C43
Non-melanoma skin	40	0	100		-	-	-	-	-	1	-	-	-	4	2	2	6	2	3	20	10.0		0.63	**8.5**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	1	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.2	0.1	0.02	**0.2**	C46
Connective and soft tissue	5	0	100		1	-	-	-	-	1	-	-	-	1	-	-	1	1	-	-	1.2	0.4	0.13	**1.4**	C47, C49
Breast	4	0	75		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	1.0	0.3	0.06	**0.8**	C50
Penis	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C60
Prostate	289	0	97		-	-	-	-	-	-	-	-	-	5	23	36	45	67	49	64	72.0	24.9	8.68	**65.3**	C61
Testis	12	0	83		-	-	-	1	2	2	3	1	2	-	-	-	1	-	-	-	3.0	1.0	0.23	**3.0**	C62
Kidney and renal pelvis	34	0	82		-	-	1	-	-	-	-	-	2	5	2	7	5	4	4	4	8.5	2.9	0.90	**7.3**	C64-65
Bladder	42	0	83		-	-	-	-	-	-	1	1	-	1	2	4	3	3	12	15	10.5	3.6	1.13	**9.1**	C67
Ureter and other urinary	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.2	0.1	0.00	**0.2**	C66, C68
Eye	2	0	100		1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0.5	0.2	0.07	**0.6**	C69
Brain and nervous system	11	0	73		1	-	-	-	-	-	-	1	-	2	2	-	2	1	2	-	2.7	0.9	0.33	**2.6**	C70-72
Thyroid	7	0	86		-	-	-	1	-	-	1	1	-	-	1	-	-	1	1	1	1.7	0.6	0.18	**1.6**	C73
Hodgkin lymphoma	8	0	100		-	-	-	2	1	1	1	-	1	-	-	2	-	-	-	-	2.0	0.7	0.15	**1.9**	C81
Non-Hodgkin lymphoma	30	0	97		-	-	-	-	1	-	-	1	-	3	4	7	3	4	3	4	7.5	2.6	0.78	**6.5**	C82-85, C96
Multiple myeloma	15	0	100		-	-	-	-	-	-	-	-	1	3	2	2	-	2	-	5	3.7	1.3	0.24	**3.0**	C90
Lymphoid leukaemia	19	0	100		1	4	-	1	-	-	1	1	3	-	-	-	1	4	-	3	4.7	1.6	0.38	**4.6**	C91
Myeloid leukaemia	26	0	100		-	-	1	-	1	-	-	-	1	-	3	2	5	3	4	6	6.5	2.2	0.68	**5.9**	C92-94
Leukaemia, unspecified	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C95
Other and unspecified	36	0	83		-	-	-	1	-	-	-	1	1	-	3	2	10	3	4	11	9.0	3.1	0.84	**8.0**	O&U
All sites	1199	0	93		4	5	3	7	5	5	11	15	29	66	113	163	176	183	172	242	298.9		32.42	**265.8**	C00-96
All sites except C44	1159	0	93		4	5	3	7	5	4	11	15	29	62	111	161	170	181	169	222	288.9	100.0	31.79	**257.4**	C00-96 exc. C44
Average annual population					33677	36105	35784	34998	28491	24792	25028	27832	30948	31080	24809	21465	16062	11303	8359	10406	401139				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

France, Réunion (2011)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	15	0	100		-	-	-	-	-	-	-	1	-	1	-	2	1	3	1	6	3.5	1.5	0.27	**2.5**	C00-06
Salivary gland	4	0	100		-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	1	0.9	0.4	0.08	**0.9**	C07-08
Nasopharynx	2	0	100		-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	0.5	0.2	0.05	**0.4**	C11
Other pharynx	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.2	0.1	0.02	**0.2**	C09-10, C12-14
Oesophagus	7	0	100		-	-	-	-	-	-	-	-	1	-	1	2	-	-	1	2	1.6	0.7	0.12	**1.1**	C15
Stomach	37	0	97		-	-	-	-	-	1	-	1	2	1	4	3	2	5	5	13	8.7	3.8	0.71	**6.3**	C16
Colon	75	0	96		-	-	-	-	-	-	-	2	1	7	12	8	10	8	14	13	17.5	7.7	1.82	**13.8**	C18
Rectum	48	0	98		-	-	-	-	-	-	-	1	3	2	5	9	7	9	3	9	11.2	4.9	1.09	**9.0**	C19-20
Anus	9	0	89		-	-	-	-	-	-	-	-	-	1	2	2	2	1	-	1	2.1	0.9	0.20	**1.7**	C21
Liver	13	0	69		-	-	-	-	-	-	-	-	1	-	1	1	1	3	3	3	3.0	1.3	0.34	**2.4**	C22
Gallbladder etc.	24	0	92		-	-	-	-	-	-	-	-	-	-	1	-	4	4	5	10	5.6	2.5	0.53	**4.1**	C23-24
Pancreas	24	0	96		-	-	-	-	-	-	-	-	-	-	1	7	4	2	8	2	5.6	2.5	0.74	**4.6**	C25
Larynx	3	0	100		-	-	-	-	-	-	-	1	-	-	-	-	-	1	1	-	0.7	0.3	0.10	**0.6**	C32
Trachea, bronchus, and lung	42	0	93		-	-	-	-	-	-	-	1	3	-	-	5	4	7	5	17	9.8	4.3	0.80	**7.0**	C33-34
Bone	2	0	100		-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	0.5	0.2	0.05	**0.4**	C40-41
Melanoma of skin	21	0	95		-	-	-	-	-	3	2	2	2	1	3	-	1	-	1	6	4.9	2.2	0.30	**3.8**	C43
Non-melanoma skin	36	0	100		-	-	-	-	-	-	-	-	1	5	2	-	3	2	2	21	8.4		0.39	**5.3**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C46
Connective and soft tissue	3	0	100		1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	0.7	0.3	0.03	**0.7**	C47, C49
Breast	332	0	99		-	-	-	-	-	5	11	26	41	51	49	38	28	21	22	40	77.7	34.2	6.54	**61.4**	C50
Vulva	6	0	100		-	-	-	-	-	-	-	-	-	2	-	1	-	1	1	1	1.4	0.6	0.14	**1.1**	C51
Vagina	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C52
Cervix uteri	60	0	100		-	-	-	-	-	-	2	5	7	8	6	8	3	6	3	12	14.0	6.2	1.10	**10.6**	C53
Uterus	34	0	100		-	-	-	-	-	-	-	2	-	1	1	4	7	5	8	6	8.0	3.5	0.93	**6.5**	C54-55
Ovary	36	0	97		-	-	-	2	-	-	-	2	4	4	2	4	8	4	4	2	8.4	3.7	0.89	**7.3**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	20	0	75		1	-	-	-	-	-	-	2	-	1	1	1	3	4	2	5	4.7	2.1	0.44	**3.9**	C64-65
Bladder	16	0	94		-	-	-	-	-	-	-	-	-	-	-	3	6	-	2	5	3.7	1.6	0.34	**2.9**	C67
Ureter and other urinary	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.2	0.1	0.00	**0.1**	C66, C68
Eye	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C69
Brain and nervous system	9	0	56		-	1	1	-	-	-	1	-	-	2	-	1	-	1	1	1	2.1	0.9	0.18	**1.8**	C70-72
Thyroid	9	0	100		-	-	-	-	1	-	-	2	4	-	-	-	-	-	-	2	2.1	0.9	0.11	**1.6**	C73
Hodgkin lymphoma	13	0	100		-	-	1	-	2	3	1	1	1	-	1	-	1	-	1	1	3.0	1.3	0.24	**2.9**	C81
Non-Hodgkin lymphoma	28	0	100		-	-	1	-	1	-	-	-	-	3	1	2	4	6	4	6	6.6	2.9	0.68	**5.4**	C82-85, C96
Multiple myeloma	14	0	79		-	-	-	-	-	-	-	-	1	-	-	1	-	2	4	6	3.3	1.4	0.30	**2.2**	C90
Lymphoid leukaemia	6	0	100		-	1	-	-	-	-	-	-	2	1	-	-	-	-	1	1	1.4	0.6	0.11	**1.1**	C91
Myeloid leukaemia	22	0	100		-	-	-	-	-	1	1	2	2	-	2	2	3	4	-	5	5.1	2.3	0.43	**4.2**	C92-94
Leukaemia, unspecified	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C95
Other and unspecified	35	0	83		-	-	-	-	-	2	-	-	1	3	1	4	2	5	3	14	8.2	3.6	0.60	**5.9**	O&U
All sites	1007	0	96		2	3	3	3	4	15	18	51	77	96	98	108	106	104	106	213	235.6		20.68	**183.8**	C00-96
All sites except C44	971	0	96		2	3	3	3	4	15	18	51	76	91	96	108	103	102	104	192	227.2	100.0	20.29	**178.5**	C00-96 exc. C44
Average annual population					32181	34279	34010	33905	29386	28680	29570	31553	33851	32726	26271	22485	16720	12599	10804	18422	427442				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Mauritius

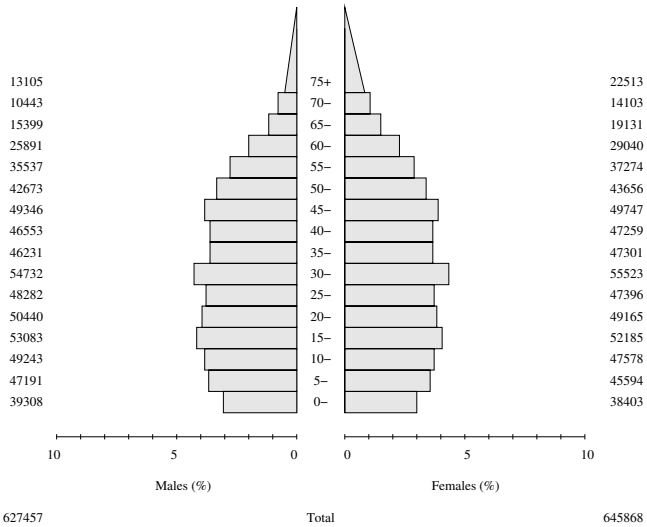
The Mauritius National Cancer Registry (MNCR) was established in 1993 after a field study by a pathologist from the University of Bordeaux II, with financial assistance from the French Cooperation. The MNCR became population-based in 2000 (and has since maintained that status with assistance from WHO/IARC) but has collected data on cancer incidence and mortality throughout Mauritius on a continuous basis since 1993, and retrospectively from 1989. All registry activities, salaries, equipment, and expenses are financed by the Ministry of Health and Quality of Life of Mauritius and by WHO. The MNCR is led by a steering committee and a coordinator. It is based in the Central Health Laboratory of Victoria Hospital in the town of Quatre Bornes. The registry is staffed by two data collection officers, one officer specializing in IARC's CanReg software, and oncology specialists.

The MNCR data presented in this volume are for the registry's coverage area of the entire country of Mauritius. About 68% of the country's residents are Indo-Mauritian (i.e. of Indian descent), 27% are Creole (of African descent), 3% are Sino-Mauritian (of Chinese descent), and 2% are Franco-Mauritian (of French descent). The population density was 673 people/km^2 in 2012, and the population growth rate was 0.4%.

The population of Mauritius is estimated to have been 1 291 167 on 31 December 2012, according to a 2012 health statistics report based on 2000 census data. The average annual population-at-risk estimates corresponding to the MNCR data presented in this volume are shown in the population pyramid.

The entire health care delivery system in Mauritius is served by a single radiotherapy centre and a centralized pathology laboratory.

Mauritius (2010–2012)
Population pyramid (average annual person-years by sex and age group)



Source: Health Statistics Unit, Ministry of Health and Quality of Life of Mauritius, *Health Statistics Report 2012*; estimates based on 2000 census data

The MNCR collects data, both retrospectively and semi-actively, from a variety of information sources, including the radiotherapy register, medical records offices, the centralized pathology laboratory register, the Overseas Treatment Unit, the civil status office, and private clinics and pathology practices.

Radiotherapy register: Valuable information on cancer cases is obtained from the country's single radiotherapy centre at Victoria Hospital in Candos.

Medical records offices: Up-to-date data on patients' cancer status are obtained from the medical records offices of the country's five regional hospitals.

Pathology laboratory register: The centralized pathology laboratory at the Central Health Laboratory in Candos enters all diagnosed cancer cases into an electronic database, from which the information can be retrieved by the MNCR and used for registration.

Overseas Treatment Unit: The MNCR collects information on brain neoplasm cases in residents of Mauritius who receive treatment abroad through the Overseas Treatment Scheme.

Civil status office: The registry has access to cancer-specific mortality data from death certificates via the civil status office. These data are not entered as primary data but are used to update patient status.

Private clinics and pathology practices: In 2001, the MNCR began reaching out to pathologists in private practice, in order to identify cases that have not been followed in a hospital.

Computerized listings of cases coded according to ICD-10 are submitted to the registry from multiple sources twice per year.

The registry uses IARC's CanReg4 software for data entry and processing, which generates standard tables. Further analysis for publications and presentations is carried out using the Epi Info set of software tools.

Great care is taken to avoid duplicate registration, by comparing the characteristics of each case with the master index in order to identify cases diagnosed in previous years, recurrences, or metastases from an already registered cancer.

The statistics department of the Ministry of Health and Quality of Life provides the MNCR with annual listings (from all regional hospitals) of the summary discharge sheets with cancer mentioned as the diagnosis. Comparing this list with the existing registry database allows MNCR personnel to identify any omissions from the registry.

The MNCR obeys all local laws and strictly follows the IARC/IACR guidelines on confidentiality. Access to the registry office and registry files is restricted to authorized personnel, and all electronic systems and files are password-protected. The MNCR has been registered with the Data Protection Office (DPO) of Mauritius as a data controller since 2010.

YEARS PRESENTED
2010–2012 (a 3-year period)

NOTES

In the decade leading up to 2012, there was a slow and steady increase in the annual number of registrations. During the 3-year period reported here, the average rate of registration was 150 cases per month.

It is not surprising that the cancer profile in Mauritius is substantially different from that seen in the mainland countries of eastern Africa, given the very different populations (in terms of ethnicity and lifestyle).

Table 4.04. The number of deaths due to cancer, as reported in the WHO Mortality Database (WHO, 2017), and the corresponding mortality-to-incidence (M:I) ratios in males (M) and females (F) in Mauritius in 2010–2012, by anatomical site

Anatomical site (ICD-10 code)	Sex	Deaths	M:I (%)
Lip, oral cavity, and pharynx (C00–14)	M	114	63
	F	39	51
Oesophagus (C15)	M	63	102
	F	33	118
Stomach (C16)	M	158	114
	F	83	108
Colorectum and anus (C18–21)	M	160	52
	F	137	49
Liver (C22)	M	77	248
	F	54	300
Pancreas (C25)	M	91	186
	F	66	236
Trachea, bronchus, and lung (C33–34)	M	285	133
	F	114	165
Breast (C50)	F	374	30
Cervix uteri (C53)	F	70	27
Uterus, other and unspecified (C54–55)	F	105	51
Prostate (C61)	M	184	62
Bladder (C67)	M	37	35
	F	13	42
Kidney, renal pelvis, ureter, and other urinary (C64–66, C68)	M	33	52
	F	10	36
Lymphoma (C81–88, C90)	M	51	46
	F	34	37
Leukaemia (C91–95)	M	53	84
	F	56	110
All sites (C00–97)	M	1546	65
	F	1490	44

Compared with the reference values for eastern Africa reported in GLOBOCAN 2012, the incidence rates of cancers of the oesophagus, liver, and cervix, and of Kaposi sarcoma, are low, whereas the rates of cancers at other sites (notably the colorectum and breast) are relatively high. Incidence rates of upper gastrointestinal cancers (i.e. of the oral cavity and pharynx, and of the oesophagus) are considerably lower than the corresponding estimates for India.

The percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer) is 91% in males and 92% in females. As explained above, cases are not registered on the basis of death certificate information only.

Because registration of death by cause is comprehensive in Mauritius, the number of deaths due to cancer can be compared with the number of cancer cases registered for the same time period. The reported numbers of deaths due to cancer and the calculated mortality-to-incidence (M:I) ratios for the period of 2010–2012 are shown in Table 4.04.

The overall M:I ratio is reasonable, at 65% in males and 44% in females; the equivalent figures for Europe reported in GLOBOCAN 2012 are 54% in males and 49% in females. The M:I ratios are > 100% for cancers at several anatomical sites that are associated with poor prognosis and/or are difficult to biopsy for diagnostic purposes (oesophagus, stomach, liver, pancreas, and lung).

SUMMARY

The high M:I ratios for cancers at internal anatomical sites may be due to inaccurate certification of cause of death, but given the relatively high MV% (e.g. 98% for oesophageal cancers), it is possible that there is a modest degree of underascertainment of cases not detected by histology.

PUBLICATIONS AND ACHIEVEMENTS

The MNCR became affiliated with IACR in 1997; its first report, pertaining to the 8-year period of 1989–1996, was published in 1999. The most recent report published by the registry pertains to the period of 2009–2013. The MNCR hosted the 33rd Annual Meeting of IACR, in Ukraine in 2011, and became a member of the African Cancer Registry Network (AFCRN) in 2013.

Manraj SS, Fauzee NJS, Mohith A, Adebamowo C (2014). Trends in female breast cancer in the Republic of Mauritius over past two decades. J Clin Oncol. 32(15 Suppl):e1156.

Manraj SS, Mustun H, Ghurhurrun P, Laniece C, Salamon R (1997). Cancer incidence in Mauritius (1989-1993). Rev Epidemiol Sante Publique. 45(3):257–9. [French] PMID:9280989

Manraj SS, Poorun SB, Eddoo MR, Jeebun N, Moussa L, Burhoo P (2006). Cancer incidence in the Republic of Mauritius - 5 years review 1997 to 2001. Internet J Med Update. 1(1):7–12. http://dx.doi.org/10.4314/ijmu.v1i1.39828

Mauritius (2010–2012)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	111	4	100		-	-	-	-	-	1	1	3	5	14	12	22	15	12	10	12	5.9	5.1	0.64	**5.3**	C00-06
Salivary gland	15	0	93		-	-	-	1	-	-	-	-	1	1	-	1	3	3	3	2	0.8	0.7	0.11	**0.8**	C07-08
Nasopharynx	18	0	94		1	-	-	1	1	-	-	-	2	1	1	3	1	4	2	1	1.0	0.8	0.12	**1.0**	C11
Other pharynx	37	0	100		-	-	-	-	-	-	-	-	4	7	3	7	8	-	1	7	2.0	1.7	0.15	**1.7**	C09-10, C12-14
Oesophagus	62	1	100		-	-	-	-	-	-	-	1	1	2	8	6	10	12	7	14	3.3	2.9	0.39	**3.2**	C15
Stomach	139	1	96		-	-	-	-	-	1	1	3	6	12	9	21	24	18	18	25	7.4	6.4	0.86	**7.0**	C16
Colon	178	1	100		-	-	1	2	-	-	1	5	7	16	21	36	24	24	15	25	9.5	8.2	1.02	**8.6**	C18
Rectum	123	0	100		-	-	-	-	-	1	1	2	2	10	16	13	20	20	16	22	6.5	5.7	0.78	**6.3**	C19-20
Anus	7	0	100		-	-	-	-	-	1	-	-	-	-	-	2	2	2	-	-	0.4	0.3	0.05	**0.4**	C21
Liver	31	0	94		-	-	-	-	-	-	1	-	-	1	5	4	4	4	7	5	1.6	1.4	0.23	**1.6**	C22
Gallbladder etc.	15	2	93		-	-	-	-	-	-	-	-	1	3	1	1	2	2	1	2	0.8	0.7	0.08	**0.7**	C23-24
Pancreas	49	0	71		-	-	-	-	-	1	2	-	1	5	4	11	9	4	6	6	2.6	2.3	0.29	**2.4**	C25
Larynx	72	0	100		-	-	-	-	1	-	-	1	2	4	11	8	12	12	12	9	3.8	3.3	0.51	**3.7**	C32
Trachea, bronchus, and lung	214	3	90		-	-	-	-	-	1	-	1	6	18	25	29	27	28	26	50	11.4	9.9	1.23	**10.7**	C33-34
Bone	16	0	94		-	-	6	1	1	1	1	-	1	-	1	1	1	-	1	1	0.8	0.7	0.07	**0.9**	C40-41
Melanoma of skin	5	3	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	0.3	0.2	0.03	**0.3**	C43
Non-melanoma skin	195	56	100		-	-	-	1	1	2	2	4	5	9	15	14	17	21	17	31	10.4		1.14	**9.9**	C44
Mesothelioma	2	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	0.1	0.1	0.02	**0.1**	C45
Kaposi sarcoma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C46
Connective and soft tissue	36	0	100		-	1	3	2	2	3	1	2	4	2	3	1	3	4	1	4	1.9	1.7	0.16	**1.9**	C47, C49
Breast	12	0	100		-	-	-	-	-	-	-	-	1	-	-	4	1	-	4	2	0.6	0.6	0.09	**0.6**	C50
Penis	12	0	92		-	-	-	-	-	-	-	-	-	1	4	4	1	2	-	-	0.6	0.6	0.07	**0.5**	C60
Prostate	297	2	95		-	-	-	-	-	-	-	-	1	3	11	27	33	51	51	118	15.8	13.7	1.77	**16.0**	C61
Testis	28	0	100		-	-	-	3	2	4	6	4	1	3	2	-	1	1	-	1	1.5	1.3	0.10	**1.3**	C62
Kidney and renal pelvis	63	0	98		1	-	-	-	-	-	1	3	8	9	10	7	8	4	3	9	3.3	2.9	0.29	**3.0**	C64-65
Bladder	105	1	96		-	-	-	-	-	-	-	-	2	7	6	13	15	12	18	31	5.6	4.8	0.63	**5.4**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	3	0	100		-	-	-	-	-	-	-	-	-	1	-	-	1	-	1	-	0.2	0.1	0.03	**0.2**	C69
Brain and nervous system	54	0	83		2	1	2	1	1	2	5	4	5	4	4	6	6	5	4	2	2.9	2.5	0.29	**2.7**	C70-72
Thyroid	21	0	95		-	-	1	-	-	4	3	-	1	4	3	2	2	-	-	1	1.1	1.0	0.08	**0.9**	C73
Hodgkin lymphoma	20	0	100		-	1	3	4	1	-	1	-	1	-	3	2	2	2	-	-	1.1	0.9	0.09	**1.0**	C81
Non-Hodgkin lymphoma	70	1	100		-	2	3	2	3	3	4	3	4	9	4	8	9	9	1	5	3.7	3.2	0.34	**3.4**	C82-85, C96
Multiple myeloma	21	0	100		-	-	-	-	-	-	-	-	1	2	1	3	4	3	3	4	1.1	1.0	0.13	**1.1**	C90
Lymphoid leukaemia	10	1	100		-	2	-	-	-	-	1	-	-	-	-	2	1	-	3	-	0.5	0.5	0.08	**0.6**	C91
Myeloid leukaemia	30	0	100		2	1	1	2	1	-	6	1	2	2	1	3	1	3	2	2	1.6	1.4	0.15	**1.6**	C92-94
Leukaemia, unspecified	23	0	100		3	3	1	6	-	2	-	-	-	2	1	1	2	2	-	-	1.2	1.1	0.10	**1.4**	C95
Other and unspecified	269	7	58		4	3	4	5	4	7	2	5	19	16	28	24	29	31	28	53	14.3	12.4	1.47	**13.8**	O&U
All sites	2363	83	92		13	14	25	31	18	34	40	42	94	169	213	286	298	296	262	445	125.5		13.60	**119.8**	C00-96
All sites except C44	2168	27	91		13	14	25	30	17	32	38	38	89	160	198	272	281	275	245	414	115.2	100.0	12.46	**109.9**	C00-96 exc. C44
Average annual population					39308	47191	49243	53083	50440	48282	54732	46231	46553	49346	42673	35537	25891	15399	10443	13105	627457				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Mauritius (2010–2012)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	55	1	98		-	-	-	-	1	-	3	3	3	6	4	4	9	8	3	10	2.8	1.7	0.25	**2.3**	C00-06
Salivary gland	9	1	100		-	-	1	-	-	-	-	-	2	1	1	-	1	-	1	1	0.5	0.3	0.04	**0.4**	C07-08
Nasopharynx	2	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	0.1	0.1	0.00	**0.1**	C11
Other pharynx	10	0	100		-	-	-	-	-	-	-	-	-	1	2	1	3	1	1	1	0.5	0.3	0.05	**0.4**	C09-10, C12-14
Oesophagus	28	0	93		-	-	-	-	-	-	-	1	-	3	2	4	1	2	2	13	1.4	0.9	0.09	**1.0**	C15
Stomach	77	1	97		-	-	-	-	-	3	-	2	4	5	10	13	7	9	10	13	4.0	2.4	0.39	**3.2**	C16
Colon	173	1	98		-	-	-	-	-	3	2	2	5	13	31	27	18	22	18	31	8.9	5.4	0.84	**7.0**	C18
Rectum	103	1	100		-	-	-	-	-	2	1	5	3	12	12	12	15	6	9	25	5.3	3.2	0.43	**4.1**	C19-20
Anus	6	0	100		-	-	-	-	-	-	2	-	-	2	-	-	1	1	-	-	0.3	0.2	0.03	**0.3**	C21
Liver	18	0	89		-	-	-	-	-	-	-	1	-	2	-	1	4	5	3	2	0.9	0.6	0.12	**0.8**	C22
Gallbladder etc.	23	0	91		-	-	-	-	-	1	-	-	-	1	1	3	5	3	1	8	1.2	0.7	0.09	**0.9**	C23-24
Pancreas	28	0	82		-	-	1	-	-	-	-	-	2	4	3	4	5	2	2	5	1.4	0.9	0.12	**1.1**	C25
Larynx	8	0	100		-	-	-	-	-	-	1	-	1	-	-	2	1	-	1	2	0.4	0.2	0.03	**0.3**	C32
Trachea, bronchus, and lung	69	1	84		-	-	-	-	-	-	-	1	3	3	11	9	9	10	8	14	3.6	2.1	0.34	**2.8**	C33-34
Bone	8	0	50		-	1	1	-	-	-	-	2	-	-	2	1	1	-	-	-	0.4	0.2	0.03	**0.4**	C40-41
Melanoma of skin	8	0	100		-	-	-	-	-	-	-	2	-	-	2	-	3	-	-	1	0.4	0.2	0.03	**0.3**	C43
Non-melanoma skin	160	62	100		-	-	-	-	-	1	3	3	7	12	10	7	12	9	11	23	8.3		0.71	**6.4**	C44
Mesothelioma	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.1	0.0	0.01	**0.1**	C45
Kaposi sarcoma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C46
Connective and soft tissue	26	1	96		2	1	-	1	2	-	1	1	2	1	1	1	4	4	2	2	1.3	0.8	0.13	**1.3**	C47, C49
Breast	1266	19	100		-	-	-	1	2	9	39	69	126	169	181	183	161	116	70	121	65.3	39.4	5.77	**51.7**	C50
Vulva	23	0	100		-	-	-	-	-	-	-	-	1	-	1	2	4	1	2	12	1.2	0.7	0.07	**0.8**	C51
Vagina	19	0	89		-	-	-	-	-	-	-	1	2	1	3	3	3	1	-	5	1.0	0.6	0.06	**0.7**	C52
Cervix uteri	262	7	98		-	-	-	-	2	3	12	16	27	36	33	30	33	15	28	20	13.5	8.1	1.27	**10.8**	C53
Uterus	205	3	99		-	-	-	-	-	-	1	6	11	9	23	33	39	33	24	23	10.6	6.4	1.14	**8.6**	C54-55
Ovary	157	2	92		1	-	2	-	5	3	6	3	12	22	39	17	16	11	10	8	8.1	4.9	0.72	**6.6**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	26	1	96		2	-	-	-	-	-	-	-	1	1	2	2	4	5	3	5	1.3	0.8	0.14	**1.2**	C64-65
Bladder	31	0	100		-	-	-	-	-	-	-	-	2	1	6	3	1	8	2	8	1.6	1.0	0.15	**1.3**	C67
Ureter and other urinary	2	0	100		-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	0.1	0.1	0.01	**0.1**	C66, C68
Eye	3	0	100		1	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	0.2	0.1	0.01	**0.2**	C69
Brain and nervous system	52	1	81		3	2	-	2	3	1	3	5	5	3	8	5	4	3	1	3	2.7	1.6	0.21	**2.5**	C70-72
Thyroid	36	0	94		-	-	-	-	2	4	3	7	1	7	-	3	-	1	4	4	1.9	1.1	0.15	**1.5**	C73
Hodgkin lymphoma	13	0	100		-	-	-	1	2	2	1	1	2	-	-	2	-	-	2	-	0.7	0.4	0.06	**0.6**	C81
Non-Hodgkin lymphoma	52	0	100		-	-	-	-	2	2	3	1	6	6	4	7	5	3	5	8	2.7	1.6	0.23	**2.1**	C82-85, C96
Multiple myeloma	27	0	100		-	-	-	-	-	-	-	-	-	3	4	2	5	4	6	3	1.4	0.8	0.17	**1.2**	C90
Lymphoid leukaemia	4	0	100		-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	2	0.2	0.1	0.01	**0.1**	C91
Myeloid leukaemia	30	2	100		1	1	-	1	1	2	-	1	2	2	6	1	3	4	3	-	1.5	0.9	0.16	**1.5**	C92-94
Leukaemia, unspecified	17	2	100		-	1	1	2	-	1	-	-	1	1	2	1	2	2	-	1	0.9	0.5	0.07	**0.8**	C95
Other and unspecified	340	11	49		3	1	-	11	2	7	5	13	25	32	31	35	35	32	39	58	17.5	10.6	1.61	**14.3**	O&U
All sites	3377	117	93		13	7	6	19	24	44	87	146	256	361	436	421	414	322	271	433	174.3		15.76	**139.8**	C00-96
All sites except C44	3217	55	92		13	7	6	19	24	43	84	143	249	349	426	414	402	313	260	410	166.0	100.0	15.04	**133.3**	C00-96 exc. C44
Average annual population					38403	45594	47578	52185	49165	47396	55523	47301	47259	49747	43656	37274	29040	19131	14103	22513	645868				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Seychelles

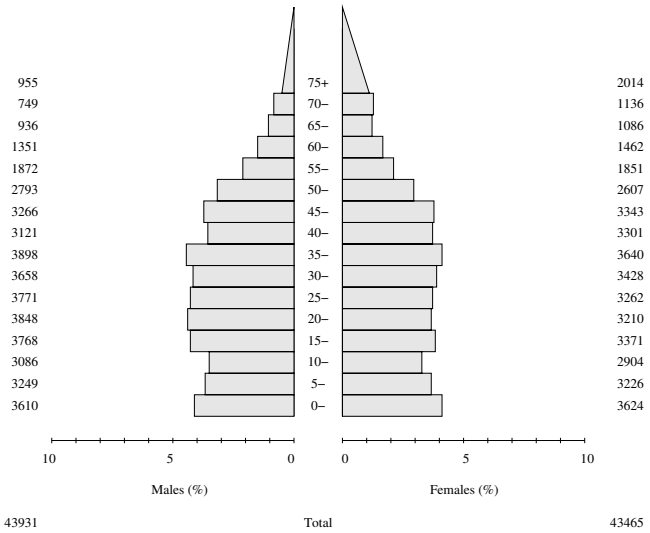
The Seychelles National Cancer Registry (SNCR) was established in 2008 under the Cancer and Mental Health Programme of the Ministry of Health within the Public Health Department, to address the burden of cancer in the country. Registration is not legally mandatory in Seychelles.

The SNCR is located within the diagnostic centre of the Seychelles Hospital. It has one full-time registrar. Five medical specialists provide assistance with stage coding, and a part-time laboratory technologist is responsible for notifying the registry of all new cancer cases recorded at the hospital's laboratory. The registry also has an advisory committee consisting of various medical and public health experts.

The SNCR data presented in this volume are for the registry's coverage area of the entire country of Seychelles. Although the country consists of more than 100 islands, only 4 are permanently inhabited: Mahé (home to almost 90% of the national population), Praslin, La Digue, and Silhouette. Administratively, Seychelles is divided into 26 districts. About 85–90% of the population is Creole, and the predominant religion is Roman Catholicism.

The population of Seychelles is estimated by the National Bureau of Statistics to have been 89 949 in 2013. The average annual population-at-risk estimates corresponding to the SNCR data presented in this volume are shown in the population pyramid.

Seychelles (2009–2012)
Population pyramid (average annual person-years by sex and age group)



Source: National Bureau of Statistics Seychelles; annual estimates, based on 2012 census

There are five hospitals in the registration area, located on the islands of Mahé, Praslin, La Digue, and Silhouette. However, apart from the Seychelles Hospital on Mahé, the others serve mostly as emergency hospitals and provide only basic diagnostic services. There is one hospice on Mahé.

The 404-bed Seychelles Hospital has a variety of wards, for female health, male health, surgery, internal medicine, paediatrics, radiology, pathology and cytology, and psychiatry. The pathology laboratory is the only one in the country. It employs two pathologists and three technicians and has maintained an electronic database since 2005. However, the laboratory software is mainly used for registering and printing out pathological findings; the data to be reported to the cancer registry are saved in spreadsheet files. The haematology laboratory employs five technicians, and bone marrow examinations and immunodiagnostics are available. The diagnostics unit offers radiography, digital mammography, computed tomography (CT), magnetic resonance imaging (MRI), colonoscopy, and gastroscopy services.

All health centres and hospital wards in Seychelles record case information for the SNCR in dedicated books provided by the registry; the pertinent patient data are recorded in these books at the time of each visit and upon prescription of palliative treatment. The SNCR collects the books every 3 months and then returns them once the data have been entered into the registry database. On the islands of Praslin and La Digue, nurses have been appointed to fill in these cancer register books.

The SNCR uses a combination of active and passive case finding. Upon confirmation of diagnosis, every notification form is checked at the registry and corrected if necessary. After a patient has received treatment, the registrar collects the patient's medical record from the ward. The availability and location of the medical records can be verified in the hospital's documentation centre. The documentation centre's database contains personal identification data and the medical record number but no medical data. Based on the data from the medical record, the registrar completes the cancer notification form. Each patient's national personal identification number is always included in the patient information, because the number is required to obtain medical treatment.

The registry uses IARC's CanReg4 software. When a Seychelles resident is diagnosed and/or treated overseas, the hospital in Seychelles receives the patient's medical records from the hospital abroad, and the notification form is completed at the registry on the basis of those records.

The cancer notification data are usually checked with the respective consultant in the notifying facility. When the cancer register books are collected, every case is cross-checked with the registry database, which is then updated as necessary. For new cases, records are tracked and identified, cancer notification forms are completed, and the data are entered into the registry database. Mortality data are used to register date and cause of death.

Each time a new notification is entered, the database is checked for duplicate registrations. After the end of each data year, all registrations for that year are checked for missing data and completed if possible.

YEARS PRESENTED

2009–2012 (a 4-year period)

YEARS PRESENTED
2009–2012 (a 4-year period)

NOTES
A total of 613 cases were registered during the 4-year period analysed. The rate of registration was constant, at 12–13 cases per month.

In males, the age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is somewhat higher than the value for eastern Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of 1.67. In females, the ASR is lower than the estimate for eastern Africa, with an O/E of 0.78, due mainly to the low incidence of cancer of the cervix; at 12.7 cases per 100 000 person-years, the ASR of cervical cancer in Seychelles is less than one third of the estimate for eastern Africa. In males, the incidence rates of cancers of the oral cavity and prostate are high. In both sexes, the ASRs of colorectal cancers are the highest reported in this volume, at 32.4 cases per 100 000 person-years in males and 14.2 cases per 100 000 person-years in females.

Table 4.05. The number of deaths due to cancer, as reported in the WHO Mortality Database (WHO, 2017), and the corresponding mortality-to-incidence (M:I) ratios in males (M) and females (F) in Seychelles in 2009–2012, by anatomical site

Anatomical site (ICD-10 code)	Sex	Deaths	M:I (%)
Lip, oral cavity, and pharynx (C00–14)	M	44	78
	F	1	14
Oesophagus (C15)	M	13	108
	F	4	133
Stomach (C16)	M	7	116
	F	2	40
Colorectum and anus (C18–21)	M	25	45
	F	24	68
Liver (C22)	M	16	228
	F	2	100
Trachea, bronchus, and lung (C33–34)	M	21	161
	F	6	60
Breast (C50)	F	43	58
Cervix uteri (C53)	F	70	27
Uterus, other and unspecified (C54–55)	F	30	107
Prostate (C61)	M	73	71
Non-Hodgkin lymphoma C82–85, C96)	M	8	46
	F	4	28
Leukaemia (C91–95)	M	14	127
	F	4	57
All sites (C00–97)	M	282	80
	F	176	57

The overall percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer) is reasonable: 82% in males and 86% in females. A total of 22 cases (excluding non-melanoma skin cancer) were registered on the basis of death certificate information only.

Because registration of death by cause is comprehensive in Seychelles, the number of deaths due to cancer can be compared with the number of cancer cases registered for the same time period. The reported numbers of deaths due to cancer and the calculated mortality-to-incidence (M:I) ratios for 2009–2012 are shown in Table 4.05.

The numbers of deaths due to cancers at individual anatomical sites are small, which gives rise to some uncertainty in the M:I ratios, but the overall ratio is reasonable, at 80% in males and 57% in females; the equivalent figures for eastern Africa reported in GLOBOCAN 2012 are 79% in males and 68% in females. The M:I ratios are > 100% for cancers at several anatomical sites that are associated with poor prognosis and/or relatively high levels of inaccuracy in the specification of cause of death (e.g. the oesophagus, stomach, liver, and lung).

SUMMARY
Although the numbers of registrations are relatively small, resulting in some variability in the calculated rates, the results appear to be a reasonably accurate reflection of the country's true cancer profile.

PUBLICATIONS AND ACHIEVEMENTS
The SNCR became a member of the African Cancer Registry Network (AFCRN) in 2012.

Parkin DM, Finesse A (2014). Seychelles National Cancer Registry Report for 2009-2011. Available from: https://afcrn.org/attachments/article/96/SNCR%20Triennial%20Report%202009-2011.pdf.

Seychelles (2009–2012)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	27	0	100	0	-	-	-	-	-	-	2	-	-	6	2	9	4	-	-	4	15.4	7.9	1.36	**14.3**	C00-06
Salivary gland	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.6	0.3	0.07	**0.5**	C07-08
Nasopharynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C11
Other pharynx	28	0	89	4	-	-	-	-	-	-	-	-	2	4	4	4	7	1	3	3	15.9	8.2	1.96	**16.3**	C09-10, C12-14
Oesophagus	12	0	92	0	-	-	-	-	-	-	-	-	-	-	-	1	1	1	5	4	6.8	3.5	1.13	**7.5**	C15
Stomach	6	0	83	0	-	-	-	-	-	-	-	-	1	-	-	1	2	-	1	1	3.4	1.8	0.46	**3.7**	C16
Colon	34	0	82	9	-	-	-	-	-	-	-	1	2	1	5	4	-	8	5	8	19.3	10.0	2.54	**20.1**	C18
Rectum	21	0	95	0	-	-	-	-	-	1	-	-	1	2	2	4	2	2	4	3	12.0	6.2	1.63	**12.3**	C19-20
Anus	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C21
Liver	7	0	43	29	-	-	-	-	-	-	-	-	-	-	3	-	2	1	-	1	4.0	2.1	0.45	**4.1**	C22
Gallbladder etc.	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.6	0.3	0.07	**0.5**	C23-24
Pancreas	5	0	60	0	-	-	-	-	-	-	-	-	1	1	-	1	-	1	-	1	2.8	1.5	0.28	**2.8**	C25
Larynx	16	0	94	6	-	-	-	-	-	-	-	-	-	1	5	2	2	4	2	-	9.1	4.7	1.45	**9.8**	C32
Trachea, bronchus, and lung	13	0	23	8	-	-	-	-	-	-	-	-	-	1	1	2	1	1	2	5	7.4	3.8	0.78	**7.5**	C33-34
Bone	2	0	100	0	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	1.1	0.6	0.07	**1.1**	C40-41
Melanoma of skin	1	0	100	0	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.6	0.3	0.04	**0.4**	C43
Non-melanoma skin	11	0	91	9	-	-	-	-	-	-	-	-	-	1	3	-	1	1	1	4	6.3		0.57	**6.1**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C46
Connective and soft tissue	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.6	0.3	0.09	**0.7**	C47, C49
Breast	1	0	100	0	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.6	0.3	0.04	**0.4**	C50
Penis	2	0	100	0	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	1.1	0.6	0.20	**1.3**	C60
Prostate	103	0	75	6	-	-	-	-	-	-	-	-	1	-	2	7	11	12	25	45	58.6	30.2	7.39	**63.1**	C61
Testis	2	0	100	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	1.1	0.6	0.10	**1.1**	C62
Kidney and renal pelvis	4	0	75	25	-	-	-	-	-	-	1	-	-	-	-	-	1	1	1	-	2.3	1.2	0.43	**2.6**	C64-65
Bladder	9	0	78	0	-	-	-	-	-	-	-	-	1	-	1	-	1	1	1	4	5.1	2.6	0.48	**5.2**	C67
Ureter and other urinary	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C69
Brain and nervous system	1	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0.6	0.3	0.17	**0.7**	C70-72
Thyroid	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C73
Hodgkin lymphoma	1	0	100	0	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.6	0.3	0.04	**0.4**	C81
Non-Hodgkin lymphoma	13	0	100	0	-	-	-	-	-	-	-	1	1	2	1	2	4	-	2	-	7.4	3.8	1.03	**7.6**	C82-85, C96
Multiple myeloma	2	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1.1	0.6	0.23	**1.5**	C90
Lymphoid leukaemia	7	0	100	0	-	1	-	-	-	1	-	-	-	-	1	1	1	-	1	1	4.0	2.1	0.44	**4.2**	C91
Myeloid leukaemia	2	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1.1	0.6	0.09	**1.3**	C92-94
Leukaemia, unspecified	2	0	50	0	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1.1	0.6	0.09	**1.3**	C95
Other and unspecified	17	0	94	0	-	-	-	-	-	-	-	-	-	1	3	7	2	2	-	2	9.7	5.0	1.09	**9.7**	O&U
All sites	352	0	82	5	-	1	1	-	-	3	3	3	10	20	36	49	46	38	54	88	200.3		24.77	**208.4**	C00-96
All sites except C44	341	0	82	4	-	1	1	-	-	3	3	3	10	19	33	49	45	37	53	84	194.1	100.0	24.21	**202.3**	C00-96 exc. C44
Average annual population					3610	3249	3086	3768	3848	3770	3658	3898	3121	3266	2793	1872	1350	936	749	955	43929				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Seychelles (2009–2012)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	5	0	100	0	-	-	-	-	-	-	-	-	-	1	1	-	2	-	-	1	2.9	1.9	0.26	**2.5**	C00-06
Salivary gland	1	0	100	0	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.6	0.4	0.04	**0.4**	C07-08
Nasopharynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C11
Other pharynx	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.6	0.4	0.07	**0.5**	C09-10, C12-14
Oesophagus	3	0	100	0	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	1.7	1.2	0.27	**1.9**	C15
Stomach	5	0	100	0	-	-	-	-	-	-	-	-	-	1	-	-	2	2	-	-	2.9	1.9	0.44	**3.2**	C16
Colon	15	0	67	13	-	-	-	-	-	-	-	-	1	-	1	1	2	2	2	6	8.6	5.8	0.77	**6.6**	C18
Rectum	19	0	100	0	-	-	-	-	-	-	-	-	2	1	2	2	-	2	2	8	10.9	7.3	0.79	**7.6**	C19-20
Anus	1	0	100	0	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.6	0.4	0.05	**0.5**	C21
Liver	2	0	50	50	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	1.2	0.8	0.08	**0.9**	C22
Gallbladder etc.	2	0	100	0	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1.2	0.8	0.15	**0.9**	C23-24
Pancreas	1	0	100	0	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.6	0.4	0.03	**0.4**	C25
Larynx	3	0	100	0	-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	1.7	1.2	0.19	**1.7**	C32
Trachea, bronchus, and lung	10	0	40	0	-	-	-	-	-	-	1	1	-	-	3	1	-	-	-	4	5.8	3.9	0.28	**3.8**	C33-34
Bone	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C40-41
Melanoma of skin	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0.6	0.4	0.11	**0.4**	C43
Non-melanoma skin	2	0	100	0	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	1.2		0.15	**1.1**	C44
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C46
Connective and soft tissue	2	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1.2	0.8	0.23	**1.1**	C47, C49
Breast	74	0	88	1	-	-	-	-	-	-	1	3	5	10	7	12	6	6	7	17	42.6	28.6	3.82	**33.8**	C50
Vulva	2	0	100	0	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1.2	0.8	0.07	**0.8**	C51
Vagina	6	0	100	0	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	3.5	2.3	0.43	**3.1**	C52
Cervix uteri	28	0	96	0	-	-	-	-	1	1	-	4	4	3	5	1	2	-	3	4	16.1	10.8	1.29	**12.7**	C53
Uterus	13	0	85	8	-	-	-	-	-	-	-	-	-	1	-	1	4	1	1	5	7.5	5.0	0.67	**6.1**	C54-55
Ovary	9	0	78	11	-	-	-	1	-	1	-	-	-	2	-	-	1	1	1	2	5.2	3.5	0.46	**4.5**	C56
Placenta	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	3	0	100	0	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	1.7	1.2	0.12	**1.3**	C64-65
Bladder	4	0	75	0	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	2	2.3	1.5	0.18	**1.5**	C67
Ureter and other urinary	1	0	100	0	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.6	0.4	0.03	**0.4**	C66, C68
Eye	1	0	100	0	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.6	0.4	0.04	**0.4**	C69
Brain and nervous system	2	0	0	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1.2	0.8	0.14	**1.3**	C70-72
Thyroid	7	0	86	0	-	-	-	-	2	-	2	-	-	-	2	-	1	-	-	-	4.0	2.7	0.33	**3.8**	C73
Hodgkin lymphoma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C81
Non-Hodgkin lymphoma	14	0	100	0	-	-	-	-	-	2	-	-	-	2	1	-	2	3	2	2	8.1	5.4	0.94	**7.4**	C82-85, C96
Multiple myeloma	2	0	100	0	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	1.2	0.8	0.13	**1.2**	C90
Lymphoid leukaemia	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0.6	0.4	0.11	**0.4**	C91
Myeloid leukaemia	5	0	100	0	1	-	-	-	1	1	-	-	-	-	2	-	-	-	-	-	2.9	1.9	0.21	**3.0**	C92-94
Leukaemia, unspecified	1	0	0	100	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.6	0.4	0.09	**0.7**	C95
Other and unspecified	15	0	73	0	-	-	-	-	1	-	-	-	-	2	3	-	1	1	3	4	8.6	5.8	0.79	**6.6**	O&U
All sites	261	0	87	3	2	-	-	1	5	5	5	12	13	25	32	25	28	22	28	58	150.1		13.75	**122.7**	C00-96
All sites except C44	259	0	86	3	2	-	-	1	5	5	5	11	13	25	32	25	28	21	28	58	149.0	100.0	13.60	**121.6**	C00-96 exc. C44
Average annual population					3624	3226	2904	3371	3210	3262	3428	3640	3301	3342	2607	1851	1462	1086	1136	2014	43463				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

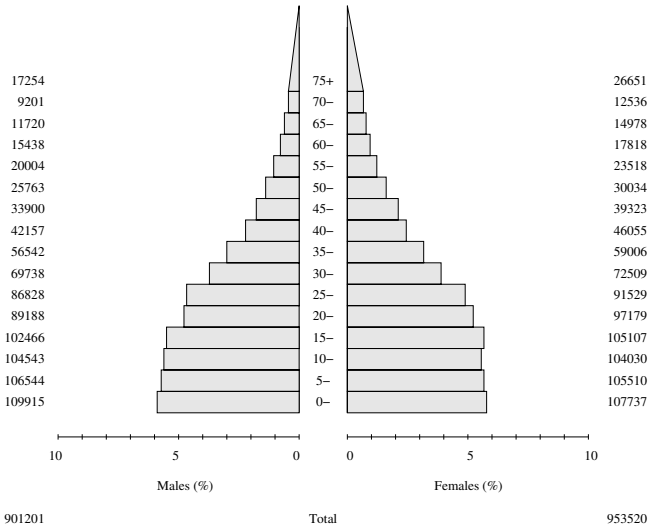
Botswana

The Botswana National Cancer Registry (BNCR) was founded in 1999 as a population-based cancer registry. After a period of inactivity, registry activity was resumed in 2003–2004 with assistance from IARC. The BNCR is located in the Department of Public Health and funded by the Ministry of Health and Wellness. The registry is staffed by a registry manager and two registrars. Cancer registration is one of the activities of Botswana's Non Communicable Disease (NCD) Programme.

The BNCR data presented in this volume are for the registry's coverage area, which comprises all cancer patients diagnosed and managed in Botswana. The Tswana are the majority ethnic group in the country, accounting for 79% of the population. It has been estimated that 70% of Botswana's citizens would identify themselves as Christian: predominantly Anglican, Methodist, or belonging to the United Congregational Church of Southern Africa.

The population of Botswana is estimated to have been 2 024 787 in 2011 (at the census). The average annual population-at-risk estimates corresponding to the BNCR data presented in this volume are shown in the population pyramid.

Botswana (2005–2008)
Population pyramid (average annual person-years by sex and age group)



Annual estimates, based on Botswana population and housing censuses of 2001 and 2011

The BNCR collects cancer cases from four public facilities, which offer basic diagnostic and treatment services, and one private hospital, which offers radiation therapy services that are available to public patients through government subsidy. Health care, including oncology care, is free in Botswana.

Data collection is active. The registrars periodically visit the information sources to carry out case finding and abstraction. The registry collects information from two public referral hospitals (Princess Marina Hospital and Nyangabgwe Referral Hospital) and two district oncology centres (Letsholathebe II Memorial Hospital and Sekgoma Memorial Hospital), as well as from the radiotherapy department of Gaborone Private Hospital. The registry also collects information from pathology laboratories and the Integrated Patient Management System (IPMS).

Information on in-hospital deaths due to cancer is obtained from the Health Statistics Unit of the Ministry of Health's Department of Policy, Planning, Monitoring and Evaluation (DPPME).

The registry uses IARC's CanReg4 software for data entry and management.

YEARS PRESENTED

2005–2008 (a 4-year period)

NOTES

The most complete 4-year period in the years leading up to 2010 was selected for analysis. During this period, the average rate of registration was 129 cases per month.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 111.5 cases per 100 000 person-years in males and 107.8 cases per 100 000 person-years in females. These values are about one half to two thirds of the values for southern Africa reported in GLOBOCAN 2012. The rates of cancers at most of the individual anatomical sites are also comparatively low, in particular the ASR of prostate cancer, at 9.2 cases per 100 000 person-years. The only ASRs that are relatively high are those of Kaposi sarcoma (at 24.3 cases per 100 000 person-years in males and 15.4 cases per 100 000 person-years in females) and those of cancers of the eye, with both findings presumably related to the prevalence of HIV/AIDS in Botswana, which was the highest in the world in 2014 (UNAIDS, 2017).

The percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer), which is influenced by the large number of Kaposi sarcoma cases, is reasonable: 74% in males and 84% in females. The MV% is relatively high for cases at some anatomical sites (e.g. the cervix, at 97%).

SUMMARY

The registry has a moderate degree of underregistration, which may be explained by inconsistencies in data collection and lack of reporting by diagnosing clinicians.

PUBLICATIONS AND ACHIEVEMENTS

The BNCR became a member of the African Cancer Registry Network (AFCRN) in 2013.

Efstathiou JA, Bvochora-Nsingo M, Gierga DP, Alphonse Kayembe MK, Mmalane M, Russell AH, et al. (2014). Addressing the growing cancer burden in the wake of the AIDS epidemic in Botswana: the BOTSOGO collaborative partnership. Int J Radiat Oncol Biol Phys. 89(3):468–75. http://dx.doi.org/10.1016/j.ijrobp.2014.03.033 PMID:24929156

Lazenby M, Sebego M, Swart NC, Lopez L, Peterson K (2016). Symptom burden and functional dependencies among cancer patients in Botswana suggest a need for palliative care nursing. Cancer Nurs. 39(1):E29–38. https://doi.org/10.1097/NCC.0000000000000249 PMID:25881812

Botswana (2005–2008)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	135	0	100		-	-	-	-	1	2	-	4	6	15	23	15	19	20	9	21	3.7	4.8	0.78	**6.5**	C00-06
Salivary gland	24	0	100		-	-	-	1	1	-	1	1	3	1	1	2	2	3	2	6	0.7	0.9	0.11	**1.0**	C07-08
Nasopharynx	31	0	97		-	-	3	2	3	1	4	1	1	4	4	1	-	3	2	2	0.9	1.1	0.12	**1.1**	C11
Other pharynx	67	0	97		-	-	-	1	-	-	1	2	-	6	5	17	9	12	5	9	1.9	2.4	0.43	**3.3**	C09-10, C12-14
Oesophagus	243	0	88		-	-	-	-	-	1	-	5	7	21	27	32	36	26	24	64	6.7	8.7	1.34	**11.4**	C15
Stomach	24	0	79		-	-	-	1	-	-	-	-	2	1	4	5	3	-	3	5	0.7	0.9	0.13	**1.1**	C16
Colon	39	0	97		-	-	-	-	1	2	2	-	4	4	3	5	6	7	2	3	1.1	1.4	0.23	**1.9**	C18
Rectum	37	0	92		-	-	-	-	1	1	1	3	3	3	-	4	7	2	5	7	1.0	1.3	0.20	**1.6**	C19-20
Anus	9	0	89		-	-	-	-	-	-	1	2	1	-	2	1	1	-	-	1	0.2	0.3	0.03	**0.4**	C21
Liver	152	0	67		3	-	1	1	2	2	2	4	9	11	18	21	13	19	15	31	4.2	5.4	0.82	**6.9**	C22
Gallbladder etc.	4	0	100		-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	1	0.1	0.1	0.02	**0.2**	C23-24
Pancreas	29	0	76		-	-	-	-	-	-	-	2	1	1	5	5	2	1	4	8	0.8	1.0	0.15	**1.3**	C25
Larynx	82	0	96		2	-	-	-	-	-	1	1	2	6	10	13	15	15	5	12	2.3	2.9	0.51	**4.1**	C32
Trachea, bronchus, and lung	149	0	85		-	-	-	-	-	-	1	1	4	8	23	17	21	22	19	33	4.1	5.3	0.93	**7.3**	C33-34
Bone	27	0	96		-	1	2	5	5	3	1	1	1	2	1	1	-	1	-	3	0.7	1.0	0.06	**0.8**	C40-41
Melanoma of skin	31	0	100		1	-	-	-	-	-	-	1	2	5	2	1	1	4	1	13	0.9	1.1	0.11	**1.2**	C43
Non-melanoma skin	112	0	100		-	1	2	3	3	1	9	8	5	13	9	14	9	10	7	18	3.1		0.52	**4.6**	C44
Mesothelioma	2	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	0.1	0.1	0.00	**0.1**	C45
Kaposi sarcoma	773	0	26		2	6	5	6	16	83	182	168	107	71	46	43	12	7	6	13	21.4	27.5	2.19	**24.3**	C46
Connective and soft tissue	42	0	100		2	-	-	1	6	2	3	2	3	3	4	7	1	3	4	1	1.2	1.5	0.20	**1.7**	C47, C49
Breast	21	0	100		-	-	-	-	1	-	-	-	1	-	1	3	2	2	3	8	0.6	0.7	0.11	**0.9**	C50
Penis	55	0	100		1	-	-	-	1	1	7	2	3	8	2	3	5	3	7	12	1.5	2.0	0.26	**2.2**	C60
Prostate	210	0	95		-	-	-	-	-	-	-	-	-	2	8	11	17	28	42	102	5.8	7.5	1.12	**9.2**	C61
Testis	12	0	92		-	-	-	-	-	2	1	2	1	-	1	1	1	-	1	2	0.3	0.4	0.04	**0.4**	C62
Kidney and renal pelvis	25	0	88		1	3	1	-	-	-	-	1	4	-	3	2	-	2	3	5	0.7	0.9	0.11	**1.0**	C64-65
Bladder	18	0	78		-	-	-	-	-	-	-	-	-	1	-	2	5	3	2	5	0.5	0.6	0.12	**0.9**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	134	0	99		12	1	-	1	-	9	18	29	23	15	9	8	1	3	-	5	3.7	4.8	0.38	**4.5**	C69
Brain and nervous system	22	0	82		1	4	5	2	1	2	-	1	-	2	1	1	1	1	-	-	0.6	0.8	0.06	**0.7**	C70-72
Thyroid	9	0	89		-	2	-	-	-	-	-	-	-	1	1	2	-	2	-	1	0.2	0.3	0.04	**0.4**	C73
Hodgkin lymphoma	34	0	100		1	2	2	4	2	6	6	5	2	1	-	1	-	1	1	-	0.9	1.2	0.08	**0.9**	C81
Non-Hodgkin lymphoma	179	0	98		6	4	4	7	6	12	18	30	25	23	18	9	6	8	1	2	5.0	6.4	0.60	**6.3**	C82-85, C96
Multiple myeloma	17	0	94		-	-	-	-	-	-	-	-	-	3	1	2	1	3	2	5	0.5	0.6	0.10	**0.8**	C90
Lymphoid leukaemia	25	0	100		4	8	2	1	2	-	2	-	1	2	-	1	1	1	-	-	0.7	0.9	0.06	**0.8**	C91
Myeloid leukaemia	24	0	100		-	2	1	1	3	3	1	3	1	2	2	-	2	2	1	-	0.7	0.9	0.09	**0.9**	C92-94
Leukaemia, unspecified	6	0	83		-	-	-	-	-	2	-	-	-	-	1	1	-	1	1	-	0.2	0.2	0.04	**0.3**	C95
Other and unspecified	118	0	89		4	2	1	1	1	5	4	7	8	18	11	7	10	18	12	9	3.3	4.2	0.66	**5.3**	O&U
All sites	2921	0	75		40	36	29	38	56	140	266	286	230	255	246	259	210	233	189	408	81.0		12.75	**116.1**	C00-96
All sites except C44	2809	0	74		40	35	27	35	53	139	257	278	225	242	237	245	201	223	182	390	77.9	100.0	12.23	**111.5**	C00-96 exc. C44
Average annual population					109915	106544	104543	102466	89188	86828	69738	56542	42157	33900	25763	20004	15438	11720	9201	17254	901200				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Botswana (2005–2008)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	40	0	98		1	-	-	-	1	-	2	2	3	3	4	1	4	4	6	9	1.0	1.2	0.17	**1.4**	C00-06
Salivary gland	18	0	100		-	-	-	-	2	1	2	-	2	-	-	2	1	3	1	4	0.5	0.5	0.07	**0.6**	C07-08
Nasopharynx	16	0	94		-	-	-	-	2	1	2	-	4	-	2	1	-	1	1	2	0.4	0.5	0.05	**0.5**	C11
Other pharynx	8	0	88		-	-	-	-	-	-	-	-	1	-	1	1	1	1	1	2	0.2	0.2	0.04	**0.3**	C09-10, C12-14
Oesophagus	112	0	89		-	-	-	-	-	1	-	1	3	5	8	10	13	11	20	40	2.9	3.3	0.50	**3.9**	C15
Stomach	13	0	85		-	1	-	-	-	-	1	-	1	1	-	1	1	1	3	3	0.3	0.4	0.06	**0.4**	C16
Colon	42	0	93		-	-	-	-	2	2	1	1	4	3	4	9	3	3	1	9	1.1	1.3	0.15	**1.5**	C18
Rectum	24	0	100		-	-	-	-	1	-	1	5	3	1	4	2	1	1	2	3	0.6	0.7	0.09	**0.8**	C19-20
Anus	8	0	100		-	-	-	-	-	-	2	-	2	1	-	-	1	1	-	1	0.2	0.2	0.03	**0.3**	C21
Liver	82	0	62		-	-	1	1	-	2	2	7	7	6	7	6	2	11	6	24	2.1	2.4	0.29	**2.7**	C22
Gallbladder etc.	9	0	89		-	-	-	-	-	-	-	-	1	2	-	-	-	1	2	3	0.2	0.3	0.04	**0.3**	C23-24
Pancreas	35	0	74		-	-	-	-	-	-	-	1	2	1	2	6	2	6	3	12	0.9	1.0	0.14	**1.2**	C25
Larynx	8	0	100		-	2	1	-	-	-	2	-	-	1	-	1	1	-	-	-	0.2	0.2	0.02	**0.2**	C32
Trachea, bronchus, and lung	42	0	76		-	-	-	-	-	2	-	-	2	2	3	6	4	6	4	13	1.1	1.3	0.18	**1.5**	C33-34
Bone	27	0	100		-	-	5	9	2	2	2	-	-	1	1	2	1	-	1	1	0.7	0.8	0.06	**0.7**	C40-41
Melanoma of skin	39	0	100		-	-	-	-	-	1	-	1	-	8	6	4	5	3	4	7	1.0	1.2	0.18	**1.5**	C43
Non-melanoma skin	98	0	99		-	-	-	2	3	4	9	7	13	7	7	6	5	8	7	20	2.6		0.33	**3.1**	C44
Mesothelioma	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	595	0	32		1	11	4	3	53	126	159	93	62	31	24	15	5	4	1	3	15.6	17.8	1.26	**15.4**	C46
Connective and soft tissue	49	0	100		2	1	-	3	2	6	1	6	2	4	2	6	2	2	4	6	1.3	1.5	0.16	**1.5**	C47, C49
Breast	510	0	98		-	-	-	-	3	17	31	30	54	72	62	45	43	43	36	74	13.4	15.2	2.04	**18.2**	C50
Vulva	47	0	100		-	-	-	1	-	6	9	6	5	5	5	2	3	1	1	3	1.2	1.4	0.14	**1.5**	C51
Vagina	6	0	100		-	-	-	-	-	-	1	1	2	-	-	-	-	1	1	-	0.2	0.2	0.03	**0.2**	C52
Cervix uteri	795	0	97		-	-	-	-	6	26	77	117	86	90	89	61	57	48	54	84	20.8	23.7	2.98	**27.1**	C53
Uterus	101	0	97		-	-	-	-	-	-	4	1	7	8	7	8	14	14	16	22	2.6	3.0	0.50	**3.8**	C54-55
Ovary	76	0	91		1	-	2	3	1	2	8	3	4	8	4	8	9	6	4	13	2.0	2.3	0.28	**2.6**	C56
Placenta	13	0	100		-	-	-	1	1	4	3	2	2	-	-	-	-	-	-	-	0.3	0.4	0.02	**0.3**	C58
Kidney and renal pelvis	21	0	95		4	1	-	2	1	3	-	-	1	1	1	-	-	3	3	1	0.6	0.6	0.08	**0.7**	C64-65
Bladder	15	0	100		-	-	1	-	1	-	-	-	-	-	1	1	1	2	3	5	0.4	0.4	0.07	**0.5**	C67
Ureter and other urinary	2	0	100		-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	0.1	0.1	0.01	**0.1**	C66, C68
Eye	170	0	99		2	2	-	2	5	17	39	34	24	13	8	7	4	3	7	3	4.5	5.1	0.48	**4.9**	C69
Brain and nervous system	21	0	95		4	1	1	3	2	1	2	2	1	2	-	1	1	-	-	-	0.6	0.6	0.04	**0.6**	C70-72
Thyroid	23	0	96		-	-	-	1	2	1	-	4	-	2	2	3	2	2	2	2	0.6	0.7	0.09	**0.8**	C73
Hodgkin lymphoma	37	0	100		-	-	2	1	4	8	5	6	3	2	2	1	1	-	-	2	1.0	1.1	0.08	**1.0**	C81
Non-Hodgkin lymphoma	172	0	97		-	3	2	4	6	19	29	26	27	12	11	11	6	4	4	8	4.5	5.1	0.48	**5.1**	C82-85, C96
Multiple myeloma	21	0	100		-	-	-	-	-	-	1	-	1	-	3	4	4	4	-	4	0.6	0.6	0.10	**0.8**	C90
Lymphoid leukaemia	22	0	100		3	1	1	4	-	1	1	-	1	1	2	1	1	-	2	3	0.6	0.7	0.06	**0.6**	C91
Myeloid leukaemia	32	0	100		1	2	1	4	3	1	1	1	3	2	-	3	4	2	3	1	0.8	1.0	0.12	**1.1**	C92-94
Leukaemia, unspecified	7	0	100		-	-	1	-	-	-	1	2	-	-	1	-	-	-	-	2	0.2	0.2	0.01	**0.2**	C95
Other and unspecified	92	0	90		2	1	1	2	4	3	4	2	6	6	8	10	4	5	12	22	2.4	2.7	0.34	**3.0**	O&U
All sites	3449	0	84		21	26	23	46	107	257	402	361	339	301	282	246	207	205	215	411	90.4		11.75	**110.9**	C00-96
All sites except C44	3351	0	84		21	26	23	44	104	253	393	354	326	294	275	240	202	197	208	391	87.9	100.0	11.42	**107.8**	C00-96 exc. C44
Average annual population					107736	105510	104030	105107	97178	91529	72509	59006	46055	39323	30034	23518	17818	14978	12536	26650	953516				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Namibia

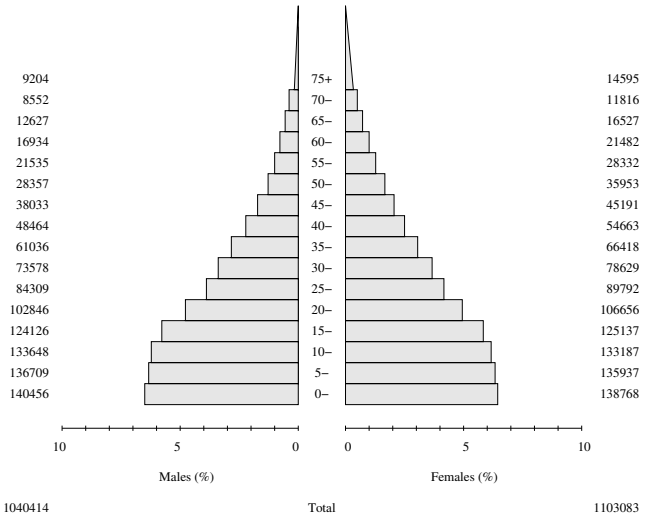
The Namibian National Cancer Registry (NNCR) was established in 1995 as a joint project of Rössing Uranium Ltd, the Namibian Ministry of Health and Social Services (the Oncology Clinic), and the Cancer Association of Namibia. To investigate concerns about the potential risks associated with uranium mining in the country, the registry retrospectively collected all cancer cases reported in 1979–1994 to the Windhoek state pathology laboratory and to Namibia's only existing private pathology laboratory. Since 1995, the NNCR has actively registered both pathology-based and clinical cases diagnosed among residents of all 13 regions of Namibia. Resident cases diagnosed in South Africa are rerouted to the NNCR via a network of South African registries that receive technical support from IARC. The NNCR aims to provide information that will ultimately lead to improved cancer prevention and control in Namibia.

The NNCR is located on the premises of the Cancer Association of Namibia, which facilitates registry activities and provides staff support for the registry. Registry activities are overseen by the chief executive officer of the association. At present, the registry has no independent budget or resources.

The NNCR data presented in this volume are for the registry's catchment population, which comprises all residents of Namibia. About 87.5% of residents are Black. The Ovambo tribe accounts for about 50% of the population and the Kavango tribe for about 9%. Approximately 80–90% of the population is Christian.

The population of Namibia is estimated to have been 2 104 900 in 2011 (at the census). The average annual population-at-risk estimates corresponding to the NNCR data presented in this volume are shown in the population pyramid.

Namibia (2009)
Population pyramid (average annual person-years by sex and age group)



Estimates based on the Namibian 2011 population and housing census

In 2009, data collection took place only at the Dr A.B. May Cancer Care Centre, to which all cancer patients should have been referred for assessment and possible treatment. There are two pathology laboratories in the country: the state-owned Namibia Institute of Pathology (NIP) and the private PathCare laboratory. Although the pathology reports received from NIP include demographic data, place of residence is noted in less than one third of cases. The printouts received from PathCare note only patient age and sex. Some case information is received from the laboratory in Cape Town, South Africa. There is no clinical haematology service in the catchment area.

Civil registration of deaths by cause is carried out by the Namibia Ministry of Home Affairs and Immigration, but the registry does not have access to death certificates. The quality of cause-of-death information is unknown.

In addition to the pathology reports described above, case finding relies on the receipt of registration forms, which are completed by registered nurses employed by the Cancer Association of Namibia in the admissions unit of the Dr A.B. May Cancer Care Centre. There is currently no active case finding.

The registry uses IARC's CanReg5 software for data entry and checks. There has been no formal evaluation of registry quality.

Cases are coded by Cancer Association of Namibia staff according to ICD-O-3. Only authorized personnel can access registry data; the CanReg file is password-protected, and the registry office is kept locked.

YEARS PRESENTED

2009 (a 1-year period)

NOTES

Of the registry data available in 2014, only the data for 2009 were relatively complete; the average rate of registration for that year (156 cases per month) was double the average for the preceding 3 years.

A total of 1878 cases were registered in 2009. The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 166.9 cases per 100 000 person-years in males and 120.9 cases per 100 000 person-years in females. These values are somewhat lower than the values for southern Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of 0.75–0.80. The incidence rates are low for cancers at most individual anatomical sites, with the exception of Kaposi sarcoma and cancers of the oral cavity and pharynx. The incidence rates of childhood cancers are very low, with no cases of leukaemia and only 1 case of non-Hodgkin lymphoma recorded in patients aged 0–14 years.

SUMMARY

The registry relies on data capture primarily from the oncology service in the capital city of Windhoek, so the moderate degree of underregistration (as suggested by the variability in registration rates and the low

incidence rates of cancers at some anatomical sites and in some age groups) is not surprising.

PUBLICATIONS AND ACHIEVEMENTS

The NNCR became a member of the African Cancer Registry Network (AFCRN) in 2013. There are three published reports of the registry's results, pertaining to the periods of 1995–1998, 2000–2005, and 2006–2009.

Stefan DC, Baadjes B, Kruger M (2014). Incidence of childhood cancer in Namibia: the need for registries in Africa. Pan Afr Med J. 17:191. http://dx.doi.org/10.11604/pamj.2014.17.191.3830 PMID:25396017

Namibia (2009)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	55	0	98		-	-	-	-	2	-	2	1	1	6	13	11	4	5	4	6	5.3	5.8	1.16	**10.2**	C00-06
Salivary gland	15	0	100		-	-	-	1	-	-	-	-	2	1	4	2	2	-	1	2	1.4	1.6	0.27	**2.7**	C07-08
Nasopharynx	8	0	100		-	-	-	-	1	-	2	-	2	1	-	1	-	-	-	1	0.8	0.8	0.08	**1.0**	C11
Other pharynx	24	0	96		-	-	-	-	-	-	-	2	-	1	3	7	2	6	-	3	2.3	2.5	0.54	**4.7**	C09-10, C12-14
Oesophagus	11	0	91		-	-	-	-	-	-	-	-	-	-	1	1	2	3	1	3	1.1	1.2	0.28	**2.4**	C15
Stomach	25	0	100		-	-	-	-	-	-	1	1	-	2	4	2	6	-	3	6	2.4	2.6	0.51	**5.0**	C16
Colon	27	0	100		-	-	-	-	1	-	1	4	1	3	1	6	1	2	2	5	2.6	2.8	0.48	**4.7**	C18
Rectum	17	0	100		-	-	-	-	-	2	-	-	-	-	1	4	5	1	2	2	1.6	1.8	0.43	**3.4**	C19-20
Anus	4	0	100		-	-	-	-	-	1	-	1	-	-	1	-	-	1	-	-	0.4	0.4	0.07	**0.6**	C21
Liver	29	0	55		-	-	2	-	-	1	2	1	1	2	5	5	-	4	4	2	2.8	3.1	0.67	**5.1**	C22
Gallbladder etc.	2	0	100		-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	0.2	0.2	0.04	**0.4**	C23-24
Pancreas	14	0	79		-	-	-	-	-	-	1	-	1	-	2	2	2	-	3	3	1.3	1.5	0.33	**2.8**	C25
Larynx	21	0	100		-	-	-	-	-	-	-	-	-	2	3	1	4	8	-	3	2.0	2.2	0.54	**4.5**	C32
Trachea, bronchus, and lung	24	0	50		-	-	-	-	-	-	-	1	1	2	1	2	1	6	5	5	2.3	2.5	0.67	**5.0**	C33-34
Bone	13	0	100		-	-	1	8	1	-	-	-	-	1	1	-	-	-	-	1	1.2	1.4	0.07	**1.3**	C40-41
Melanoma of skin	25	0	100		-	-	-	-	-	1	1	2	-	3	1	4	-	6	3	4	2.4	2.6	0.59	**4.8**	C43
Non-melanoma skin	569	0	100		-	-	-	1	1	9	24	18	21	37	52	61	64	69	84	128	54.7		12.94	**112.6**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	185	0	50		1	1	3	1	6	8	40	34	31	24	12	7	7	5	-	5	17.8	19.5	2.06	**23.2**	C46
Connective and soft tissue	15	0	100		-	-	-	-	3	2	-	-	-	2	2	-	1	4	-	1	1.4	1.6	0.28	**2.5**	C47, C49
Breast	9	0	100		-	-	-	-	-	1	-	2	-	2	-	-	2	-	1	1	0.9	0.9	0.17	**1.5**	C50
Penis	3	0	100		-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	0.3	0.3	0.04	**0.5**	C60
Prostate	222	0	95		-	-	-	-	-	-	2	-	3	10	18	16	39	39	33	62	21.3	23.4	5.49	**47.9**	C61
Testis	7	0	100		-	-	-	-	-	-	-	4	-	1	-	-	-	2	-	-	0.7	0.7	0.13	**1.0**	C62
Kidney and renal pelvis	12	0	83		-	-	1	-	-	1	-	-	1	-	-	3	1	1	-	4	1.2	1.3	0.16	**2.2**	C64-65
Bladder	31	0	100		-	-	-	-	-	-	-	3	-	2	2	2	4	5	4	9	3.0	3.3	0.68	**6.4**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	43	0	100		-	-	-	-	-	1	8	12	5	5	1	2	1	1	3	4	4.1	4.5	0.58	**5.9**	C69
Brain and nervous system	14	0	57		-	-	-	2	-	3	1	2	-	-	-	3	2	1	-	-	1.3	1.5	0.22	**2.0**	C70-72
Thyroid	2	0	100		-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	0.2	0.2	0.07	**0.4**	C73
Hodgkin lymphoma	10	0	100		-	-	-	4	1	1	1	2	-	-	-	1	-	-	-	-	1.0	1.1	0.07	**0.9**	C81
Non-Hodgkin lymphoma	24	0	100		-	1	-	-	1	3	-	2	2	7	2	2	-	2	-	2	2.3	2.5	0.32	**3.6**	C82-85, C96
Multiple myeloma	9	0	33		-	-	-	-	-	-	1	-	1	1	1	2	1	1	-	1	0.9	0.9	0.16	**1.6**	C90
Lymphoid leukaemia	3	0	100		-	-	-	1	-	-	-	-	-	-	-	-	1	1	-	-	0.3	0.3	0.07	**0.5**	C91
Myeloid leukaemia	10	0	100		-	-	-	1	1	2	2	-	-	-	-	2	-	-	-	2	1.0	1.1	0.08	**1.3**	C92-94
Leukaemia, unspecified	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C95
Other and unspecified	36	0	100		-	-	1	1	-	-	2	1	2	2	2	2	7	1	3	12	3.5	3.8	0.58	**6.9**	O&U
All sites	1518	0	90		1	2	8	20	18	36	91	94	76	117	137	151	159	174	157	277	145.9		30.82	**279.6**	C00-96
All sites except C44	949	0	84		1	2	8	19	17	27	67	76	55	80	85	90	95	105	73	149	91.2	100.0	17.88	**166.9**	C00-96 exc. C44
Average annual population					140456	136709	133648	124126	102846	84309	73578	61036	48464	38033	28357	21535	16934	12627	8552	9204	1040414				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Namibia (2009)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	28	0	96		-	-	-	-	-	1	3	-	2	3	3	3	3	4	3	3	2.5	3.0	0.49	**4.0**	C00-06
Salivary gland	9	0	100		-	-	-	-	1	-	2	-	-	1	2	-	-	2	1	-	0.8	1.0	0.16	**1.2**	C07-08
Nasopharynx	4	0	100		-	1	-	-	1	-	-	-	1	-	-	1	-	-	-	-	0.4	0.4	0.04	**0.4**	C11
Other pharynx	7	0	100		-	-	-	-	-	-	-	-	-	1	-	1	1	-	2	2	0.6	0.8	0.14	**1.1**	C09-10, C12-14
Oesophagus	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.1	0.1	0.00	**0.1**	C15
Stomach	15	0	100		-	-	-	-	-	1	1	1	-	4	1	3	1	1	1	1	1.4	1.6	0.23	**2.0**	C16
Colon	34	0	100		-	-	-	-	-	1	1	1	3	4	8	1	3	1	9	2	3.1	3.7	0.70	**4.9**	C18
Rectum	17	0	100		-	-	-	-	-	-	-	4	-	-	2	1	1	2	4	3	1.5	1.8	0.33	**2.4**	C19-20
Anus	7	0	100		-	-	-	-	-	-	-	1	1	-	-	-	1	1	3	-	0.6	0.8	0.20	**1.1**	C21
Liver	19	0	84		-	-	-	-	-	-	3	1	-	4	3	2	3	-	2	1	1.7	2.0	0.30	**2.6**	C22
Gallbladder etc.	2	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	0.2	0.2	0.05	**0.3**	C23-24
Pancreas	2	0	50		-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	0.2	0.2	0.05	**0.3**	C25
Larynx	8	0	100		-	-	-	-	-	-	-	-	-	-	4	-	-	1	-	3	0.7	0.9	0.09	**1.1**	C32
Trachea, bronchus, and lung	20	0	65		-	-	-	-	-	1	1	-	-	3	4	3	2	4	-	2	1.8	2.2	0.32	**2.9**	C33-34
Bone	6	0	83		-	-	-	2	-	-	-	-	1	1	-	1	-	1	-	-	0.5	0.6	0.08	**0.7**	C40-41
Melanoma of skin	20	0	100		-	-	-	-	2	-	1	1	3	2	-	-	5	2	1	3	1.8	2.2	0.29	**2.8**	C43
Non-melanoma skin	327	0	100		-	-	-	7	2	8	9	15	25	24	39	26	36	46	42	48	29.6		5.75	**47.2**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	78	0	73		-	1	3	1	4	14	13	18	9	7	3	1	1	-	2	1	7.1	8.4	0.66	**7.7**	C46
Connective and soft tissue	13	0	100		1	-	1	-	1	1	1	-	1	1	3	2	-	1	-	-	1.2	1.4	0.15	**1.5**	C47, C49
Breast	272	0	98		-	-	-	-	5	5	15	22	42	37	31	30	26	30	12	17	24.7	29.3	4.09	**36.7**	C50
Vulva	12	0	100		-	-	-	-	1	-	2	1	1	1	-	2	1	2	-	1	1.1	1.3	0.16	**1.5**	C51
Vagina	4	0	75		-	-	-	-	-	-	-	-	-	1	1	-	-	2	-	-	0.4	0.4	0.09	**0.6**	C52
Cervix uteri	162	0	92		-	-	-	-	1	5	13	24	22	18	15	22	10	7	10	15	14.7	17.4	2.16	**20.6**	C53
Uterus	32	0	100		-	-	-	1	-	1	1	-	-	4	2	3	6	3	6	5	2.9	3.4	0.63	**4.8**	C54-55
Ovary	26	0	77		-	-	-	-	-	1	1	2	2	4	3	1	3	4	-	5	2.4	2.8	0.34	**3.6**	C56
Placenta	5	0	80		-	-	-	-	3	1	-	-	-	1	-	-	-	-	-	-	0.5	0.5	0.03	**0.4**	C58
Kidney and renal pelvis	8	0	62		-	-	-	-	-	-	-	-	-	2	2	2	1	-	-	1	0.7	0.9	0.11	**1.1**	C64-65
Bladder	14	0	100		-	-	-	-	-	-	-	-	-	1	2	-	3	-	2	6	1.3	1.5	0.19	**2.1**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	26	0	96		-	-	-	-	-	4	3	9	4	-	2	2	-	1	1	-	2.4	2.8	0.28	**2.7**	C69
Brain and nervous system	11	0	64		-	-	-	-	-	2	4	2	-	-	1	2	-	-	-	-	1.0	1.2	0.10	**1.1**	C70-72
Thyroid	13	0	100		-	-	-	-	-	2	2	2	2	3	1	-	1	-	-	-	1.2	1.4	0.13	**1.5**	C73
Hodgkin lymphoma	2	0	100		-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	0.01	**0.1**	C81
Non-Hodgkin lymphoma	25	0	96		-	-	-	-	1	1	5	3	1	3	-	1	5	2	1	2	2.3	2.7	0.34	**3.2**	C82-85, C96
Multiple myeloma	1	0	0		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C90
Lymphoid leukaemia	3	0	100		-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	1	0.3	0.3	0.03	**0.5**	C91
Myeloid leukaemia	7	0	100		-	-	-	1	1	-	1	-	-	1	-	2	-	-	-	1	0.6	0.8	0.06	**0.8**	C92-94
Leukaemia, unspecified	1	0	100		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C95
Other and unspecified	15	0	93		-	-	-	-	-	-	-	1	1	3	1	2	1	1	3	2	1.4	1.6	0.28	**2.2**	O&U
All sites	1256	0	94		1	2	4	13	24	50	82	109	121	137	133	114	115	118	107	126	113.9		19.07	**168.1**	C00-96
All sites except C44	929	0	92		1	2	4	6	22	42	73	94	96	113	94	88	79	72	65	78	84.2	100.0	13.31	**120.9**	C00-96 exc. C44
Average annual population					138768	135937	133187	125137	106656	89792	78629	66418	54663	45191	35953	28332	21482	16527	11816	14595	1103083				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

South Africa: National Cancer Registry of South Africa

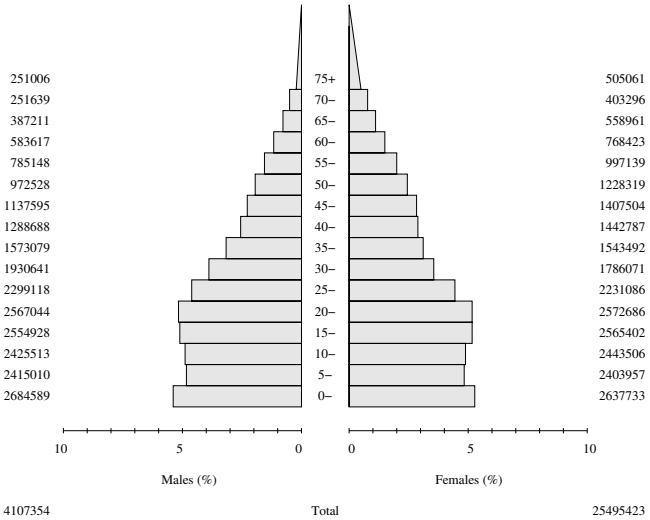
The National Cancer Registry of South Africa (NCR-SA) was established as a pathology-based cancer registry in 1986 by the pathology division of the former South African Institute for Medical Research and the National Department of Health. Recognized methods of analysis and routine reporting were introduced in 1990, and a cancer research unit funded by the South African Medical Research Council (SAMRC) was established. Between 2002 and 2009, due to competing public health priorities in South Africa, chronic diseases (and cancers in particular) were perceived to be of relatively low priority. As a result, the progress and development of the NCR-SA was hampered by a lack of funding and human resources, which resulted in a lag in registration and a drop in publications.

In 2009, the NCR-SA was transferred to new management. With renewed managerial and financial support, the momentum of the registry was restored. The NCR-SA now has 12 staff members, including cancer coders, data capturers, a quality assurance manager, and an operations manager. The lag in data capture and analysis is being addressed with the recruitment of additional staff members and the automation of data-capture processes, with the goal of bringing data capture up to date within 3 years.

The NCR-SA data presented in this volume are specifically for histologically confirmed cancer cases.

The average annual population-at-risk estimates corresponding to the NCR-SA data presented in this volume are shown in the population pyramid.

South Africa (2007)
Population pyramid (average annual person-years by sex and age group)



Source: Statistics South Africa, mid-year population estimates for 2001

The registry obtains 100% notification from the public-sector laboratories, via data download directly from the public laboratory archives. Reporting to the NCR-SA by private laboratories has decreased by 28% due to unfounded concerns about the release of patient information to an external organization. The registry receives 90 000–100 000 cancer notifications each year, of which 50 000–60 000 are new cases.

In April 2011, Regulation 380 of the National Health Act made cancer a notifiable disease in South Africa, so the NCR-SA will receive 100% notification from both public and private laboratories as of 2012.

Regulation 380 also tasks the NCR-SA with the development of a population-based cancer registry. The project will begin with the piloting of a population-based registry in the Ekurhuleni Health District in the province of Gauteng. The district has a population of approximately 3 million, served by five regional hospitals and one district hospital in the public health sector. In the private health sector, there are eight cancer treatment centres and one hospice. A system for health care professionals to report every newly diagnosed cancer case to the NCR-SA is being established in both the private and public hospitals in the district. This will provide valuable information about the status of cancer management services in South Africa to policy-makers and public health managers.

The registry uses IARC's CanReg5 software for data registration and management.

YEARS PRESENTED

2007 (a 1-year period)

NOTES

As described above, the registered cancer cases are those reported by pathology laboratories across the country. The results for 2007 are presented, with incidence rates calculated using national population estimates for that year.

As would be expected given that registration is limited to cases diagnosed by pathology – i.e. the percentage of microscopically verified cases (MV%) is 100% – the age-standardized incidence rates (ASRs) are relatively low. At 111.2 cases per 100 000 person-years in males and 95.2 cases per 100 000 person-years in females, the ASRs of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) are only slightly more than half of the values for southern Africa reported in GLOBOCAN 2012.

The number of cases registered in 2007 can be compared with the number of deaths registered for the same year. The numbers of deaths due to cancer and the calculated mortality-to-incidence (M:I) ratios are shown in Table 4.06.

Even allowing for a considerable degree of misclassification of cause of death as liver or lung cancer (i.e. metastases coded as primary site), there is likely underrecording of cancers of the oesophagus,

liver, pancreas, and lung (all of which are difficult to biopsy), as well as of leukaemia (which is diagnosed by haematology rather than pathology).

Table 4.06. The number of deaths due to cancer, as reported in the WHO Mortality Database (WHO, 2017), and the corresponding mortality-to-incidence (M:I) ratios in males (M) and females (F) in South Africa in 2007, by anatomical site

Anatomical site (ICD-10 code)	Sex	Deaths	M:I (%)
Lip, oral cavity, and pharynx (C00–14)	M	749	65
	F	295	59
Oesophagus (C15)	M	1879	189
	F	1197	176
Stomach (C16)	M	719	115
	F	483	122
Colorectum and anus (C18–21)	M	1180	98
	F	992	94
Liver (C22)	M	998	577
	F	651	880
Pancreas (C25)	M	641	745
	F	603	628
Trachea, bronchus, and lung (C33–34)	M	3201	227
	F	1484	227
Kaposi sarcoma (C46)	M	504	37
	F	432	40
Breast (C50)	F	2691	48
Cervix uteri (C53)	F	2586	53
Uterus, other and unspecified (C54–55)	F	444	47
Prostate (C61)	M	2208	51
Bladder (C67)	M	358	54
	F	151	67
Kidney, renal pelvis, ureter, and other urinary (C64–66, C68)	M	171	63
	F	104	57
Lymphoma (C81–88, C90)	M	828	72
	F	693	70
Leukaemia (C91–95)	M	461	129
	F	407	141
All sites (C00–97)	M	17 239	68
	F	16 644	62
All sites except C44 (C00–97 exc. C44)	M	17 102	94
	F	16 562	75

As a consequence, the incidence rates are all lower than the corresponding regional estimates for southern Africa, except for the rate of cancers coded as occurring at "other and unspecified" anatomical sites, which account for 9% of the registrations among males and 6.7% among females; this high reported rate is due to the fact that anatomical site is not always specified on request forms.

SUMMARY

The data have the advantage of being fairly comprehensive (because the great majority of pathology diagnoses are reported), although some of the registrations are for non-residents, because specimens are sent to South African laboratories from several neighbouring countries. Good national incidence estimates could be calculated if there were data available on the MV% within the South African population by sex, anatomical site, and (ideally) age, so that the recorded data could be appropriately scaled.

PUBLICATIONS AND ACHIEVEMENTS

The NCR-SA became a member of the African Cancer Registry Network (AFCRN) in 2012.

Dickens C, Joffe M, Jacobson J, Venter F, Schüz J, Cubasch H, et al. (2014). Stage at breast cancer diagnosis and distance from diagnostic hospital in a periurban setting: a South African public hospital case series of over 1,000 women. Int J Cancer. 135(9):2173-82. https://doi.org/10.1002/ijc.28861 PMID:24658866

Erdmann F, Kielkowski D, Schonfeld SJ, Kellett P, Stanulla M, Dickens C, et al. (2015). Childhood cancer incidence patterns by race, sex and age for 2000-2006: a report from the South African National Cancer Registry. Int J Cancer. 136(11):2628–39. http://dx.doi.org/10.1002/ijc.29308 PMID:25363616

Sengayi M, Babb C, Egger M, Urban MI (2015). HIV testing and burden of HIV infection in black cancer patients in Johannesburg, South Africa: a cross-sectional study. BMC Cancer. 15:144. http://dx.doi.org/10.1186/s12885-015-1171-7 PMID:25884599

Singh E, Ruff P, Babb C, Sengayi M, Beery M, Khoali L, et al. (2015). Establishment of a cancer surveillance programme: the South African experience. Lancet Oncol. 16(8):e414–21. http://dx.doi.org/10.1016/S1470-2045(15)00162-X PMID:26248849

Singh E, Underwood JM, Nattey C, Babb C, Sengayi M, Kellett P (2015). South African National Cancer Registry: effect of withheld data from private health systems on cancer incidence estimates. S Afr Med J. 105(2):107–9. http://dx.doi.org/10.7196/SAMJ.8858 PMID:26242527

South Africa (2007)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	812	23	100	2	1	-	1	3	7	5	21	48	86	120	139	125	112	54	65	3.4	4.5	0.59	**5.0**	C00-06
Salivary gland	89	2	100	-	-	1	-	2	1	3	5	7	10	8	8	10	9	9	14	0.4	0.5	0.06	**0.5**	C07-08
Nasopharynx	43	2	100	-	1	1	1	6	3	1	2	5	8	4	1	3	3	-	2	0.2	0.2	0.02	**0.2**	C11
Other pharynx	218	6	100	1	-	-	-	-	2	1	1	12	25	34	43	36	31	15	11	0.9	1.2	0.17	**1.3**	C09-10, C12-14
Oesophagus	993	60	100	-	-	-	1	2	3	8	15	56	90	144	173	135	117	95	94	4.1	5.5	0.75	**6.2**	C15
Stomach	626	20	100	-	-	-	2	3	2	8	15	46	52	65	91	73	74	64	111	2.6	3.4	0.44	**4.0**	C16
Colon	722	9	100	-	-	-	1	5	10	20	19	32	40	65	70	100	108	102	141	3.0	4.0	0.56	**4.8**	C18
Rectum	417	6	100	1	-	-	3	9	10	5	14	22	28	36	60	58	58	53	54	1.7	2.3	0.32	**2.6**	C19-20
Anus	62	2	100	-	-	-	-	2	1	3	4	5	8	9	10	6	5	4	3	0.3	0.3	0.04	**0.3**	C21
Liver	173	4	100	7	3	2	-	-	3	14	18	21	22	14	16	21	8	13	7	0.7	0.9	0.10	**0.9**	C22
Gallbladder etc.	62	0	100	-	-	-	-	1	-	-	3	3	4	7	9	10	7	12	6	0.3	0.3	0.05	**0.4**	C23-24
Pancreas	86	2	100	-	-	-	-	-	-	-	3	7	7	10	10	12	18	11	6	0.4	0.5	0.08	**0.6**	C25
Larynx	458	14	100	-	-	-	-	-	1	4	5	20	39	58	108	86	58	32	33	1.9	2.5	0.35	**2.8**	C32
Trachea, bronchus, and lung	1409	38	100	-	-	-	-	-	2	11	18	70	114	199	242	216	202	145	152	5.8	7.7	1.11	**8.9**	C33-34
Bone	113	4	100	3	3	17	20	19	9	4	9	4	2	7	6	3	1	-	2	0.5	0.6	0.03	**0.5**	C40-41
Melanoma of skin	638	5	100	-	-	1	4	7	26	31	32	48	57	69	67	77	77	55	82	2.6	3.5	0.43	**3.8**	C43
Non-melanoma skin	7123	55	100	1	2	4	9	24	50	121	249	345	500	648	813	932	998	851	1521	29.5		5.15	**46.7**	C44
Mesothelioma	102	0	100	-	-	-	-	-	1	-	1	7	7	9	12	17	22	12	14	0.4	0.6	0.09	**0.7**	C45
Kaposi sarcoma	1365	50	100	5	11	6	5	36	148	284	301	199	141	78	40	20	23	10	8	5.7	7.5	0.50	**5.7**	C46
Connective and soft tissue	294	3	100	11	11	4	11	18	10	17	23	18	27	32	31	23	22	14	19	1.2	1.6	0.16	**1.5**	C47, C49
Breast	121	5	100	-	-	-	-	1	-	3	1	4	14	17	15	16	15	14	16	0.5	0.7	0.09	**0.8**	C50
Penis	109	2	100	-	-	-	-	1	5	8	8	8	6	10	15	12	9	9	16	0.5	0.6	0.07	**0.6**	C60
Prostate	4293	90	100	-	-	-	-	1	1	2	4	20	75	234	513	758	858	767	970	17.8	23.6	3.85	**30.6**	C61
Testis	151	2	100	4	1	1	12	18	22	32	18	13	9	5	6	4	3	-	1	0.6	0.8	0.05	**0.6**	C62
Kidney and renal pelvis	239	2	100	26	7	3	1	1	4	6	8	12	24	24	32	30	27	23	9	1.0	1.3	0.17	**1.4**	C64-65
Bladder	666	3	100	2	2	-	2	-	1	5	9	13	39	71	77	99	111	78	154	2.8	3.7	0.50	**4.5**	C67
Ureter and other urinary	32	2	100	-	-	-	-	1	-	-	-	3	2	-	3	6	4	5	6	0.1	0.2	0.03	**0.2**	C66, C68
Eye	246	11	100	19	4	-	-	1	10	43	47	39	23	14	12	4	7	6	6	1.0	1.4	0.10	**1.1**	C69
Brain and nervous system	158	0	100	7	8	8	6	7	15	5	15	7	15	17	19	13	7	5	4	0.7	0.9	0.08	**0.8**	C70-72
Thyroid	79	1	100	-	-	-	2	6	7	11	5	6	7	7	4	11	8	2	2	0.3	0.4	0.04	**0.4**	C73
Hodgkin lymphoma	190	4	100	2	12	19	14	20	22	18	25	17	12	6	6	5	2	4	2	0.8	1.0	0.07	**0.8**	C81
Non-Hodgkin lymphoma	815	17	100	15	23	13	13	27	32	77	97	82	72	76	76	56	49	43	47	3.4	4.5	0.43	**4.2**	C82-85, C96
Multiple myeloma	141	1	100	-	1	-	-	-	-	-	6	7	18	22	22	26	14	14	10	0.6	0.8	0.11	**0.9**	C90
Lymphoid leukaemia	136	1	100	16	13	7	9	11	4	5	3	3	4	8	13	9	10	9	11	0.6	0.7	0.07	**0.7**	C91
Myeloid leukaemia	154	1	100	5	6	8	9	14	13	10	10	8	14	9	10	11	9	11	6	0.6	0.8	0.08	**0.8**	C92-94
Leukaemia, unspecified	68	0	100	2	2	5	3	7	3	2	2	3	6	5	6	5	4	6	7	0.3	0.4	0.04	**0.4**	C95
Other and unspecified	1932	64	100	16	4	2	12	20	14	44	65	109	182	274	271	255	232	168	200	8.0	10.6	1.38	**11.8**	O&U
All sites	25335	511	100	145	115	102	141	273	442	811	1081	1329	1789	2415	3049	3283	3322	2715	3812	105.1		18.15	**158.0**	C00-96
All sites except C44	18212	456	100	144	113	98	132	249	392	690	832	984	1289	1767	2236	2351	2324	1864	2291	75.5	100.0	13.00	**111.2**	C00-96 exc. C44
Average annual population (thousands)				2684.6	2415.0	2425.5	2554.9	2567.0	2299.1	1930.6	1573.1	1288.7	1137.6	972.5	785.1	583.6	387.2	251.6	251.0	24107.4				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

South Africa (2007)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	344	11	100	1	-	2	1	3	2	6	14	19	29	44	53	42	36	36	45	1.3	1.6	0.18	**1.5**	C00-06
Salivary gland	68	1	100	-	-	2	3	2	4	3	4	6	5	9	8	1	6	5	9	0.3	0.3	0.03	**0.3**	C07-08
Nasopharynx	28	2	100	-	-	3	1	1	2	3	4	1	1	4	1	2	2	1	-	0.1	0.1	0.01	**0.1**	C11
Other pharynx	60	2	100	-	-	-	-	1	-	4	3	3	11	12	8	6	3	3	4	0.2	0.3	0.03	**0.3**	C09-10, C12-14
Oesophagus	679	31	100	-	-	-	-	-	-	4	7	34	50	81	85	93	106	84	104	2.7	3.1	0.39	**3.1**	C15
Stomach	396	12	100	-	-	-	-	2	3	8	13	25	27	36	47	51	54	52	66	1.6	1.8	0.22	**1.8**	C16
Colon	612	8	100	-	-	-	1	3	5	8	29	30	51	55	72	76	84	65	125	2.4	2.8	0.31	**2.7**	C18
Rectum	362	11	100	-	-	-	1	5	7	9	10	22	30	38	35	33	49	34	78	1.4	1.6	0.17	**1.6**	C19-20
Anus	79	1	100	-	-	-	-	2	2	4	2	6	7	11	11	8	4	11	10	0.3	0.4	0.04	**0.3**	C21
Liver	74	3	100	4	1	1	3	1	4	-	5	7	7	4	7	9	7	4	7	0.3	0.3	0.03	**0.3**	C22
Gallbladder etc.	95	9	100	-	-	-	-	-	2	-	2	3	7	10	10	8	16	6	22	0.4	0.4	0.04	**0.4**	C23-24
Pancreas	96	1	100	-	-	-	-	-	1	2	3	9	9	10	14	12	13	13	9	0.4	0.4	0.06	**0.4**	C25
Larynx	64	2	100	-	-	-	-	-	2	1	2	2	5	10	16	10	4	5	5	0.3	0.3	0.03	**0.3**	C32
Trachea, bronchus, and lung	654	7	100	-	-	-	-	2	3	3	13	31	47	86	101	95	113	76	77	2.6	3.0	0.38	**3.0**	C33-34
Bone	97	0	100	3	7	11	15	4	7	4	9	3	7	3	8	5	2	5	4	0.4	0.4	0.03	**0.4**	C40-41
Melanoma of skin	593	10	100	1	4	3	7	16	17	38	42	43	55	49	58	54	58	49	89	2.3	2.7	0.27	**2.5**	C43
Non-melanoma skin	4797	27	100	1	2	5	5	22	55	98	177	234	298	393	449	540	587	559	1345	18.8		2.26	**21.2**	C44
Mesothelioma	40	1	100	-	-	-	-	1	-	-	1	1	1	5	4	10	4	8	4	0.2	0.2	0.03	**0.2**	C45
Kaposi sarcoma	1092	45	100	3	6	2	11	107	210	235	165	124	84	41	30	13	6	4	6	4.3	4.9	0.33	**4.1**	C46
Connective and soft tissue	255	1	100	15	9	5	5	17	14	6	17	18	18	29	22	20	19	22	18	1.0	1.2	0.11	**1.1**	C47, C49
Breast	5636	91	100	-	-	2	4	17	66	199	420	585	718	713	670	645	538	376	592	22.1	25.5	2.71	**24.5**	C50
Vulva	194	5	100	-	-	-	-	7	12	14	14	19	20	16	22	18	11	12	24	0.8	0.9	0.08	**0.8**	C51
Vagina	150	4	100	1	-	-	2	2	4	5	8	17	20	13	17	14	19	9	15	0.6	0.7	0.07	**0.7**	C52
Cervix uteri	4889	160	100	-	-	2	-	22	97	311	445	612	619	636	547	446	381	274	337	19.2	22.1	2.27	**20.9**	C53
Uterus	955	11	100	-	-	-	2	9	12	10	20	44	48	78	99	145	168	137	172	3.7	4.3	0.55	**4.4**	C54-55
Ovary	406	4	100	1	1	5	5	5	7	19	22	29	41	52	57	56	43	26	33	1.6	1.8	0.20	**1.8**	C56
Placenta	12	0	100	-	-	-	1	1	-	6	1	1	1	-	-	-	-	1	-	0.0	0.1	0.00	**0.0**	C58
Kidney and renal pelvis	158	2	100	27	15	1	1	3	2	4	4	14	10	19	20	7	12	10	7	0.6	0.7	0.07	**0.7**	C64-65
Bladder	227	2	100	1	1	-	-	-	1	8	8	7	18	15	31	26	21	21	67	0.9	1.0	0.10	**1.0**	C67
Ureter and other urinary	26	0	100	-	-	-	-	-	-	1	-	3	-	4	2	3	3	4	6	0.1	0.1	0.01	**0.1**	C66, C68
Eye	345	19	100	13	4	1	-	11	44	72	57	54	26	13	9	5	10	4	3	1.4	1.6	0.12	**1.3**	C69
Brain and nervous system	129	1	100	10	14	5	5	4	9	7	6	9	16	6	12	8	10	3	4	0.5	0.6	0.05	**0.5**	C70-72
Thyroid	225	3	100	-	2	3	5	7	13	24	23	20	26	17	30	12	11	15	14	0.9	1.0	0.10	**0.9**	C73
Hodgkin lymphoma	133	0	100	-	2	7	4	18	19	20	23	11	12	5	3	2	3	2	2	0.5	0.6	0.04	**0.5**	C81
Non-Hodgkin lymphoma	734	17	100	9	4	11	14	32	66	104	79	68	67	43	43	45	35	37	60	2.9	3.3	0.28	**3.0**	C82-85, C96
Multiple myeloma	123	4	100	-	-	-	-	1	1	3	2	6	13	10	14	16	21	15	17	0.5	0.6	0.07	**0.6**	C90
Lymphoid leukaemia	91	4	100	7	9	9	2	5	7	1	6	2	3	3	3	6	9	5	10	0.4	0.4	0.03	**0.4**	C91
Myeloid leukaemia	139	3	100	6	5	5	4	10	13	10	8	9	9	14	11	10	9	4	9	0.5	0.6	0.05	**0.6**	C92-94
Leukaemia, unspecified	58	1	100	2	1	1	4	1	1	6	3	3	6	5	4	5	3	3	9	0.2	0.3	0.02	**0.2**	C95
Other and unspecified	1791	63	100	13	6	5	8	18	35	57	86	111	151	186	221	206	235	171	219	7.0	8.1	0.93	**7.9**	O&U
All sites	26906	579	100	118	93	91	114	362	749	1317	1757	2245	2573	2778	2854	2763	2715	2171	3627	105.5		12.70	**116.4**	C00-96
All sites except C44	22109	552	100	117	91	86	109	340	694	1219	1580	2011	2275	2385	2405	2223	2128	1612	2282	86.7	100.0	10.45	**95.2**	C00-96 exc. C44
Average annual population (thousands)				2637.7	2404.0	2443.5	2565.4	2572.7	2231.1	1786.1	1543.5	1442.8	1407.5	1228.3	997.1	768.4	559.0	403.3	505.1	25495.4				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

South Africa: Eastern Cape

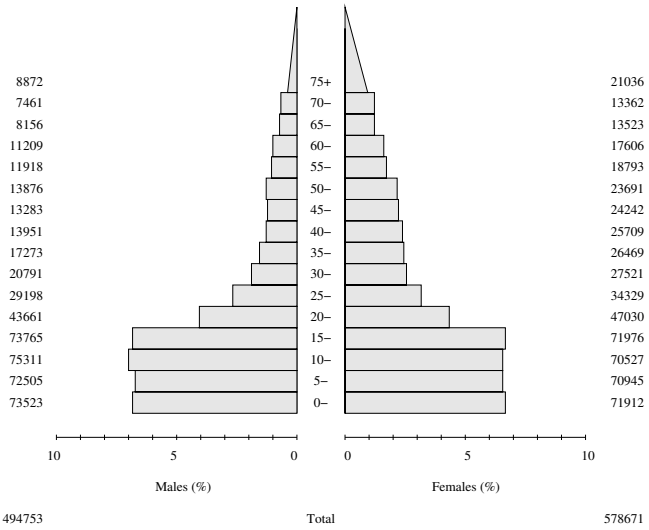
The population-based Eastern Cape Province Cancer Registry was established in the 1980s by the Programme on Mycotoxin and Experimental Carcinogenesis (PROMEC) Unit of the South African Medical Research Council (SAMRC). The registry was initially set up to monitor trends in the incidence and geographical variation of oesophageal cancer within four magisterial areas of the former Transkei region in the province of Eastern Cape. In 1998, the scope of the registry expanded to the collection of data on all cancers, and its geographical coverage expanded to include the populations of an addition four magisterial areas: Idutuya, Nqamakwe, Willowvale, and Flagstaff.

The registry is funded mainly by the SAMRC. It is staffed full-time by a senior scientist (who manages and oversees all registry activities), a junior scientist, and two research assistants (who help with data management). Three oncology nurses from collaborating hospitals work part-time as trained data collectors.

The Eastern Cape Province Cancer Registry data presented in this volume are for the registry's catchment population of eight magisterial areas in the province of Eastern Cape. These areas are located within the municipalities of Ntabankulu, Mbizana, and Ingquza Hill (formerly Qaukeni) in the north-eastern part of the former Transkei region, and Mnquma and Mbhashe in the south-western part of the region. About 99% of residents are Black Africans who speak Xhosa and support both Christian and traditional norms and values.

The population of the registry's area of coverage is estimated to have been 1.1 million in 2011 (at the most recent census). The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

South Africa, Eastern Cape (2008–2012)
Population pyramid (average annual person-years by sex and age group)



Source: Statistics South Africa; estimates based on 2001 and 2011 census counts by geography (magisterial district)

The registry collaborates with 15 facilities that serve the registration area. The facilities within the area are St Patrick's Hospital and Greenville Hospital in Bizana; Butterworth Hospital in Butterworth; Tafalofefe Hospital in Centane; Holy Cross Hospital, St Elizabeth's Mission Hospital, and Bambisana Hospital in Lusikisiki; and the Nqamakwe Community Health Centre in Nqamakwe. The facilities, including referral centres, outside the registration area are Mthatha General Hospital and the National Health Laboratory Service (NHLS) pathology laboratory located in the Nelson Mandela Academic Hospital in Mthatha; the oncology and radiation unit of Frere Hospital in East London; and East Griqualand and Usher Memorial Hospital, Inkosi Albert Luthuli Central Hospital, Addington Hospital, and King Dinuzulu Hospital in the province of KwaZulu-Natal.

The registry uses both active and passive case finding methods. The active case finding system, set up by the registry manager, uses multiple sources. The collaborating hospitals located in the eight covered magisterial areas are visited twice a year. During these visits, the data collectors examine the records to identify all cancer cases treated in the facility, and abstract the case information for inclusion in the registry. The records examined include inpatient admission, treatment, transfer, discharge, and death registers, as well as midnight census records and pathology reports.

As mentioned above, case finding also extends to hospitals located outside the registration area that may serve residents of the registration area. Part-time data collectors have been employed since 2015 to collect data from two major sources outside the registration area: the Mthatha Hospital Complex (which includes the Nelson Mandela Academic Hospital) and Frere Hospital; this ensures timely collection of data to minimize case loss. Part-time staff members receive special training on cancer registration from IARC and receive in-service training from the registry manager at least once a year.

The Department of Home Affairs, which maintains the national death register, is also used as an information source. However, the information contained in the death register is very limited: cause of death is recorded only as either natural or unnatural. Death register information is used to update vital status for registered cases; records that include the patient's South African Identity Number can easily be linked.

Cases are manually coded according to ICD-O-3 and registered using IARC's CanReg4 software. Only malignant cases are included in analysis. Potential duplicate registrations are carefully assessed to determine whether they represent new malignancies, secondary cancers, or duplicate information. Geographical location is coded according to a list of village codes created on the basis of information from the 1985 census and amended as new residential areas form.

The confidentiality of registry data is carefully maintained. Data access is controlled using personal identification numbers, and staff members are granted varying levels of data access according to their roles. Only the registry manager is authorized to make changes to the dataset. Registry information is backed up to a shared drive weekly, and backup memory sticks are stored in a locked, fireproof location. Papers containing confidential information are shredded before disposal.

There are standard procedures for the release of confidential data, and requests for data are handled by the head of the registry. Registry information is never provided to insurance companies, medical funds, pension schemes, etc. Registry data released for the purpose of publication or inclusion in collaborative studies do not include any personally identifiable information. In annual reports, registry data are presented only in aggregate, making individual identification impossible.

YEARS PRESENTED

2008–2012 (a 5-year period)

NOTES

The registry has previously reported results for the 15-year period of 1998–2012 (Somdyala et al., 2015). The most recent complete 5-year period (2008–2012) was selected for analysis in the current volume.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is relatively low compared with the values for southern Africa reported in GLOBOCAN 2012. However, the ASRs of cancers of the oesophagus (23.8 cases per 100 000 person-years in males and 14.6 cases per 100 000 person-years in females) and the cervix (29.5 cases per 100 000 person-years) are higher than the estimates for southern Africa.

The percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer) is relatively low (54% in males and 66% in females), in part due to the large number of oesophageal cancers, for which the MV% is only 36.5%.

Changes since the preceding 5-year period of 2003–2007 (for which data were published in Volume X of *Cancer Incidence in Five Continents*) are examined in the paper by Somdyala et al. (2015). The main changes were significant increases in the incidence of cancers of the prostate, cervix, and breast and of Kaposi sarcoma (in both sexes), and a significant decrease in the incidence of cancer of the oesophagus in both sexes.

SUMMARY

The changes observed since the preceding 5-year period seem to be consistent with expected trends, and the current data seem to be of comparable quality to those published in Volume X of *Cancer Incidence in Five Continents*. The low observed rates are probably due to the rural lifestyle of the population, as well as to some level of underdiagnosis of cancer in these relatively remote communities.

PUBLICATIONS AND ACHIEVEMENTS

The Eastern Cape Province Cancer Registry became a member of the African Cancer Registry Network (AFCRN) in 2012.

Somdyala NI, Bradshaw D, Gelderblom WC, Parkin DM (2010). Cancer incidence in a rural population of South Africa, 1998-2002. Int J Cancer. 127(10):2420–9. http://dx.doi.org/10.1002/ijc.25246 PMID:20162610

Somdyala NI, Marasas WF, Venter FS, Vismer HF, Gelderblom WC, Swanevelder SA (2003). Cancer patterns in four districts of the Transkei region--1991-1995. S Afr Med J. 93(2):144–8. PMID:12640888

Somdyala NI, Parkin DM, Sithole N, Bradshaw D (2015). Trends in cancer incidence in rural Eastern Cape Province; South Africa, 1998-2012. Int J Cancer. 136(5):E470–4. http://dx.doi.org/10.1002/ijc.29224 PMID:25236502

Somdyala NIM, Bradshaw D, Gelderblom WCA (2013). Cancer incidence in selected municipalities of the Eastern Cape Province, 2003–2007. Eastern Cape Province Cancer Registry Technical Report. Cape Town: South African Medical Research Council. Available from: http://afcrn.org/membership/members/84-easterncape.

Somdyala NIM, Gelderblom WCA, Bradshaw D, Marasas WFO, Vismer HF (2014). Cancer incidence in South Africa, PROMEC (2003–2007). In: Forman D, Bray F, Brewster DH, Gombe Mbalawa C, Kohler B, Piñeros M, et al., editors. Cancer incidence in five continents, Vol. X. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 164. Available from: http://publications.iarc.fr/319.

South Africa, Eastern Cape (2008–2012)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	74	0	88		-	-	-	1	-	-	-	4	3	6	11	11	9	14	6	9	3.0	6.1	0.60	**5.0**	C00-06
Salivary gland	3	0	100		-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	1	0.1	0.2	0.00	**0.1**	C07-08
Nasopharynx	2	0	100		-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	0.1	0.2	0.02	**0.1**	C11
Other pharynx	20	0	75		-	-	-	-	-	-	-	-	-	1	4	5	6	1	1	2	0.8	1.6	0.16	**1.4**	C09-10, C12-14
Oesophagus	370	0	38		-	-	-	-	-	2	2	4	9	19	38	44	64	55	54	79	15.0	30.4	2.86	**23.8**	C15
Stomach	21	0	52		-	-	-	-	-	-	1	1	1	3	4	-	1	4	2	4	0.8	1.7	0.15	**1.4**	C16
Colon	21	0	52		-	-	-	1	1	2	1	2	2	3	-	1	4	3	-	1	0.8	1.7	0.14	**1.4**	C18
Rectum	15	0	73		-	-	-	-	-	-	-	1	3	1	1	3	-	1	-	5	0.6	1.2	0.08	**1.0**	C19-20
Anus	5	0	100		-	-	-	-	-	-	1	1	-	-	2	-	-	1	-	-	0.2	0.4	0.04	**0.3**	C21
Liver	62	0	45		1	-	1	1	-	-	8	8	-	6	7	1	6	8	4	11	2.5	5.1	0.40	**3.9**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	11	0	0		-	-	-	-	-	-	-	-	-	-	1	1	2	3	3	1	0.4	0.9	0.11	**0.7**	C25
Larynx	51	0	86		-	-	-	-	-	-	-	-	2	5	3	7	10	6	8	10	2.1	4.2	0.40	**3.3**	C32
Trachea, bronchus, and lung	66	0	64		-	-	-	-	-	-	-	1	2	2	8	5	14	10	9	15	2.7	5.4	0.50	**4.2**	C33-34
Bone	16	0	81		-	-	1	2	1	2	-	1	-	4	1	1	-	1	2	-	0.6	1.3	0.10	**1.0**	C40-41
Melanoma of skin	6	0	100		-	-	-	-	-	-	-	-	-	-	1	1	2	-	1	1	0.2	0.5	0.05	**0.4**	C43
Non-melanoma skin	12	0	83		-	-	-	-	2	-	1	-	4	1	3	1	-	-	-	-	0.5		0.08	**0.8**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	85	0	47		-	-	-	-	2	15	14	15	15	7	4	4	2	5	-	2	3.4	7.0	0.51	**5.8**	C46
Connective and soft tissue	14	0	100		3	-	-	1	-	1	3	-	3	1	-	-	-	-	2	-	0.6	1.1	0.08	**0.8**	C47, C49
Breast	17	0	82		-	-	-	-	-	-	-	-	2	1	3	2	3	1	3	2	0.7	1.4	0.14	**1.2**	C50
Penis	15	0	67		-	-	-	-	-	1	5	1	1	1	1	1	2	1	1	-	0.6	1.2	0.11	**1.0**	C60
Prostate	182	0	31		-	-	-	-	-	-	-	-	1	-	5	13	25	24	40	74	7.4	14.9	1.21	**10.3**	C61
Testis	7	0	86		-	1	-	1	-	2	-	1	1	-	1	-	-	-	-	-	0.3	0.6	0.03	**0.4**	C62
Kidney and renal pelvis	8	0	75		5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.7	0.01	**0.2**	C64-65
Bladder	9	0	67		-	-	-	-	-	-	-	-	-	2	2	1	2	-	-	2	0.4	0.7	0.06	**0.6**	C67
Ureter and other urinary	1	0	0		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.0	0.1	0.01	**0.1**	C66, C68
Eye	13	0	85		6	2	-	-	-	-	2	-	2	-	-	1	-	-	-	-	0.5	1.1	0.04	**0.6**	C69
Brain and nervous system	4	0	75		-	-	1	-	1	1	-	-	-	-	1	-	-	-	-	-	0.2	0.3	0.01	**0.2**	C70-72
Thyroid	3	0	67		-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	0.1	0.2	0.02	**0.2**	C73
Hodgkin lymphoma	3	0	100		-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	0.1	0.2	0.02	**0.2**	C81
Non-Hodgkin lymphoma	23	0	78		1	-	-	-	3	2	2	3	2	4	-	2	-	3	1	-	0.9	1.9	0.15	**1.5**	C82-85, C96
Multiple myeloma	7	0	100		-	-	-	-	-	-	-	-	-	1	-	1	-	-	3	2	0.3	0.6	0.06	**0.4**	C90
Lymphoid leukaemia	6	0	100		-	-	1	-	-	-	-	-	1	-	-	-	2	1	-	1	0.2	0.5	0.04	**0.4**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	5	0	80		1	2	1	-	-	-	-	-	-	-	-	1	-	-	-	-	0.2	0.4	0.01	**0.2**	C95
Other and unspecified	73	0	84		1	1	-	2	-	-	3	4	5	5	9	6	10	9	12	6	3.0	6.0	0.59	**4.8**	O&U
All sites	1230	0	55		18	9	6	9	11	28	43	47	60	73	112	117	166	151	152	228	49.7		8.80	**77.9**	C00-96
All sites except C44	1218	0	54		18	9	6	9	9	28	42	47	56	72	109	116	166	151	152	228	49.2	100.0	8.72	**77.1**	C00-96 exc. C44
Average annual population					73523	72505	75311	73765	43661	29198	20791	17273	13951	13283	13876	11918	11209	8156	7461	8872	494754				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

South Africa, Eastern Cape (2008–2012)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	26	0	69		-	-	-	-	-	1	1	-	2	-	1	3	3	1	8	6	0.9	1.2	0.12	**0.9**	C00-06
Salivary gland	5	0	40		-	-	-	-	-	-	-	1	-	-	-	-	-	1	1	2	0.2	0.2	0.02	**0.2**	C07-08
Nasopharynx	2	0	100		-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	0.1	0.1	0.01	**0.1**	C11
Other pharynx	3	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1	0.1	0.1	0.01	**0.1**	C09-10, C12-14
Oesophagus	413	0	35		-	-	-	-	1	4	3	3	11	23	31	34	65	56	72	110	14.3	19.6	1.81	**14.6**	C15
Stomach	24	0	42		-	-	-	-	-	1	1	1	1	1	2	2	3	-	5	7	0.8	1.1	0.09	**0.8**	C16
Colon	30	0	50		-	-	-	-	2	1	-	2	1	1	2	3	3	5	4	6	1.0	1.4	0.13	**1.1**	C18
Rectum	19	0	89		-	-	-	-	-	3	-	1	-	-	2	1	2	1	3	6	0.7	0.9	0.07	**0.7**	C19-20
Anus	2	0	100		-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C21
Liver	42	0	64		-	-	-	-	2	-	-	4	2	2	3	5	3	8	6	7	1.5	2.0	0.20	**1.6**	C22
Gallbladder etc.	3	0	0		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	0.1	0.1	0.00	**0.1**	C23-24
Pancreas	10	0	0		-	-	-	-	-	-	-	-	-	2	1	3	-	1	2	1	0.3	0.5	0.05	**0.4**	C25
Larynx	9	0	89		-	-	-	-	-	1	-	-	-	1	1	-	5	-	-	1	0.3	0.4	0.04	**0.4**	C32
Trachea, bronchus, and lung	28	0	57		-	-	-	-	-	-	1	-	-	1	3	3	5	5	4	6	1.0	1.3	0.13	**1.0**	C33-34
Bone	11	0	100		-	-	2	-	-	-	-	-	-	1	2	-	2	1	-	3	0.4	0.5	0.03	**0.4**	C40-41
Melanoma of skin	14	0	79		-	-	-	-	-	-	-	-	-	-	1	2	2	2	2	5	0.5	0.7	0.06	**0.5**	C43
Non-melanoma skin	11	0	82		-	-	-	-	1	-	-	1	-	-	1	2	3	1	2	-	0.4		0.06	**0.4**	C44
Mesothelioma	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.0	0.0	0.01	**0.0**	C45
Kaposi sarcoma	81	0	44		-	1	-	2	5	18	17	14	9	9	1	3	2	-	-	-	2.8	3.9	0.29	**3.6**	C46
Connective and soft tissue	14	0	79		1	1	2	-	1	-	2	-	1	1	1	2	1	-	-	1	0.5	0.7	0.04	**0.5**	C47, C49
Breast	306	0	82		-	-	-	1	3	11	16	14	32	32	30	38	47	20	23	39	10.6	14.6	1.32	**12.4**	C50
Vulva	22	0	86		-	-	-	-	2	4	3	1	-	2	3	-	2	2	1	2	0.8	1.0	0.09	**0.9**	C51
Vagina	5	0	60		-	-	-	-	-	-	-	1	1	-	-	-	-	-	1	2	0.2	0.2	0.02	**0.2**	C52
Cervix uteri	734	0	78		-	-	-	-	2	13	41	51	65	65	69	81	110	69	80	88	25.4	34.9	3.36	**29.5**	C53
Uterus	67	0	60		-	-	-	-	-	1	-	1	4	5	5	6	12	12	11	10	2.3	3.2	0.34	**2.6**	C54-55
Ovary	58	0	64		-	-	1	2	2	3	3	4	2	6	6	8	3	7	3	8	2.0	2.8	0.23	**2.3**	C56
Placenta	11	0	82		-	-	-	1	1	2	-	3	2	1	-	1	-	-	-	-	0.4	0.5	0.04	**0.5**	C58
Kidney and renal pelvis	10	0	80		6	-	-	-	1	-	-	-	-	-	1	-	1	-	1	-	0.3	0.5	0.03	**0.4**	C64-65
Bladder	7	0	71		-	-	-	-	-	-	-	-	-	1	1	-	-	2	1	2	0.2	0.3	0.03	**0.2**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	20	0	75		2	-	-	-	1	3	1	4	2	2	1	2	1	-	1	-	0.7	1.0	0.08	**0.9**	C69
Brain and nervous system	9	0	33		2	-	1	1	-	-	1	1	-	1	-	-	2	-	-	-	0.3	0.4	0.03	**0.3**	C70-72
Thyroid	15	0	67		-	-	-	-	-	1	-	2	-	3	3	2	1	-	3	-	0.5	0.7	0.07	**0.6**	C73
Hodgkin lymphoma	1	0	100		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C81
Non-Hodgkin lymphoma	30	0	73		-	1	3	1	-	2	5	1	4	1	-	1	1	6	2	2	1.0	1.4	0.12	**1.2**	C82-85, C96
Multiple myeloma	6	0	83		-	-	-	-	-	-	-	-	-	-	1	2	1	-	1	1	0.2	0.3	0.03	**0.2**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	6	0	0		-	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.3	0.01	**0.2**	C95
Other and unspecified	58	0	67		3	-	-	1	2	6	1	2	4	7	2	3	11	3	2	11	2.0	2.8	0.21	**2.3**	O&U
All sites	2113	0	66		14	8	10	9	26	76	97	114	143	170	174	207	292	204	240	329	73.0		9.17	**82.0**	C00-96
All sites except C44	2102	0	66		14	8	10	9	25	76	97	113	143	170	173	205	289	203	238	329	72.6	100.0	9.11	**81.6**	C00-96 exc. C44
Average annual population					71912	70945	70527	71976	47030	34329	27521	26469	25709	24242	23691	18793	17606	13523	13362	21036	578670				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Benin, Cotonou

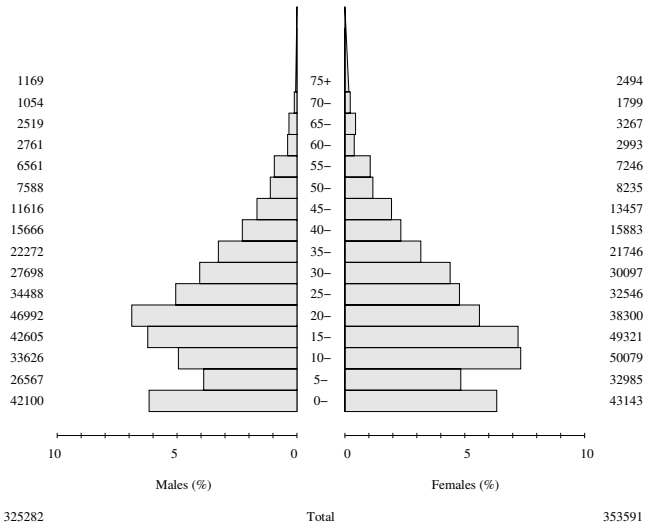
The Cotonou Cancer Registry, established by the Benin Ministry of Health in 2014, is a population-based cancer registry under the control of the National Program for the Fight against Noncommunicable Diseases (PNLMNT). Cancer registration in Benin first started in 2013, in the pathology department of the University of Benin's health sciences faculty.

The Cotonou Cancer Registry is supervised by a committee, whose president is an epidemiologist and coordinator of the PNLMNT. The five staff members of the registry (the medical director, the deputy medical director, and three epidemiologists) are responsible for data collection and management. The registry is financed by the PNLMNT. Visits to data sources are conducted using public transport or personal vehicles; there is a budget for fuel but no dedicated registry vehicle.

The Cotonou Cancer Registry data presented in this volume are for the registry's catchment area of the city of Cotonou, which is subdivided into 13 arrondissements. The largest ethnic group in the city is the Fon, followed by the Yoruba, Goun, Mina, Xueda, Aja, and many others. The most common religion in Benin is Roman Catholicism, followed closely by Islam, Vodun, and Protestantism.

The population of Cotonou is estimated to have been 678 874 in 2013 (at the census). The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Benin, Cotonou (2013–2015)
Population pyramid (average annual person-years by sex and age group)



Estimates based on the general population and housing census, February 2013

The registry collects information from 28 sources that diagnose, treat, and/or hospitalize patients: 9 hospitals, 14 private clinics, and 5 private pathology laboratories. The most important source is the Centre National Hospitalier Universitaire (CNHU), which is by far the largest hospital in Benin and is the only centre with specialist services, although there is no separate oncology department and no radiotherapy service.

Case finding in hospitals is carried out through visits by the cancer registrar to all services where cancer patients are treated. The Hôpital de Menontin has a computerized central records system with a full index of patients (both inpatient and outpatient) that includes demographic and diagnostic details. At the other hospitals, case finding is carried out through regular examination of ward registers. These registers generally list diagnosis, but finding other information (e.g. personal data – especially address – and details such as histological type) requires tracing the clinical records to wherever they have been stored in each service.

A focal-point staff member, generally the head nurse, has been identified in each service, and these focal-point personnel receive special training in the principles and methods of cancer registration.

There is no systematic death registration, even for deaths occurring in hospital.

The registry uses IARC's CanReg5 software for data entry, management, and quality control. The registry has well-developed security procedures to preserve the confidentiality of documents and computer files.

YEARS PRESENTED

Mid-2013–mid-2015 (a 2-year period)

NOTES

The registry is very new; the calculated rates presented in this volume are based on the first 24 months of activity.

The age-standardized incidence rates (ASRs) are reasonably similar to the values for western Africa reported in GLOBOCAN 2012. The ASR of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 128.0 cases per 100 000 person-years in males and 115.0 cases per 100 000 person-years in females.

In males, prostate cancer predominates (accounting for 28% of registered cases) and, perhaps surprisingly, stomach cancer is apparently more common than liver cancer. In females, the ASR of breast cancer (40.2 cases per 100 000 person-years) is higher than that of cervical cancer (23.1 cases per 100 000 person-years).

SUMMARY

The data are still sparse and may be influenced by registration of prevalent cases in the early months of registry operation. The relatively low frequency of liver cancer may be due to problems with identifying clinically diagnosed cases.

PUBLICATIONS AND ACHIEVEMENTS

The Cotonou Cancer Registry became a member of the African Cancer Registry Network (AFCRN) in 2015.

Benin, Cotonou (2013–2015)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	2	0	100		-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	0.3	0.7	0.05	**0.5**	C00-06
Salivary gland	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C07-08
Nasopharynx	4	0	75		-	-	-	-	1	-	-	1	1	1	-	-	-	-	-	-	0.6	1.5	0.05	**0.7**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	15	0	73		-	-	-	-	-	-	-	1	-	-	5	3	-	4	1	1	2.3	5.5	0.92	**6.9**	C15
Stomach	24	0	58		-	-	-	-	-	-	-	2	2	2	3	3	4	6	1	1	3.7	8.9	1.51	**11.3**	C16
Colon	10	0	60		-	-	-	-	-	-	-	1	2	1	1	2	-	2	1	-	1.5	3.7	0.61	**3.9**	C18
Rectum	11	0	73		-	-	-	-	-	-	-	1	1	1	2	1	3	2	-	-	1.7	4.1	0.62	**4.9**	C19-20
Anus	5	0	60		-	-	-	-	-	2	1	-	-	1	1	-	-	-	-	-	0.8	1.8	0.08	**0.9**	C21
Liver	16	0	12		-	-	-	-	-	1	1	2	1	-	3	1	2	1	-	4	2.5	5.9	0.47	**7.4**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	6	0	0		-	-	-	-	-	-	1	-	-	-	-	2	2	1	-	-	0.9	2.2	0.37	**2.8**	C25
Larynx	2	0	100		-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	0.3	0.7	0.12	**1.1**	C32
Trachea, bronchus, and lung	3	0	33		-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	0.5	1.1	0.09	**0.9**	C33-34
Bone	7	0	29		-	-	1	1	1	1	1	-	-	1	-	-	1	-	-	-	1.1	2.6	0.15	**1.5**	C40-41
Melanoma of skin	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C43
Non-melanoma skin	5	0	80		-	-	-	-	1	-	-	1	1	1	-	-	-	-	-	1	0.8		0.05	**1.5**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C46
Connective and soft tissue	4	0	100		-	-	-	-	-	2	-	-	1	-	-	-	1	-	-	-	0.6	1.5	0.12	**1.1**	C47, C49
Breast	6	0	83		-	-	-	-	-	-	-	-	1	-	1	-	-	4	-	-	0.9	2.2	0.45	**2.9**	C50
Penis	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.2	0.4	0.00	**0.9**	C60
Prostate	75	0	53		-	-	-	-	-	-	-	-	-	1	6	4	12	11	19	22	11.5	27.7	7.06	**55.6**	C61
Testis	2	0	50		-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	0.3	0.7	0.04	**0.4**	C62
Kidney and renal pelvis	12	0	50		2	1	-	-	-	-	-	3	-	-	2	1	-	2	1	-	1.8	4.4	0.59	**4.0**	C64-65
Bladder	7	0	14		-	-	1	-	-	-	1	-	-	2	1	1	-	1	-	-	1.1	2.6	0.23	**2.0**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	2	0	100		2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.7	0.01	**0.3**	C69
Brain and nervous system	2	0	0		-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	0.3	0.7	0.25	**1.1**	C70-72
Thyroid	2	0	100		-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	0.3	0.7	0.10	**0.7**	C73
Hodgkin lymphoma	4	0	100		-	-	-	1	-	1	-	1	1	-	-	-	-	-	-	-	0.6	1.5	0.04	**0.5**	C81
Non-Hodgkin lymphoma	5	0	20		-	1	-	-	-	-	1	1	-	-	1	-	1	-	-	-	0.8	1.8	0.15	**1.5**	C82-85, C96
Multiple myeloma	9	0	100		-	-	-	-	1	-	-	1	1	1	5	-	-	-	-	-	1.4	3.3	0.22	**2.3**	C90
Lymphoid leukaemia	11	0	100		-	2	2	-	-	1	-	2	-	-	-	-	-	-	1	3	1.7	4.1	0.30	**4.5**	C91
Myeloid leukaemia	4	0	100		-	-	-	1	-	-	1	-	1	-	-	-	-	-	1	-	0.6	1.5	0.27	**1.4**	C92-94
Leukaemia, unspecified	1	0	100		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.2	0.4	0.04	**0.3**	C95
Other and unspecified	19	0	79		-	-	-	2	-	1	2	2	2	3	2	1	1	2	-	1	2.9	7.0	0.55	**5.7**	O&U
All sites	276	0	60		4	4	4	6	5	9	10	19	16	16	37	21	28	37	26	34	42.4		15.52	**129.5**	C00-96
All sites except C44	271	0	59		4	4	4	6	4	9	10	18	15	15	37	21	28	37	26	33	41.7	100.0	15.46	**128.0**	C00-96 exc. C44
Average annual population					42100	26566	33626	42604	46992	34488	27698	22272	15666	11616	7588	6560	2760	2518	1054	1168	325279				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Benin, Cotonou (2013–2015)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	4	0	75		-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	-	0.6	1.1	0.38	**2.1**	C00-06
Salivary gland	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C07-08
Nasopharynx	2	0	100		-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	0.3	0.5	0.03	**0.3**	C11
Other pharynx	2	0	0		-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	0.3	0.5	0.05	**0.5**	C09-10, C12-14
Oesophagus	8	0	50		-	-	-	-	-	-	-	1	-	-	1	-	3	-	-	3	1.1	2.1	0.29	**3.6**	C15
Stomach	6	0	67		-	-	-	-	-	-	-	1	-	-	2	-	1	-	1	1	0.8	1.6	0.29	**2.4**	C16
Colon	10	0	80		-	-	-	-	-	-	-	1	1	4	2	-	1	1	-	-	1.4	2.7	0.32	**3.0**	C18
Rectum	4	0	25		-	-	-	-	-	-	-	2	-	1	1	-	-	-	-	-	0.6	1.1	0.07	**0.8**	C19-20
Anus	2	0	100		-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	0.3	0.5	0.10	**0.9**	C21
Liver	5	0	0		-	-	-	-	-	-	-	-	1	-	1	1	2	-	-	-	0.7	1.3	0.25	**2.1**	C22
Gallbladder etc.	2	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	0.3	0.5	0.15	**0.9**	C23-24
Pancreas	8	0	12		-	-	-	-	-	-	-	-	-	2	-	2	2	2	-	-	1.1	2.1	0.43	**3.3**	C25
Larynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C32
Trachea, bronchus, and lung	3	0	33		-	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	0.4	0.8	0.18	**1.0**	C33-34
Bone	5	0	60		-	-	2	-	-	-	1	-	-	-	2	-	-	-	-	-	0.7	1.3	0.08	**0.9**	C40-41
Melanoma of skin	1	0	100		-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.2**	C43
Non-melanoma skin	6	0	100		-	1	-	-	-	-	-	1	1	-	1	-	2	-	-	-	0.8		0.23	**2.1**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C46
Connective and soft tissue	2	0	100		-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	0.3	0.5	0.06	**0.6**	C47, C49
Breast	153	0	67		-	-	-	-	3	3	19	14	22	26	26	14	10	8	3	5	21.6	40.8	4.33	**40.2**	C50
Vulva	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.3	0.03	**0.3**	C51
Vagina	2	0	100		-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	0.3	0.5	0.04	**0.4**	C52
Cervix uteri	63	0	86		-	-	-	2	1	1	1	3	5	5	9	7	10	6	5	8	8.9	16.8	2.74	**23.1**	C53
Uterus	12	0	92		-	-	-	-	-	-	-	-	1	1	1	2	5	-	2	-	1.7	3.2	0.83	**5.7**	C54-55
Ovary	12	0	67		-	-	-	1	1	-	1	-	4	1	1	2	-	1	-	-	1.7	3.2	0.28	**2.6**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	11	0	27		1	-	-	-	-	1	1	-	-	1	3	1	2	-	-	1	1.6	2.9	0.33	**3.5**	C64-65
Bladder	2	0	100		-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	0.3	0.5	0.05	**0.5**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	6	0	67		4	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.8	1.6	0.04	**0.8**	C69
Brain and nervous system	1	0	0		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0.1	0.3	0.14	**0.6**	C70-72
Thyroid	3	0	100		-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1	0.4	0.8	0.02	**0.7**	C73
Hodgkin lymphoma	2	0	100		-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	0.3	0.5	0.02	**0.2**	C81
Non-Hodgkin lymphoma	6	0	50		-	-	-	1	1	-	-	1	-	1	-	-	1	-	1	-	0.8	1.6	0.26	**1.8**	C82-85, C96
Multiple myeloma	6	0	100		-	-	-	-	-	-	-	-	2	-	-	3	-	1	-	-	0.8	1.6	0.21	**1.7**	C90
Lymphoid leukaemia	8	0	100		-	-	-	-	-	-	1	1	-	-	-	-	3	3	-	-	1.1	2.1	0.50	**3.6**	C91
Myeloid leukaemia	6	0	100		-	-	-	-	-	-	1	1	1	1	1	-	1	-	-	-	0.8	1.6	0.17	**1.6**	C92-94
Leukaemia, unspecified	1	0	100		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C95
Other and unspecified	16	0	100		-	-	1	-	1	-	1	-	6	-	-	2	3	-	1	1	2.3	4.3	0.57	**4.9**	O&U
All sites	381	0	71		6	3	3	5	7	7	28	28	47	45	57	35	48	26	16	20	53.9		13.49	**117.1**	C00-96
All sites except C44	375	0	71		6	2	3	5	7	7	28	27	46	45	56	35	46	26	16	20	53.0	100.0	13.26	**115.0**	C00-96 exc. C44
Average annual population					43142	32984	50078	49320	38300	32546	30096	21746	15882	13456	8234	7246	2992	3266	1798	2494	353586				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

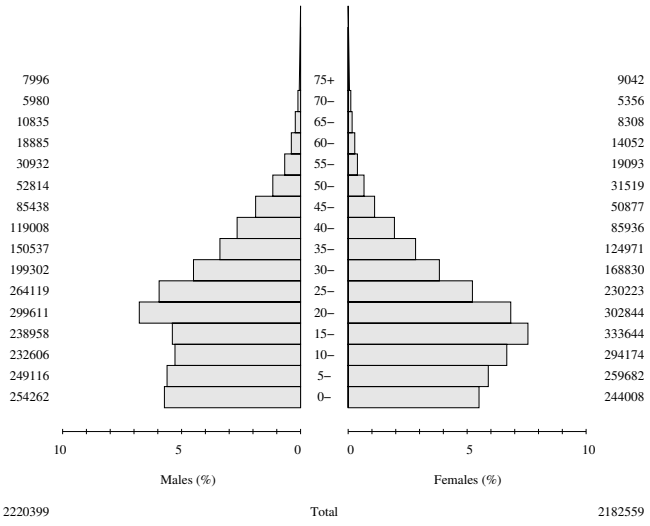
Côte d'Ivoire, Abidjan

The Registre du Cancer d'Abidjan was established in 1994 under the leadership of the Ministry of Health and Public Hygiene and IARC. It served as a population-based cancer registry from 1995 to 2000. The operation of the registry was then interrupted for 10 years due to political instability in the country. The registry was re-established in late 2011 as an initiative of the National Programme for the Fight against Cancer (PNLCa). The registry is located in the oncology department of the University Hospital Centre (CHU) of Treichville, and the head of the department oversees the registry activities. The registry coordinator, who manages the day-to-day work of the registry, is assisted by a full-time data clerk and two data collectors. An archivist/secretary from the oncology department provides support to the registry. The staff members' salaries are generally paid from the budget of the oncology department. The registry receives technical and financial support from the PNLCa, F. Hoffmann-La Roche Ltd, and IARC. Travel expenses are covered by the budget of the PNLCa.

The Registre du Cancer d'Abidjan covers the city of Abidjan and some of its suburbs (Alépé, Anyama, Bingerville, Bonoua, Dabou, and Grand-Bassam). The registry data presented in this volume are specifically for the city of Abidjan, which consists of 10 communes: Abobo, Adjamé, Attécoubé, Cocody, Koumassi, Marcory, Plateau, Port-Bouët, Treichville, and Yopougon.

The population of the city of Abidjan is estimated by the Institut National de la Statistique (INS) to have been 4 402 949 in 2012, based on data from the 1998 census. The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Côte d'Ivoire, Abidjan (2012–2013)
Population pyramid (average annual person-years by sex and age group)



Source: Institut National de la Statistique (INS) of Côte d'Ivoire, 2012 and 2013 estimates

The main sources of information are the three major teaching hospitals serving the city (the CHUs of Treichville, Cocody, and Yopougon), each of which offers a full range of diagnostic and therapeutic services. The other public hospitals in the area are relatively small. Other sources of information are the Abidjan Military Hospital and a number of small private clinics, such as the Polyclinique Internationale Sainte Anne-Marie (PISAM).

The CHU of Treichville has the area's only oncology service. Patients requiring radiotherapy have to go to France, Ghana, Morocco, or Tunisia. The paediatrics department at the CHU of Cocody provides paediatric oncology services. The haematology clinic at the CHU of Yopougon sees a large number of cases of lymphoma and haematological malignancies.

None of the hospitals has a centralized record system. In general, each service maintains its own register of admissions and discharges, which include the patient's hospital number, name, age, sex, diagnosis, and condition at time of discharge. The patient's residential address is not included. A few of the non-oncological services in the area (e.g. the otorhinolaryngology unit at the CHU of Treichville) keep registers of patients with cancer.

There are three major pathology institutes: at the CHU of Treichville, the CHU of Cocody, and the private Centre Wilic. All three provide only basic histopathology examinations; for specialized diagnostic procedures (e.g. immunohistochemical analysis), specimens must be sent to collaborating centres in Europe or the USA.

Case finding is fully active, carried out through visits to each service and private clinic. A focal-point staff member has been identified in each of the key services and clinics.

Death certificates are completed for deaths occurring in hospital, with cause of death certified by a physician. Deaths occurring at home are often investigated by forensic autopsy in one of the pathology departments. The use of death certificates as a source of information is recent; certificates are found in the archives of the administrative offices of hospitals.

The registry has used IARC's CanReg5 software since 2012. The database from the initial registration period (1994–2002), which was created using CanReg4, has been merged with the more recent records.

YEARS PRESENTED

2012–2013 (a 2-year period)

NOTES

The registry resumed activity only recently, after a lapse of several years. Therefore, relatively complete data were available only for the 2-year period of 2012–2013, and there was an obvious decline in the rate of registration during the final 4 months of that period.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 68.8 cases per 100 000 person-years in males and 111.5 cases per 100 000 person-years in females, values similar to

those for western Africa reported in GLOBOCAN 2012. The ASRs for lymphomas and, in particular, leukaemias are low. Kaposi sarcoma appears to be relatively rare, and there were more cases of lung cancer reported in females than in males.

The overall percentage of microscopically verified cases (MV%) is relatively low: 53% in males and 65% in females.

SUMMARY

The rates are relatively low, which may reflect difficulties in case finding in this large city with three large teaching hospitals and several smaller institutions. The population denominators are based on projections from the census of 1998 and therefore may also be relatively inaccurate. Interestingly, the proportional distribution of various cancers has changed little since the first report from the registry (for 1995–1997), with the exception of the reversal in the relative frequency of breast and cervical cancers in females (Echimane et al., 2000).

PUBLICATIONS AND ACHIEVEMENTS

The Registre du Cancer d'Abidjan became a member of the African Cancer Registry Network (AFCRN) in 2013. It hosted the 2015 Third AFCRN Annual Meeting.

Echimane AK, Ahnoux AA, Adoubi I, Hien S, M'Bra K, D'Horpock A, et al. (2000). Cancer incidence in Abidjan, Ivory Coast: first results from the cancer registry, 1995-1997. Cancer. 89(3):653–63. http://dx.doi.org/10.1002/1097-0142(20000801)89:3<653::AID-CNCR22>3.0.CO;2-Z PMID:10931466

N'da GG, Ayemou A, Adoubi I, et al. Registre du Cancer d'Abidjan rapport biennal: 2012–2013.

Tanon A, Jaquet A, Ekouevi DK, Akakpo J, Adoubi I, Diomande I, et al.; IeDEA West Africa Collaboration (2012). The spectrum of cancers in West Africa: associations with human immunodeficiency virus. PLoS One. 7(10):e48108. http://dx.doi.org/10.1371/journal.pone.0048108 PMID:23144732

Toure M, Nguessan E, Bambara AT, Kouassi YK, Dia JM, Adoubi I (2013). Factors linked to late diagnosis in breast cancer in sub-Saharan Africa: case of Côte d'Ivoire. Gynecol Obstet Fertil. 41(12):696–700. [French] http://dx.doi.org/10.1016/j.gyobfe.2013.08.019 PMID:24210776

Côte d´Ivoire, Abidjan (2012–2013)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	14	0	79		-	-	-	1	-	2	1	2	1	1	2	1	2	-	1	-	0.3	1.5	0.10	**0.7**	C00-06
Salivary gland	12	0	25		-	-	-	2	1	-	1	-	-	1	1	2	4	-	-	-	0.3	1.3	0.08	**0.7**	C07-08
Nasopharynx	7	0	71		-	-	-	-	1	2	1	-	-	1	-	-	1	-	-	1	0.2	0.7	0.02	**0.3**	C11
Other pharynx	5	0	60		-	-	-	-	-	-	-	-	-	1	1	1	1	1	-	-	0.1	0.5	0.05	**0.4**	C09-10, C12-14
Oesophagus	3	0	100		-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	0.1	0.3	0.02	**0.2**	C15
Stomach	36	0	64		-	-	-	-	-	-	1	4	1	2	8	6	5	6	2	1	0.8	3.8	0.39	**2.8**	C16
Colon	40	0	68		-	-	-	1	-	5	2	2	7	1	2	11	1	2	3	3	0.9	4.3	0.31	**2.4**	C18
Rectum	11	0	45		-	-	-	-	-	1	1	-	2	1	-	1	2	2	-	1	0.2	1.2	0.09	**0.8**	C19-20
Anus	3	0	33		-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	0.1	0.3	0.00	**0.0**	C21
Liver	179	0	14		-	2	-	2	3	7	9	26	20	18	24	27	21	7	4	9	4.0	19.1	1.10	**9.9**	C22
Gallbladder etc.	3	0	67		-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	0.1	0.3	0.04	**0.3**	C23-24
Pancreas	34	0	21		-	-	-	-	1	1	2	1	3	5	5	3	4	3	4	2	0.8	3.6	0.36	**2.5**	C25
Larynx	19	0	79		-	-	-	-	-	1	3	-	-	1	1	3	5	2	1	2	0.4	2.0	0.19	**1.6**	C32
Trachea, bronchus, and lung	29	0	31		-	-	-	-	-	-	1	1	4	3	2	6	3	1	4	4	0.7	3.1	0.31	**2.3**	C33-34
Bone	39	0	46		-	1	1	4	5	5	5	4	-	1	4	4	1	1	2	1	0.9	4.2	0.20	**1.6**	C40-41
Melanoma of skin	2	0	100		-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	0.0	0.2	0.02	**0.2**	C43
Non-melanoma skin	20	0	35		-	-	-	-	1	3	4	1	4	-	1	-	2	1	2	1	0.5		0.16	**1.1**	C44
Mesothelioma	1	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C45
Kaposi sarcoma	16	0	94		-	-	-	-	1	-	2	3	2	1	3	2	1	1	-	-	0.4	1.7	0.08	**0.7**	C46
Connective and soft tissue	25	0	64		2	-	-	2	4	2	1	2	-	2	3	3	-	3	-	1	0.6	2.7	0.13	**1.2**	C47, C49
Breast	12	0	83		-	-	-	-	-	-	-	-	1	1	2	2	3	2	-	1	0.3	1.3	0.12	**1.0**	C50
Penis	3	0	33		-	-	-	-	-	-	-	-	-	1	-	1	-	-	1	-	0.1	0.3	0.05	**0.3**	C60
Prostate	251	0	67		-	-	-	-	-	-	1	-	2	4	13	31	53	44	43	60	5.7	26.8	3.84	**29.2**	C61
Testis	2	0	100		-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	0.0	0.2	0.00	**0.0**	C62
Kidney and renal pelvis	15	0	67		4	1	-	-	1	1	-	2	-	1	2	1	1	1	-	-	0.3	1.6	0.07	**0.6**	C64-65
Bladder	16	0	25		-	-	-	-	1	-	-	1	2	-	2	4	2	2	1	1	0.4	1.7	0.16	**1.2**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	15	0	87		4	1	2	1	-	-	-	2	1	1	2	-	1	-	-	-	0.3	1.6	0.04	**0.5**	C69
Brain and nervous system	8	0	50		-	-	-	-	1	-	1	1	1	-	-	3	-	-	-	1	0.2	0.9	0.03	**0.4**	C70-72
Thyroid	2	0	0		-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	0.0	0.2	0.03	**0.2**	C73
Hodgkin lymphoma	8	0	100		1	1	1	1	-	-	1	-	2	-	1	-	-	-	-	-	0.2	0.9	0.01	**0.2**	C81
Non-Hodgkin lymphoma	63	0	90		4	18	4	3	1	3	2	2	6	4	5	6	2	1	-	2	1.4	6.7	0.18	**2.2**	C82-85, C96
Multiple myeloma	2	0	100		-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	0.0	0.2	0.01	**0.1**	C90
Lymphoid leukaemia	3	0	100		-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-	0.1	0.3	0.06	**0.3**	C91
Myeloid leukaemia	1	0	100		-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C92-94
Leukaemia, unspecified	9	0	56		1	1	-	-	2	-	1	-	1	1	-	-	-	1	1	-	0.2	1.0	0.07	**0.5**	C95
Other and unspecified	49	0	47		-	1	1	-	2	5	6	2	1	5	3	1	9	6	3	4	1.1	5.2	0.44	**3.5**	O&U
All sites	957	0	53		16	27	9	18	26	39	49	57	61	59	91	119	130	88	73	95	21.6		8.78	**69.9**	C00-96
All sites except C44	937	0	53		16	27	9	18	25	36	45	56	57	59	90	119	128	87	71	94	21.1	100.0	8.63	**68.8**	C00-96 exc. C44
Average annual population					254262	249116	232606	238958	299611	264119	199302	150536	119008	85438	52814	30932	18885	10834	5980	7996	2220395				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Côte d´Ivoire, Abidjan (2012–2013)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	22	0	59	-	-	-	-	-	1	1	2	1	4	3	2	1	2	3	-	2	0.5	1.5	0.19	**1.7**	C00-06
Salivary gland	9	0	78	-	-	-	-	-	-	2	2	1	-	1	1	-	-	2	-	-	0.2	0.6	0.08	**0.6**	C07-08
Nasopharynx	1	0	100	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C11
Other pharynx	2	0	50	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.1**	C09-10, C12-14
Oesophagus	3	0	33	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	0.1	0.2	0.03	**0.3**	C15
Stomach	23	0	61	-	-	-	-	-	-	-	3	-	1	-	3	2	4	7	1	2	0.5	1.5	0.39	**2.8**	C16
Colon	26	0	65	-	1	-	-	-	1	2	1	1	5	6	3	3	1	-	2	0.6	1.7	0.20	**2.0**	C18
Rectum	28	0	61	-	-	-	-	-	1	2	1	3	3	3	10	1	2	1	1	0.6	1.9	0.31	**2.4**	C19-20
Anus	15	0	80	-	-	-	-	-	-	5	2	1	1	1	1	1	2	1	-	0.3	1.0	0.16	**1.1**	C21
Liver	84	0	15	-	-	-	2	1	3	7	5	10	10	8	10	7	10	5	6	1.9	5.6	0.96	**7.4**	C22
Gallbladder etc.	10	0	30	-	-	-	-	-	-	1	-	1	-	-	4	1	1	-	2	0.2	0.7	0.10	**1.0**	C23-24
Pancreas	20	0	20	-	-	-	-	-	-	-	2	1	1	3	3	5	3	1	1	0.5	1.3	0.30	**2.2**	C25
Larynx	4	0	0	-	-	-	-	-	-	1	-	3	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C32
Trachea, bronchus, and lung	25	0	48	-	-	-	-	-	-	-	-	2	3	1	4	3	3	3	6	0.6	1.7	0.36	**2.9**	C33-34
Bone	32	0	41	-	1	3	2	3	3	3	3	1	4	3	-	4	1	1	-	0.7	2.1	0.22	**1.8**	C40-41
Melanoma of skin	7	0	86	-	-	-	-	-	-	-	1	1	1	1	1	-	-	1	1	0.2	0.5	0.08	**0.6**	C43
Non-melanoma skin	26	0	58	-	-	-	-	5	-	1	3	4	3	2	1	1	2	1	3	0.6		0.19	**1.8**	C44
Mesothelioma	1	0	100	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.0	0.1	0.01	**0.1**	C45
Kaposi sarcoma	22	0	91	1	-	-	-	1	3	7	7	2	-	1	-	-	-	-	-	0.5	1.5	0.04	**0.5**	C46
Connective and soft tissue	28	0	46	-	2	-	2	1	1	5	-	1	3	4	2	3	-	2	2	0.6	1.9	0.24	**1.9**	C47, C49
Breast	536	0	79	-	-	-	5	5	16	50	72	88	70	85	60	36	26	12	11	12.3	35.8	4.29	**36.5**	C50
Vulva	14	0	64	-	-	-	-	-	1	-	2	-	2	3	4	1	-	1	-	0.3	0.9	0.16	**1.2**	C51
Vagina	8	0	75	-	-	-	-	-	1	-	2	-	1	-	2	1	-	-	1	0.2	0.5	0.05	**0.6**	C52
Cervix uteri	276	0	67	-	-	-	-	1	4	12	33	25	49	40	36	31	13	19	13	6.3	18.4	3.02	**23.5**	C53
Uterus	43	0	60	-	-	-	-	-	-	-	1	4	3	7	11	6	5	5	1	1.0	2.9	0.72	**4.8**	C54-55
Ovary	68	0	51	1	-	1	-	3	6	3	10	8	7	10	8	4	3	2	2	1.6	4.5	0.53	**4.5**	C56
Placenta	10	0	40	-	-	-	1	1	1	3	2	1	-	-	-	-	-	-	1	0.2	0.7	0.01	**0.3**	C58
Kidney and renal pelvis	13	0	46	-	1	1	-	1	-	1	3	2	1	2	-	-	1	-	-	0.3	0.9	0.07	**0.6**	C64-65
Bladder	9	0	22	-	-	-	-	-	-	-	-	2	2	-	1	-	1	-	3	0.2	0.6	0.06	**0.8**	C67
Ureter and other urinary	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	23	0	87	6	1	-	1	-	2	3	1	2	-	3	3	-	1	-	-	0.5	1.5	0.12	**1.1**	C69
Brain and nervous system	7	0	43	-	1	1	-	-	1	1	-	1	1	-	-	1	-	-	-	0.2	0.5	0.03	**0.3**	C70-72
Thyroid	19	0	53	-	-	-	-	-	1	-	3	3	4	1	2	2	-	2	1	0.4	1.3	0.20	**1.5**	C73
Hodgkin lymphoma	6	0	100	-	-	-	1	-	1	-	-	2	1	-	1	-	-	-	-	0.1	0.4	0.03	**0.3**	C81
Non-Hodgkin lymphoma	36	0	86	5	6	7	1	-	4	-	1	5	1	2	1	1	-	2	-	0.8	2.4	0.18	**1.5**	C82-85, C96
Multiple myeloma	1	0	100	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C90
Lymphoid leukaemia	1	0	100	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.0	0.1	0.01	**0.1**	C91
Myeloid leukaemia	1	0	100	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C92-94
Leukaemia, unspecified	8	0	100	2	3	-	-	-	-	-	-	-	-	1	1	1	-	-	-	0.2	0.5	0.04	**0.4**	C95
Other and unspecified	57	0	58	-	1	1	1	3	2	4	7	6	7	5	9	4	-	2	5	1.3	3.8	0.40	**3.8**	O&U
All sites	1524	0	65	15	17	14	16	26	57	118	166	187	187	200	182	124	87	62	66	34.9		13.80	**113.3**	C00-96
All sites except C44	1498	0	65	15	17	14	16	21	57	117	163	183	184	198	181	123	85	61	63	34.3	100.0	13.60	**111.5**	C00-96 exc. C44
Average annual population				244008	259682	294174	333644	302844	230222	168830	124970	85936	50876	31519	19093	14052	8308	5356	9042	2182554					

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

The Gambia

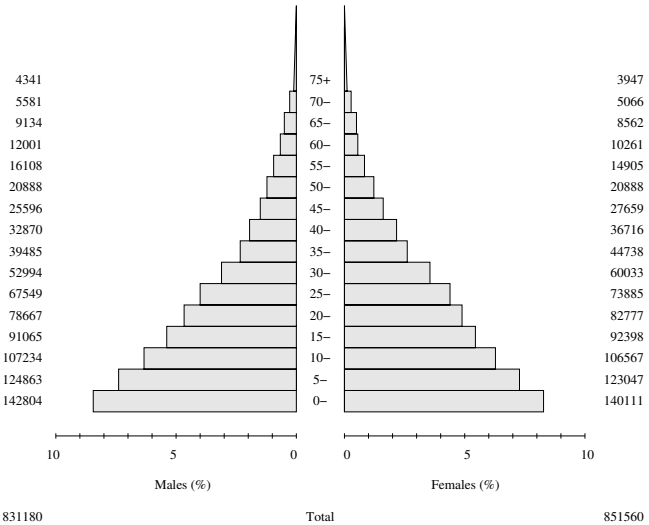
The Gambia National Cancer Registry (GNCR) was established in 1986 as part of The Gambia Hepatitis Intervention Study (GHIS), to record data on the pattern of cancer occurrence in The Gambia. This collaborative project involving IARC, the Gambian government, and the UK Medical Research Council (MRC) was initially also supported by the Italian Ministry of Foreign Affairs and the Swedish Medical Research Council. The GNCR is wholly funded by IARC through the GHIS. The registry is based at the MRC Unit The Gambia and employs 10 staff members.

Since the inception of the GHIS project, improvements have been made in the diagnosis of liver cancer and chronic liver disease. A Gambian hepatologist was recruited by IARC in 2011 to head the GHIS and is responsible not only for further improving the diagnosis and management of chronic liver disease but also for supervising the activities of the GNCR.

The GNCR data presented in this volume are for the entire country of The Gambia.

The population of The Gambia is estimated by the United Nations to have been 1 728 000 in 2010. The average annual population-at-risk estimates corresponding to the GNCR data presented in this volume are shown in the population pyramid.

The Gambia (2007–2011)
Population pyramid (average annual person-years by sex and age group)



Source: United Nations, Department of Economic and Social Affairs, Population Division (2013). World Population Prospects: The 2012 Revision, Highlights and Advance Tables. Working Paper No. ESA/P/WP.228

The GNCR's main information sources are four public hospitals: the Edward Francis Small Teaching Hospital (EFSTH) in Banjul, the Armed Forces Provisional Ruling Council (AFPRC) General Hospital in Farafenni, Bwiam General Hospital in the West Coast Region, and Bansang Hospital in the east of the country (which serves a mainly rural population). These hospitals provide general medical and laboratory services and are the major referral centres for the various public dispensaries and health centres located throughout The Gambia. The MRC clinic in Fajara is also a major referral centre, with three outreach stations in rural areas; it has a broad-based laboratory research facility and has been the national referral centre for all patients with suspected liver disease since 2011. Histopathology services are offered by the EFSTH in Banjul, with support from IARC in Lyon, where tissue blocks are sent for additional staining and analysis, in particular for cases of liver cancer. The registry receives copies of all histology reports from the EFSTH and, since mid-2014, from a dedicated histopathologist at IARC.

There are also more than a dozen private clinics and hospitals in The Gambia (located mainly in and around Banjul and the coastal areas) and several mission clinics that offer general medical care in the periurban and rural areas.

The registry collects information from the following sources: medical records, log books, ward/admission books, central medical records, histology report books, ultrasonography and computed tomography (CT) reports, specific biochemistry request books, surgical operation lists, nursing report books, and death certificates. These documents are searched for diagnoses of cancer. Data are also obtained from the database of the Prevention of Liver Fibrosis and Cancer in Africa (PROLIFICA) project, a 5-year European Union–funded study involving The Gambia and two other countries in western Africa.

Case finding is entirely active. It is carried out by trained tumour registration officers, who visit the clinical services and collect information using standard registration forms. They then cross-check these forms against ward records, central medical records, and registers of admissions/discharges.

Death registration is incomplete in The Gambia. A death certificate is needed only to obtain a permit for burial within the capital city of Banjul or the Brikama Local Government Area (accounting for approximately 30% of the country's population), or for specific legal purposes. Copies of death certificates mentioning cancer are obtained from the registration office. Death-certificate-only cases are not included in the registry database.

The registry uses IARC's CanReg5 software for data entry and management. Registry data are well secured; electronic information is stored on a central server with restricted access, and paper files are stored in locked cabinets.

YEARS PRESENTED

2007–2011 (a 5-year period)

NOTES

The rate of registration has remained relatively constant over the past 10 years. The most recent complete 5-year period (2007–2011) was selected for analysis.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 59.2 cases per 100 000 person-years in males and 51.6 cases per 100 000 person-years in females. These values are substantially lower than the values for western Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of only 0.45 for females. The rates are lower than the corresponding estimates for western Africa for cancers at almost all anatomical sites, with the exception of liver cancers. The ASR of liver cancer was 32.3 cases per 100 000 person-years in males and 12.5 cases per 100 000 person-years in females, values similar to those reported in this volume for Guinea (Conakry), but considerably higher than values reported for elsewhere in Africa.

The overall percentage of microscopically verified cases (MV%) is low: 16% in males and 33% in females. This is partly due to the large number of liver cancers, which are very rarely confirmed by biopsy. Similarly, the MV% for cervical cancer cases is only 23%.

SUMMARY

The GNCR is unusual in that it serves the entire national population, most of which is rural and has a relatively traditional lifestyle compared with other registry populations in this volume. This may account in part for the very low rates of most cancers. However, the lack of diagnostic (and treatment) capacity also likely results in the underdiagnosis of cancer. The GNCR was founded to help monitor the protective effects of hepatitis B vaccination, which was added to the national immunization schedule in a controlled fashion in the late 1980s (Viviani et al., 2008); the registry therefore has a particular focus on finding and recording liver cancers. Recently, an evaluation estimated the overall completeness of the registry at 50.3%, and the authors noted that data are particularly incomplete in the rural and elderly populations, most likely due to patterns of health care use and lack of health care access (Shimakawa et al., 2013). A new tumour registration officer was recruited in September 2013 to improve the registry's coverage of the North Bank Region. The GHIS lead and the new interim head of the GNCR – who recently received training in cancer registration, epidemiology, and survival from the African Cancer Registry Network (AFCRN) and IARC – conduct monthly outreach clinics and surveys of facilities around the country. It is anticipated that these measures will go a long way towards improving the deficiencies in case detection and registration.

PUBLICATIONS AND ACHIEVEMENTS

The GNCR became a member of the AFCRN in 2012.

Bah E, Hall AJ, Inskip HM (1990). The first 2 years of the Gambian National Cancer Registry. Br J Cancer. 62(4):647–50. http://dx.doi.org/10.1038/bjc.1990.347 PMID:2223583

Bah E, Jack A, Parkin M, Whittle H, Hall A, Sam O (2002). Cancer incidence in The Gambia (1997–1998). In: Parkin DM, Whelan SL, Ferlay J, Teppo L, Thomas DB, editors. Cancer incidence in five continents, Vol. VIII. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 155. Available from: http://publications.iarc.fr/310.

Bah E, Parkin DM, Hall AJ, Jack AD, Whittle H (2001). Cancer in The Gambia: 1988-97. Br J Cancer. 84(9):1207–14. http://dx.doi.org/10.1054/bjoc.2001.1730 PMID:11336472

Shimakawa Y, Bah E, Wild CP, Hall AJ (2013). Evaluation of data quality at the Gambia National Cancer Registry. Int J Cancer. 132(3):658–65. http://dx.doi.org/10.1002/ijc.27646 PMID:22618962

Sighoko D, Bah E, Haukka J, McCormack VA, Aka EP, Bourgeois D, et al. (2010). Population-based breast (female) and cervix cancer rates in The Gambia: evidence of ethnicity-related variations. Int J Cancer. 127(10):2248–56. http://dx.doi.org/10.1002/ijc.25244 PMID:20162609

Sighoko D, Curado MP, Bourgeois D, Mendy M, Hainaut P, Bah E (2011). Increase in female liver cancer in The Gambia, West Africa: evidence from 19 years of population-based cancer registration (1988-2006). PLoS One. 6(4):e18415. http://dx.doi.org/10.1371/journal.pone.0018415 PMID:21490972

Viviani S, Carrieri P, Bah E, Hall AJ, Kirk GD, Mendy M, et al.; Gambia Hepatitis Intervention Study (2008). 20 years into The Gambia Hepatitis Intervention Study: assessment of initial hypotheses and prospects for evaluation of protective effectiveness against liver cancer. Cancer Epidemiol Biomarkers Prev. 17(11):3216–23. http://dx.doi.org/10.1158/1055-9965.EPI-08-0303 PMID:18990765

The Gambia (2007–2011)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	10	6	40		-	-	-	-	1	-	-	-	1	-	-	1	-	-	1	-	0.2	0.8	0.07	**0.4**	C00-06
Salivary gland	2	0	100		1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.0	0.2	0.01	**0.1**	C07-08
Nasopharynx	1	0	0		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C11
Other pharynx	1	0	100		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.0	0.1	0.01	**0.0**	C09-10, C12-14
Oesophagus	22	4	14		-	-	-	-	1	-	4	2	1	3	2	1	-	2	-	2	0.5	1.7	0.08	**1.0**	C15
Stomach	39	4	31		-	-	-	-	-	-	-	5	1	4	5	2	6	4	5	3	0.9	3.0	0.28	**2.2**	C16
Colon	4	0	25		-	-	-	-	-	-	-	-	2	1	1	-	-	-	-	-	0.1	0.3	0.01	**0.2**	C18
Rectum	23	3	26		-	-	-	2	-	-	3	2	2	2	-	3	3	2	1	-	0.6	1.7	0.13	**1.0**	C19-20
Anus	2	0	100		-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	0.0	0.2	0.01	**0.1**	C21
Liver	774	72	1		5	2	6	20	27	73	99	88	58	57	57	62	49	35	28	36	18.6	58.8	3.24	**32.3**	C22
Gallbladder etc.	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C23-24
Pancreas	13	0	8		-	-	-	-	-	1	1	-	1	1	3	-	4	-	2	-	0.3	1.0	0.09	**0.7**	C25
Larynx	3	0	33		-	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	0.1	0.2	0.02	**0.2**	C32
Trachea, bronchus, and lung	78	4	6		-	-	-	1	1	-	3	3	1	8	9	12	8	9	10	9	1.9	5.9	0.54	**4.5**	C33-34
Bone	25	7	48		-	-	1	1	5	1	2	1	1	1	2	-	2	1	-	-	0.6	1.9	0.08	**0.9**	C40-41
Melanoma of skin	5	2	100		-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	0.1	0.4	0.06	**0.3**	C43
Non-melanoma skin	16	6	75		-	1	-	1	-	1	1	1	-	1	-	-	1	-	1	2	0.4		0.06	**0.8**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	7	3	29		-	-	-	-	-	-	2	-	-	1	-	-	-	-	-	1	0.2	0.5	0.01	**0.3**	C46
Connective and soft tissue	13	2	77		-	1	1	1	1	-	-	-	-	1	1	2	-	-	1	2	0.3	1.0	0.05	**0.6**	C47, C49
Breast	2	0	50		-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	0.0	0.2	0.01	**0.1**	C50
Penis	5	0	60		-	-	-	-	-	-	-	1	1	-	1	-	-	1	1	-	0.1	0.4	0.04	**0.3**	C60
Prostate	103	20	30		-	-	-	-	1	-	-	1	-	6	4	3	14	15	21	18	2.5	7.8	0.90	**7.1**	C61
Testis	3	0	0		-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	0.1	0.2	0.04	**0.2**	C62
Kidney and renal pelvis	5	1	40		-	-	-	-	-	1	-	-	1	-	1	-	1	-	-	-	0.1	0.4	0.02	**0.2**	C64-65
Bladder	21	2	29		-	-	-	-	-	1	2	-	-	2	3	1	5	3	1	1	0.5	1.6	0.14	**1.2**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	9	0	100		4	2	-	-	1	-	-	-	-	-	-	-	-	-	1	1	0.2	0.7	0.02	**0.3**	C69
Brain and nervous system	8	6	75		1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.2	0.6	0.05	**0.3**	C70-72
Thyroid	8	2	50		-	-	-	-	1	1	-	-	-	-	1	-	1	2	-	-	0.2	0.6	0.05	**0.4**	C73
Hodgkin lymphoma	6	0	50		-	-	1	-	1	-	-	1	1	-	1	-	-	1	-	-	0.1	0.5	0.02	**0.2**	C81
Non-Hodgkin lymphoma	71	21	49		6	6	6	6	5	1	6	2	3	2	2	2	1	1	-	1	1.7	5.4	0.15	**1.9**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	6	0	0		-	-	2	-	1	-	-	-	-	1	1	-	-	1	-	-	0.1	0.5	0.02	**0.2**	C95
Other and unspecified	46	10	65		1	1	3	3	2	3	3	2	1	2	7	4	1	1	-	2	1.1	3.5	0.15	**1.7**	O&U
All sites	1332	175	16		18	14	20	35	49	84	127	110	75	93	102	95	99	82	76	78	32.1		6.38	**60.0**	C00-96
All sites except C44	1316	169	16		18	13	20	34	49	83	126	109	75	92	102	95	98	82	75	76	31.7	100.0	6.31	**59.2**	C00-96 exc. C44
Average annual population					142804	124863	107234	91065	78667	67549	52994	39485	32870	25596	20888	16108	12001	9134	5581	4341	831180				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

The Gambia (2007–2011)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	7	4	86		-	-	1	1	-	-	-	-	-	-	-	-	1	-	-	-	0.2	0.6	0.03	**0.3**	C00-06
Salivary gland	1	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C07-08
Nasopharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	9	0	0		-	-	-	1	1	-	-	1	-	-	1	3	1	-	-	1	0.2	0.8	0.04	**0.5**	C15
Stomach	12	1	42		-	-	-	-	-	-	-	-	1	2	-	-	3	2	1	2	0.3	1.0	0.09	**0.8**	C16
Colon	3	1	67		-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	0.1	0.3	0.02	**0.1**	C18
Rectum	11	1	55		-	-	-	-	1	1	-	1	-	2	-	1	-	1	2	1	0.3	0.9	0.08	**0.6**	C19-20
Anus	2	1	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.0	0.2	0.00	**0.2**	C21
Liver	270	44	2		1	-	1	9	9	20	25	21	17	30	14	15	24	10	18	12	6.3	23.0	1.39	**12.5**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	12	0	0		-	-	-	-	-	-	-	-	2	-	2	2	3	-	1	2	0.3	1.0	0.08	**0.8**	C25
Larynx	1	1	0		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C32
Trachea, bronchus, and lung	13	3	8		-	-	1	-	-	-	-	-	1	1	1	1	-	3	2	-	0.3	1.1	0.12	**0.7**	C33-34
Bone	12	4	83		-	-	4	1	-	-	1	-	-	1	-	-	-	-	-	1	0.3	1.0	0.02	**0.4**	C40-41
Melanoma of skin	11	2	91		-	1	-	-	1	-	-	-	-	1	1	-	2	2	-	1	0.3	0.9	0.07	**0.6**	C43
Non-melanoma skin	9	3	67		-	-	-	1	2	1	-	-	-	-	1	-	-	-	1	-	0.2		0.04	**0.3**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	3	1	67		-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C46
Connective and soft tissue	15	2	80		-	1	1	2	1	1	2	-	-	2	2	-	-	1	-	-	0.4	1.3	0.04	**0.5**	C47, C49
Breast	163	33	70		-	-	-	3	2	16	18	15	22	15	11	9	8	3	3	5	3.8	13.9	0.61	**6.5**	C50
Vulva	4	0	100		-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	0.1	0.3	0.02	**0.2**	C51
Vagina	8	1	88		1	-	-	-	1	-	-	2	1	1	-	-	1	-	-	-	0.2	0.7	0.03	**0.3**	C52
Cervix uteri	439	105	23		-	-	-	2	3	14	36	48	54	52	34	19	24	21	15	12	10.3	37.3	2.09	**19.5**	C53
Uterus	29	5	21		-	-	-	-	1	1	2	2	4	3	1	2	2	4	1	1	0.7	2.5	0.16	**1.4**	C54-55
Ovary	24	6	62		-	1	-	1	1	2	-	2	3	2	-	3	2	-	1	-	0.6	2.0	0.11	**1.0**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	1	1	0		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C64-65
Bladder	9	2	33		-	-	-	-	-	-	-	1	-	-	-	1	2	1	-	2	0.2	0.8	0.05	**0.7**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	13	2	85		7	-	1	-	-	2	-	1	-	-	-	-	-	-	-	-	0.3	1.1	0.01	**0.2**	C69
Brain and nervous system	5	2	60		-	1	-	-	-	-	-	-	-	1	-	-	-	1	-	-	0.1	0.4	0.03	**0.2**	C70-72
Thyroid	13	4	92		-	-	-	1	1	1	2	1	1	1	-	-	-	-	-	1	0.3	1.1	0.02	**0.4**	C73
Hodgkin lymphoma	5	1	100		-	-	-	1	1	-	-	-	-	-	1	-	-	-	-	1	0.1	0.4	0.01	**0.2**	C81
Non-Hodgkin lymphoma	40	10	52		5	5	2	5	2	1	-	1	1	-	3	5	-	-	-	-	0.9	3.4	0.10	**1.1**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	1	0	0		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C92-94
Leukaemia, unspecified	3	0	0		-	-	-	-	-	1	-	1	-	-	-	-	1	-	-	-	0.1	0.3	0.01	**0.1**	C95
Other and unspecified	37	15	68		1	1	-	1	1	2	4	2	1	2	3	1	2	1	-	-	0.9	3.1	0.13	**1.3**	O&U
All sites	1185	255	34		15	10	11	29	28	63	93	100	108	118	77	63	77	50	45	43	27.8		5.47	**51.9**	C00-96
All sites except C44	1176	252	33		15	10	11	28	26	62	93	100	108	118	76	63	77	50	44	43	27.6	100.0	5.43	**51.6**	C00-96 exc. C44
Average annual population					140111	123047	106567	92398	82777	73885	60033	44738	36716	27659	20888	14905	10261	8562	5066	3947	851560				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

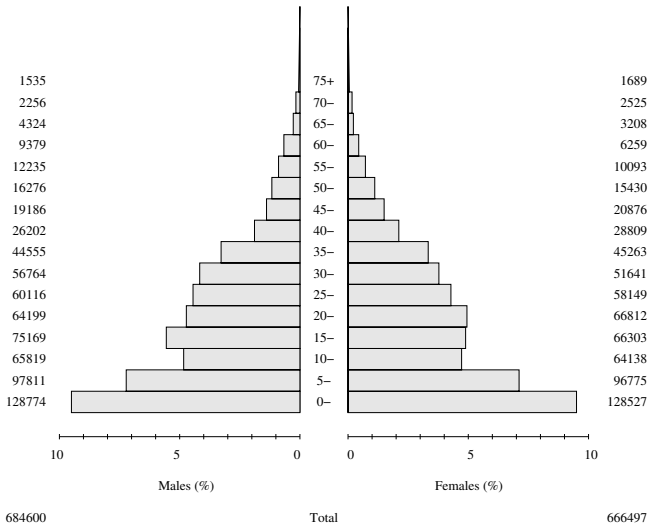
Guinea, Conakry

The Registre de Cancer de Guinée was established in 1990 with assistance from IARC. It is located in and supported by the pathology department of the Donka National Hospital in Conakry. The registry director provides overall supervision of registry activities, and the registry's single staff member carries out the day-to-day work of registration, including data collection, data entry, and data management.

The data presented in this volume are for the city of Conakry. Conakry residents (defined by ≥ 6 months of residence in the city) are distinguished from temporary visitors (such as patients staying in the city for the purpose of receiving medical care).

The population of Conakry is estimated to have been 1 667 864 in 2014 (at the most recent census). The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Guinea, Conakry (2001–2010)
Population pyramid (average annual person-years by sex and age group)



Estimates based on the general population and housing censuses of 1996 and 2014

The main sources of information are the Hôpital National de Donka (which offers all specialities, including oncological surgery), the 471-bed Hôpital National Ignace Deen (which offers all specialities), and the 120-bed Hôpital de l'Amitié Sino-Guinéenne (which offers services such as surgery and neurosurgery). Data are also collected from four community hospitals and several private clinics. There are few specialized oncology services in Guinea, apart from the oncological surgery and gynaecological oncology departments of the Hôpital National de Donka. There is no radiotherapy service in the country; patients are sent to Dakar, Senegal, for treatment. There are two pathology laboratories in the city (at the Hôpital National Donka and the Hôpital de l'Amitié Sino-Guinéenne); the laboratory at Hôpital National Donka is a major source of information for the registry. Information on cancer cases is retrieved and added to the database, together with the diagnosis. Civil death registration does not include certification of cause of death.

Case finding is entirely active and is carried out by medical students as part of their course work. The students visit the clinical services and collect information using registration forms. None of the hospitals in the area has a central records department. Medical records are maintained by each service, although some hospitals also have registers of admissions/discharges that include a simple diagnosis for each entry.

The registry uses IARC's CanReg4 software for data entry and management.

YEARS PRESENTED

2001–2010 (a 10-year period)

NOTES

During the 10-year period selected for analysis, there was a slow decline in the annual rate of registration, with an overall annual change of –7.2%; this trend was seen for cancers at most major anatomical sites (including breast and cervix) but not for prostate cancer.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 87.1 cases per 100 000 person-years in males and 101.0 cases per 100 000 person-years in females. These values are similar to the values for western Africa reported in GLOBOCAN 2012. The incidence rates of cancers of the liver, prostate, and cervix are relatively high, whereas there is a marked paucity of leukaemia cases. The incidence rates of childhood cancers are low.

The overall percentage of microscopically verified cases (MV%) is low (47% in males and 64% in females), which is similar to the profile seen elsewhere in western Africa, and is in part due to the large number of liver cancers, for which the MV% is very low (~4%).

SUMMARY

The results are very similar to previously published findings for 1996–1999 (Parkin et al., 2003), although the more recent incidence rates are slightly lower for cancers at several anatomical sites. However, the ASR of prostate cancer has tripled since 1996–1999, and prostate cancer is now the most common cancer in males. The completeness of registration may have decreased, but it is also possible that there are errors in the population-at-risk estimates, given that only preliminary results from the 2014 census were available to construct the population estimate for 2001–2010, and the most recent complete census before that was in 1996.

PUBLICATIONS AND ACHIEVEMENTS

The Registre de Cancer de Guinée became a member of the African Cancer Registry Network (AFCRN) in 2012.

Keita N, Clifford GM, Koulibaly M, Douno K, Kabba I, Haba M, et al. (2009). HPV infection in women with and without cervical cancer in Conakry, Guinea. Br J Cancer. 101(1):202–8. http://dx.doi.org/10.1038/sj.bjc.6605140 PMID:19536089

Koulibaly M, Kabba IS, Cissé A, Diallo SB, Diallo MB, Keita N, et al. (1997). Cancer incidence in Conakry, Guinea: first results from the cancer registry 1992-1995. Int J Cancer. 70(1):39–45. http://dx.doi.org/10.1002/(SICI)1097-0215(19970106)70:1<39::AID-IJC6>3.0.CO;2-7 PMID:8985088

Muwonge R, Mbalawa CG, Keita N, Dolo A, Nouhou H, Nacoulma M, et al.; IARC Multicentre Study Group on Cervical Cancer Early Detection (2009). Performance of colposcopy in five sub-Saharan African countries. BJOG. 116(6):829–37. http://dx.doi.org/10.1111/j.1471-0528.2009.02122.x PMID:19432573

Guinea, Conakry (2001–2010)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	32	0	78		-	-	-	1	2	2	3	2	4	5	1	4	4	1	1	2	0.5	1.7	0.10	**1.1**	C00-06
Salivary gland	8	0	88		-	1	-	-	1	-	-	-	1	1	-	1	2	1	-	-	0.1	0.4	0.03	**0.3**	C07-08
Nasopharynx	2	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	0.0	0.1	0.03	**0.2**	C11
Other pharynx	12	0	83		-	1	-	1	1	-	-	1	1	1	3	1	2	-	-	-	0.2	0.6	0.03	**0.3**	C09-10, C12-14
Oesophagus	13	0	69		-	-	-	-	-	-	-	1	1	2	2	-	2	1	2	2	0.2	0.7	0.08	**0.8**	C15
Stomach	114	0	39		-	-	-	-	-	1	5	4	6	13	22	26	15	12	6	4	1.7	6.0	0.58	**4.7**	C16
Colon	27	0	81		-	-	-	-	1	1	1	4	1	3	7	5	1	1	1	1	0.4	1.4	0.10	**0.9**	C18
Rectum	17	0	100		-	1	1	-	-	2	1	1	3	-	1	1	2	2	2	-	0.2	0.9	0.10	**0.6**	C19-20
Anus	16	0	88		-	-	-	1	-	1	1	-	2	1	3	-	4	2	1	-	0.2	0.8	0.08	**0.6**	C21
Liver	706	0	4		1	1	2	1	2	2	6	35	57	75	114	213	95	53	30	19	10.3	37.0	3.36	**27.6**	C22
Gallbladder etc.	2	0	0		-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	0.0	0.1	0.01	**0.1**	C23-24
Pancreas	15	0	20		-	-	-	-	-	1	1	1	1	2	2	2	4	1	-	-	0.2	0.8	0.06	**0.5**	C25
Larynx	35	0	80		1	-	1	-	-	1	2	1	2	2	7	4	7	5	2	-	0.5	1.8	0.19	**1.3**	C32
Trachea, bronchus, and lung	99	0	13		-	-	1	-	-	-	-	3	10	14	18	32	12	7	2	-	1.4	5.2	0.44	**3.5**	C33-34
Bone	22	0	100		-	1	4	5	3	1	1	3	-	-	-	1	-	1	1	1	0.3	1.2	0.05	**0.5**	C40-41
Melanoma of skin	8	0	88		-	1	-	1	-	-	-	-	1	-	2	1	-	1	1	-	0.1	0.4	0.05	**0.3**	C43
Non-melanoma skin	81	0	90		1	1	1	3	5	5	4	6	8	11	11	9	5	5	2	4	1.2		0.27	**2.7**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	24	0	83		-	-	-	1	2	1	5	1	2	1	1	2	3	2	2	1	0.4	1.3	0.11	**0.9**	C46
Connective and soft tissue	32	0	97		3	3	1	1	3	3	5	1	2	1	3	1	-	1	1	3	0.5	1.7	0.07	**1.0**	C47, C49
Breast	15	0	87		-	-	-	-	-	-	-	-	1	-	3	2	4	2	1	2	0.2	0.8	0.09	**0.8**	C50
Penis	5	0	100		-	-	-	-	-	-	2	-	1	-	1	-	-	-	-	1	0.1	0.3	0.01	**0.2**	C60
Prostate	357	0	81		-	-	-	-	-	-	-	-	-	2	9	20	51	78	89	108	5.2	18.7	3.26	**30.5**	C61
Testis	3	0	67		1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.2	0.00	**0.0**	C62
Kidney and renal pelvis	17	0	47		4	3	1	1	-	-	2	1	-	1	-	2	-	1	1	-	0.2	0.9	0.05	**0.4**	C64-65
Bladder	23	0	91		-	-	-	-	-	-	1	2	4	-	5	2	4	-	3	2	0.3	1.2	0.12	**1.0**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	24	0	21		13	1	3	-	1	-	-	1	2	-	3	-	-	-	-	-	0.4	1.3	0.02	**0.3**	C69
Brain and nervous system	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C70-72
Thyroid	11	0	82		-	-	-	-	-	1	-	1	2	3	2	-	-	1	-	1	0.2	0.6	0.03	**0.4**	C73
Hodgkin lymphoma	22	0	100		-	2	2	5	2	4	1	2	1	1	-	1	1	-	-	-	0.3	1.2	0.03	**0.4**	C81
Non-Hodgkin lymphoma	112	0	90		2	19	15	7	7	6	6	7	11	2	7	11	5	2	1	4	1.6	5.9	0.21	**2.7**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	8	0	100		2	-	-	2	2	-	-	1	-	-	-	1	-	-	-	-	0.1	0.4	0.01	**0.1**	C92-94
Leukaemia, unspecified	7	0	100		-	-	1	-	-	-	1	1	-	2	1	1	-	-	-	-	0.1	0.4	0.02	**0.2**	C95
Other and unspecified	120	0	83		2	3	-	3	5	3	3	9	6	15	21	15	11	10	6	8	1.8	6.3	0.51	**4.8**	O&U
All sites	1989	0	48		30	39	33	34	37	35	51	89	131	158	249	359	234	191	156	163	29.1		10.09	**89.8**	C00-96
All sites except C44	1908	0	47		29	38	32	31	32	30	47	83	123	147	238	350	229	186	154	159	27.9	100.0	9.82	**87.1**	C00-96 exc. C44
Average annual population					128774	97810	65819	75169	64199	60116	56764	44555	26202	19186	16276	12235	9379	4324	2256	1535	684599				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Guinea, Conakry (2001–2010)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	41	0	93		1	1	1	2	1	3	1	2	3	5	5	4	3	3	4	2	0.6	1.4	0.21	**1.7**	C00-06
Salivary gland	8	0	88		-	1	-	1	-	1	1	-	1	1	-	-	1	-	-	1	0.1	0.3	0.02	**0.3**	C07-08
Nasopharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C11
Other pharynx	6	0	50		-	1	-	-	-	-	-	-	2	-	1	1	-	-	-	1	0.1	0.2	0.01	**0.2**	C09-10, C12-14
Oesophagus	3	0	100		-	-	-	-	-	-	-	-	1	1	-	1	-	-	-	-	0.0	0.1	0.01	**0.1**	C15
Stomach	61	0	43		-	-	-	-	-	-	2	4	3	11	8	13	9	6	4	1	0.9	2.2	0.37	**2.8**	C16
Colon	13	0	100		-	-	-	-	-	-	1	1	1	1	2	2	3	1	-	1	0.2	0.5	0.06	**0.6**	C18
Rectum	21	0	95		1	-	-	-	-	5	1	2	1	-	3	1	4	2	1	-	0.3	0.7	0.11	**0.8**	C19-20
Anus	10	0	100		-	-	-	-	-	1	3	1	1	2	-	-	1	-	1	-	0.2	0.4	0.04	**0.3**	C21
Liver	384	0	4		-	-	1	2	2	1	12	19	34	57	71	103	44	27	5	6	5.8	13.5	1.84	**15.6**	C22
Gallbladder etc.	1	0	100		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	9	0	0		-	-	-	-	-	-	1	2	1	3	1	-	1	-	-	-	0.1	0.3	0.02	**0.2**	C25
Larynx	10	0	40		-	-	-	-	-	-	-	1	1	2	-	3	-	1	2	-	0.2	0.4	0.08	**0.5**	C32
Trachea, bronchus, and lung	32	0	6		-	-	-	-	-	-	-	2	2	6	4	13	5	-	-	-	0.5	1.1	0.14	**1.2**	C33-34
Bone	11	0	91		-	-	2	1	-	2	-	2	3	-	-	-	-	1	-	-	0.2	0.4	0.03	**0.3**	C40-41
Melanoma of skin	23	0	96		-	1	-	-	-	4	1	1	2	-	-	-	5	1	6	2	0.3	0.8	0.18	**1.3**	C43
Non-melanoma skin	55	0	89		-	-	3	1	-	3	4	5	3	6	5	6	8	6	3	2	0.8		0.30	**2.4**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	11	0	82		-	-	-	1	-	2	3	1	-	1	1	-	2	-	-	-	0.2	0.4	0.03	**0.3**	C46
Connective and soft tissue	20	0	95		3	2	1	1	-	-	-	-	1	3	1	3	3	-	2	-	0.3	0.7	0.09	**0.7**	C47, C49
Breast	446	0	74		-	-	1	5	18	21	29	65	60	57	60	57	34	19	10	10	6.7	15.7	1.62	**14.8**	C50
Vulva	11	0	73		-	-	1	1	-	1	1	1	2	1	1	1	1	-	-	-	0.2	0.4	0.03	**0.3**	C51
Vagina	12	0	100		-	-	-	-	-	1	-	1	2	3	1	2	-	2	-	-	0.2	0.4	0.06	**0.5**	C52
Cervix uteri	1251	0	71		-	-	-	2	13	44	88	170	194	211	152	142	106	56	43	30	18.8	44.1	4.93	**43.7**	C53
Uterus	67	0	69		-	-	-	1	1	3	2	3	5	11	8	13	7	3	9	1	1.0	2.4	0.42	**2.9**	C54-55
Ovary	91	0	84		-	-	1	4	7	7	10	12	9	10	8	10	6	3	3	1	1.4	3.2	0.31	**2.7**	C56
Placenta	15	0	100		-	-	-	1	6	4	1	1	-	2	-	-	-	-	-	-	0.2	0.5	0.02	**0.2**	C58
Kidney and renal pelvis	17	0	71		3	3	2	2	1	1	1	-	1	-	2	-	1	-	-	-	0.3	0.6	0.02	**0.3**	C64-65
Bladder	10	0	100		-	-	-	-	1	1	1	-	1	1	1	2	1	-	-	1	0.2	0.4	0.03	**0.4**	C67
Ureter and other urinary	1	0	100		-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	14	0	14		5	1	-	-	-	1	2	-	3	-	1	-	1	-	-	-	0.2	0.5	0.02	**0.3**	C69
Brain and nervous system	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C70-72
Thyroid	18	0	56		1	-	-	-	3	1	-	1	3	2	3	1	2	-	1	-	0.3	0.6	0.07	**0.5**	C73
Hodgkin lymphoma	13	0	92		-	1	3	3	1	-	-	-	3	-	1	-	1	-	-	-	0.2	0.5	0.02	**0.3**	C81
Non-Hodgkin lymphoma	72	0	86		-	5	14	7	10	7	3	3	3	3	5	4	2	5	1	-	1.1	2.5	0.20	**1.8**	C82-85, C96
Multiple myeloma	1	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.0	0.0	0.01	**0.1**	C91
Myeloid leukaemia	3	0	100		-	-	-	-	1	-	1	-	-	-	1	-	-	-	-	-	0.0	0.1	0.00	**0.1**	C92-94
Leukaemia, unspecified	1	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C95
Other and unspecified	129	0	83		3	-	2	3	5	3	4	10	8	22	15	19	12	15	3	5	1.9	4.5	0.62	**5.4**	O&U
All sites	2892	0	64		17	16	32	39	70	117	174	310	355	423	361	401	264	151	98	64	43.4		11.92	**103.4**	C00-96
All sites except C44	2837	0	64		17	16	29	38	70	114	170	305	352	417	356	395	256	145	95	62	42.6	100.0	11.62	**101.0**	C00-96 exc. C44
Average annual population					128527	96775	64138	66303	66812	58149	51641	45262	28809	20876	15430	10093	6259	3208	2524	1689	666494				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

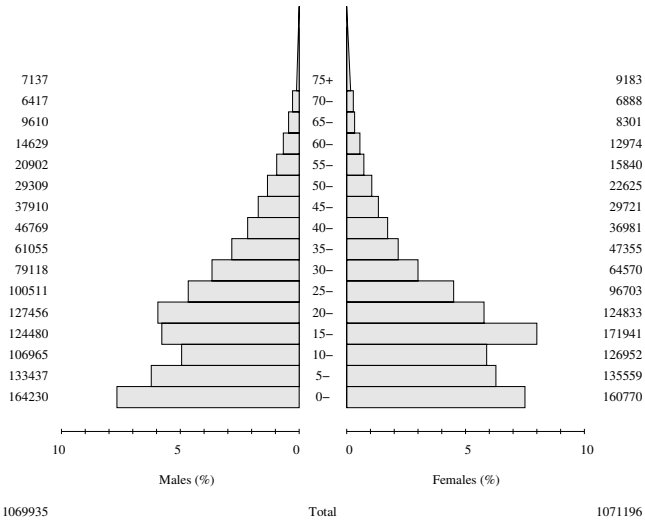
Mali, Bamako

The Registre du Cancer du Mali was established in 1986. It is based in and is entirely funded by the pathology department of the Centre Hospitalier Universitaire (CHU) du Point G, in the capital city of Bamako. The head of the pathology department oversees the activities of the registry. Two junior pathologists are responsible for data collection, and basic data collection tasks are carried out by medical students as part of their course work.

The Registre du Cancer du Mali collects information on cancer cases from all possible sources within the city of Bamako, which consists of six communes. The registry data presented in this volume pertain to the residents of the city. On average, cases in Bamako residents account for 64% of all cases registered.

The population of Bamako is estimated to have been 1 810 366 in 2009 (at the most recent census). The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Mali, Bamako (2010–2014)
Population pyramid (average annual person-years by sex and age group)



Source: Institut National de la Statistique (INSTAT) of Mali; estimates based on the 1999 and 2009 censuses

Since its inception, the registry has aimed to be a population-based cancer registry for Bamako and has collected information on cases from all possible sources within the city. Four major hospitals serve Bamako: the CHU du Point G, the CHU Gabriel Touré, the Hôpital du Mali, and the Hôpital de Kati. There are also some specialist services for ophthalmology, dermatology, and dentistry/otolaryngology, as well as six small district hospitals. There are specialized cancer treatment services in the CHU du Point G (medical oncology and paediatric oncology) and the Hôpital du Mali (radiotherapy). The CHU du Point G also has a specialist haematology clinic.

There are four pathology laboratories in the area. The main one, located in Point G, has four pathologists and does the great majority of the laboratory analysis in Bamako (and nationally). The laboratory at the Hôpital du Mali analyses some of the hospital's specimens. Several clinicians in the area send specimens to overseas laboratories.

Once a year, the medical students working with the registry visit the clinical services that diagnose cancer cases, and record case information onto simple registration forms. The registry pathologists visit certain key services (i.e. oncology and gynaecology services) more frequently, and also collect information from the pathology department of the CHU du Point G. The data from the request/reporting forms for each case are then recorded onto a form along with the diagnosis.

All deaths must be certified by the civil registration office in order for a burial permit to be issued. The registry uses death certificates as a source of information. Death certificates listing cancer as the cause of death are compared against the registry database; cases not found in any hospital records are registered as death-certificate-only cases.

The registry uses IARC's CanReg4 software for data entry and management; the registry was one of the first to adopt this system, more than 20 years ago.

YEARS PRESENTED

2010–2014 (a 5-year period)

NOTES

The total number of cases registered annually increased from 578 in 2007 to 2855 in 2013. The most recent 5-year period (2010–2014) was selected for analysis, despite the considerable variation in the annual number of registrations during this period, from 1100 cases in 2010 to 2148 in 2013.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 121.7 cases per 100 000 person-years in males and 175.4 cases per 100 000 person-years in females. These values are higher than the values for western Africa reported in GLOBOCAN 2012, with an observed-to-expected ratio (O/E) of about 1.5 for both sexes. Incidence rates of cancers of the gastrointestinal tract are high, in particular the ASR of cancer of the stomach, at 19.1 cases per 100 000 person-years in males and 15.3 cases per 100 000 person-years in females. There are also high rates of cancers of the bladder (ASR, 10.5 cases per 100 000 person-years in males and 6.9 cases per 100 000 person-years in females) and cervix (ASR, 48.4 cases per 100 000 person-years). The incidence of leukaemias is low.

The percentage of microscopically verified cases (MV%) at all anatomical sites combined (excluding non-melanoma skin cancer) is 79% in males and 85% in females. This is a substantial increase from the early days of the registry: for the period of 1987–1989, the

Table 4.07. Age-standardized incidence rates (ASRs), expressed as cases per 100 000 person-years, of cancers in males (M) and females (F) in Bamako, Mali, reported in Volumes VI–VIII of *Cancer Incidence in Five Continents* (CI5) and in this volume, by anatomical site

Anatomical site (ICD-10 code)	Sex	CI5-VI 1987–1989	CI5-VII 1988–1992	CI5-VIII 1994–1996	2010–2014
Stomach (C16)	M	19.4	17.0	17.7	19.1
	F	10.3	12.7	20.8	15.3
Liver (C22)	M	47.9	43.0	31.2	11.5
	F	21.4	20.6	14.0	4.0
Colorectum and anus (C18–21)	M	5.4	5.2	5.1	9.8
	F	3.0	2.4	4.7	10.4
Prostate (C61)	M	6.3	5.2	7.6	19.8
Bladder (C67)	M	12.4	9.6	11.3	10.5
Breast (C50)	F	10.2	12.4	20.0	37.0
Cervix uteri (C53)	F	23.4	29.1	35.9	48.4

CI5-VI–III, *Cancer Incidence in Five Continents*, Volumes VI (Parkin et al., 1992), VII (Parkin et al., 1997), and VIII (Parkin et al., 2002).

figures were 20% in males and 32% in females (Parkin et al., 1992).

Table 4.07 shows the ASRs of cancers at several major anatomical sites during the periods reported in Volumes VI–VIII of *Cancer Incidence in Five Continents* compared with the current data.

SUMMARY

The variability in the number of cases registered annually suggests problems with case finding, and the incidence rates of haematological malignancies are relatively low.

Nevertheless, the incidence rates are consistent with those reported 20–30 years earlier, with relatively constant rates of cancers of the stomach and bladder, and with increases in the incidence of cancers of the large bowel, prostate, breast, and (to a lesser extent) cervix. The decrease in the incidence of liver cancer is interesting; it is accompanied by an increase in MV% (from 7% in 1987–1989 to 69% in 2010–2014), suggesting possible misclassification of some diagnoses during the earlier periods.

PUBLICATIONS AND ACHIEVEMENTS

The Registre du Cancer du Mali became a member of the African Cancer Registry Network (AFCRN) in 2015.

Bayo S, Parkin DM, Koumaré AK, Diallo AN, Ba T, Soumaré S, et al. (1990). Cancer in Mali, 1987-1988. Int J Cancer. 45(4):679–84. http://dx.doi.org/10.1002/ijc.2910450418 PMID:2323845

Kamate B, Traore CB, Diallo D, Foko I, Sangare F, Malle B, et al. (2008). Epidemiology and morphology of breast benign tumors in Mali: about 186 cases. Mali Med. 23(3):36–9. [French] PMID:19617151

Ndiaye C, Alemany L, Ndiaye N, Kamaté B, Diop Y, Odida M, et al. (2012). Human papillomavirus distribution in invasive cervical carcinoma in sub-Saharan Africa: could HIV explain the differences? Trop Med Int Health. 17(12):1432–40. http://dx.doi.org/10.1111/tmi.12004 PMID:23107344

Sighoko D, Kamaté B, Traore C, Mallé B, Coulibaly B, Karidiatou A, et al. (2013). Breast cancer in pre-menopausal women in West Africa: analysis of temporal trends and evaluation of risk factors associated with reproductive life. Breast. 22(5):828–35. http://dx.doi.org/10.1016/j.breast.2013.02.011 PMID:23489760

Traoré CB, Kamaté B, Kéita M, Tchoupa MM, Timbo SK, Ag MA, et al. (2008). Laryngo-pharyngeal cancer at a health service of last resort in Mali: anatomo-clinical and therapeutic aspects. Mali Med. 23(2):51–4. [French] PMID:19434970

Mali, Bamako (2010–2014)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	56	0	95	0	-	-	2	-	-	6	6	2	3	6	8	-	7	4	5	7	1.0	1.7	0.24	**2.1**	C00-06
Salivary gland	18	1	83	0	-	-	-	2	2	1	-	1	1	3	2	1	1	1	1	1	0.3	0.6	0.06	**0.6**	C07-08
Nasopharynx	6	1	83	0	-	-	-	-	-	1	-	1	-	-	-	3	-	-	-	-	0.1	0.2	0.02	**0.2**	C11
Other pharynx	13	0	92	0	-	-	-	-	-	-	1	1	2	-	-	2	2	1	-	4	0.2	0.4	0.04	**0.6**	C09-10, C12-14
Oesophagus	76	4	80	0	1	-	-	-	3	5	6	7	8	10	7	7	4	5	4	5	1.4	2.4	0.28	**2.6**	C15
Stomach	443	13	78	2	-	2	-	2	1	6	13	21	42	38	45	59	73	40	43	45	8.3	13.8	2.34	**19.1**	C16
Colon	111	3	79	1	1	-	-	2	2	3	9	3	13	12	13	10	10	10	8	12	2.1	3.5	0.48	**4.3**	C18
Rectum	135	5	87	1	1	-	2	4	9	10	10	8	14	16	15	8	11	11	6	5	2.5	4.2	0.51	**4.5**	C19-20
Anus	28	0	89	0	-	-	-	-	1	1	1	2	3	4	6	2	4	1	2	1	0.5	0.9	0.12	**1.0**	C21
Liver	313	3	69	4	5	2	1	5	6	11	22	28	35	23	40	34	27	30	18	23	5.9	9.8	1.32	**11.5**	C22
Gallbladder etc.	4	1	100	0	-	-	-	-	-	-	1	-	-	-	-	1	-	1	-	-	0.1	0.1	0.02	**0.2**	C23-24
Pancreas	87	1	61	5	-	1	-	-	-	1	6	5	9	4	13	14	13	11	4	5	1.6	2.7	0.43	**3.5**	C25
Larynx	36	4	92	0	-	1	-	-	-	-	1	-	2	1	4	3	6	10	4	-	0.7	1.1	0.27	**1.8**	C32
Trachea, bronchus, and lung	86	2	73	3	1	-	-	-	1	1	5	-	5	5	14	12	10	16	5	9	1.6	2.7	0.46	**3.8**	C33-34
Bone	108	1	84	0	6	4	6	12	5	9	6	9	11	5	7	8	6	2	5	6	2.0	3.4	0.30	**3.0**	C40-41
Melanoma of skin	21	0	95	0	-	-	-	-	1	1	1	4	4	-	1	1	3	1	2	2	0.4	0.7	0.09	**0.8**	C43
Non-melanoma skin	94	3	94	0	-	3	2	4	4	6	3	5	11	7	4	10	6	10	8	8	1.8		0.41	**3.5**	C44
Mesothelioma	2	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	0.0	0.1	0.02	**0.1**	C45
Kaposi sarcoma	52	2	96	0	-	-	1	2	2	1	6	7	8	6	2	1	4	3	1	6	1.0	1.6	0.15	**1.7**	C46
Connective and soft tissue	98	1	94	1	4	3	7	8	-	9	3	5	14	5	6	9	4	3	3	14	1.8	3.1	0.25	**3.1**	C47, C49
Breast	33	0	97	0	-	-	-	-	-	-	-	6	6	3	2	6	5	1	-	4	0.6	1.0	0.11	**1.2**	C50
Penis	5	0	80	0	-	-	-	-	-	-	3	-	-	-	1	-	1	-	-	-	0.1	0.2	0.01	**0.1**	C60
Prostate	354	4	79	1	-	-	-	-	-	-	-	2	-	3	11	21	58	53	81	121	6.6	11.0	2.39	**19.8**	C61
Testis	21	0	86	0	-	1	2	-	1	3	1	-	1	2	1	3	1	2	-	3	0.4	0.7	0.06	**0.7**	C62
Kidney and renal pelvis	92	0	65	1	26	19	5	3	-	-	4	2	4	2	8	4	5	4	1	5	1.7	2.9	0.20	**2.3**	C64-65
Bladder	260	2	72	1	4	2	1	1	2	11	9	21	19	19	32	29	36	23	24	25	4.9	8.1	1.27	**10.5**	C67
Ureter and other urinary	2	0	50	0	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	0.0	0.1	0.01	**0.1**	C66, C68
Eye	88	0	66	0	47	11	4	-	1	1	1	3	3	5	2	1	3	1	2	3	1.6	2.7	0.14	**1.9**	C69
Brain and nervous system	22	0	50	18	5	2	3	3	1	-	-	-	2	1	3	-	1	-	-	1	0.4	0.7	0.03	**0.5**	C70-72
Thyroid	35	2	94	3	-	-	-	2	-	1	2	2	5	1	2	4	4	3	4	3	0.7	1.1	0.18	**1.4**	C73
Hodgkin lymphoma	52	1	98	0	1	7	13	8	3	5	3	4	1	-	1	3	-	1	1	-	1.0	1.6	0.09	**1.0**	C81
Non-Hodgkin lymphoma	132	4	98	0	6	17	11	19	5	7	4	5	9	9	6	8	6	10	4	2	2.5	4.1	0.39	**3.6**	C82-85, C96
Multiple myeloma	8	0	88	0	1	1	2	-	-	-	1	-	1	-	1	-	-	-	1	-	0.1	0.2	0.03	**0.2**	C90
Lymphoid leukaemia	26	0	81	0	1	13	7	1	2	-	-	-	-	-	-	-	-	1	-	1	0.5	0.8	0.03	**0.5**	C91
Myeloid leukaemia	4	0	75	0	-	2	1	-	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C92-94
Leukaemia, unspecified	8	0	100	0	1	2	2	2	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.2	0.01	**0.1**	C95
Other and unspecified	370	12	81	5	12	12	9	20	13	20	20	19	31	22	29	26	46	28	23	28	6.9	11.5	1.49	**13.1**	O&U
All sites	3299	70	80	2	123	105	81	100	65	120	148	173	267	212	288	291	359	288	260	349	61.7		14.26	**125.1**	C00-96
All sites except C44	3205	67	79	2	123	102	79	96	61	114	145	168	256	205	284	281	353	278	252	341	59.9	100.0	13.85	**121.7**	C00-96 exc. C44
Average annual population					164230	133437	106965	124480	127456	100511	79118	61055	46769	37910	29309	20902	14629	9610	6417	7137	1069935				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Mali, Bamako (2010–2014)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	60	0	83	3	-	1	2	3	2	1	6	2	8	5	5	5	10	1	4	5	1.1	1.4	0.26	**2.4**	C00-06
Salivary gland	18	1	94	0	-	-	-	-	-	2	-	1	3	1	2	3	-	4	1	-	0.3	0.4	0.11	**0.8**	C07-08
Nasopharynx	3	0	100	0	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	0.1	0.1	0.02	**0.1**	C11
Other pharynx	15	1	80	7	-	-	-	-	1	-	2	2	2	2	2	2	-	-	-	1	0.3	0.3	0.04	**0.5**	C09-10, C12-14
Oesophagus	66	1	77	0	-	-	-	2	-	2	6	7	10	10	4	8	6	6	2	2	1.2	1.5	0.31	**2.7**	C15
Stomach	332	3	79	1	-	-	2	2	5	5	21	13	26	34	38	39	47	31	28	38	6.2	7.5	1.83	**15.3**	C16
Colon	114	3	84	0	-	-	-	2	1	2	7	3	7	16	13	18	17	16	7	2	2.1	2.6	0.71	**5.5**	C18
Rectum	104	2	88	1	-	-	-	1	1	5	12	9	9	13	16	10	11	4	3	8	1.9	2.4	0.43	**4.2**	C19-20
Anus	18	0	72	0	-	-	-	-	1	-	2	1	4	-	-	2	1	1	2	4	0.3	0.4	0.08	**0.7**	C21
Liver	104	2	68	6	2	-	1	1	7	5	9	9	10	14	10	6	11	5	4	8	1.9	2.4	0.41	**4.0**	C22
Gallbladder etc.	12	0	83	0	-	-	-	-	1	-	-	-	-	2	2	2	-	1	3	1	0.2	0.3	0.08	**0.6**	C23-24
Pancreas	53	0	62	4	1	-	-	-	2	-	-	1	3	3	3	7	9	7	5	12	1.0	1.2	0.31	**2.6**	C25
Larynx	10	1	100	0	-	-	-	-	-	2	1	1	-	1	1	-	1	1	-	1	0.2	0.2	0.04	**0.4**	C32
Trachea, bronchus, and lung	41	1	78	2	-	-	3	1	1	1	1	1	1	6	5	3	7	4	2	4	0.8	0.9	0.21	**1.8**	C33-34
Bone	114	4	82	0	8	4	13	11	4	5	9	10	8	10	6	3	8	5	3	3	2.1	2.6	0.35	**3.4**	C40-41
Melanoma of skin	27	0	100	0	-	-	-	-	1	1	-	2	-	1	4	2	8	2	4	2	0.5	0.6	0.18	**1.4**	C43
Non-melanoma skin	97	1	91	0	2	-	3	3	3	7	4	6	7	9	16	10	6	8	7	5	1.8		0.47	**3.9**	C44
Mesothelioma	1	0	100	0	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.0	0.0	0.01	**0.1**	C45
Kaposi sarcoma	25	0	80	4	-	-	-	1	2	3	6	4	1	2	3	2	1	-	-	-	0.5	0.6	0.07	**0.7**	C46
Connective and soft tissue	70	2	91	0	1	1	4	5	4	7	2	4	7	3	5	7	8	4	2	4	1.3	1.6	0.27	**2.5**	C47, C49
Breast	944	13	91	1	-	-	-	4	26	40	87	107	132	131	126	100	72	47	37	22	17.6	21.4	4.13	**37.0**	C50
Vulva	19	2	95	0	-	-	-	-	-	1	2	3	4	-	1	-	-	-	5	1	0.4	0.4	0.11	**0.7**	C51
Vagina	19	0	100	0	1	-	-	-	1	1	4	3	3	1	-	1	-	1	1	2	0.4	0.4	0.06	**0.6**	C52
Cervix uteri	1140	17	86	1	1	1	-	-	14	39	94	101	146	128	148	123	136	72	73	47	21.3	25.8	5.73	**48.4**	C53
Uterus	97	2	84	1	-	-	1	5	4	5	-	4	5	8	7	10	20	7	12	7	1.8	2.2	0.58	**4.4**	C54-55
Ovary	126	4	87	2	-	1	-	2	9	12	9	6	21	17	13	8	7	6	9	2	2.4	2.9	0.54	**4.6**	C56
Placenta	20	0	85	0	-	-	-	3	1	4	4	3	4	1	-	-	-	-	-	-	0.4	0.5	0.03	**0.4**	C58
Kidney and renal pelvis	77	2	71	0	27	13	1	3	2	5	2	2	5	2	7	2	3	-	1	-	1.4	1.7	0.15	**1.8**	C64-65
Bladder	169	0	73	1	1	1	-	2	4	10	20	17	12	13	21	14	25	8	15	6	3.2	3.8	0.85	**6.9**	C67
Ureter and other urinary	2	0	50	0	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	0.0	0.0	0.01	**0.1**	C66, C68
Eye	85	1	84	0	44	6	2	-	3	5	6	6	1	5	2	-	1	-	3	-	1.6	1.9	0.14	**1.7**	C69
Brain and nervous system	24	0	50	12	1	4	1	-	1	1	1	1	4	3	2	1	2	1	-	1	0.4	0.5	0.07	**0.8**	C70-72
Thyroid	76	0	97	0	-	-	1	1	4	4	6	7	10	9	7	5	11	8	1	2	1.4	1.7	0.35	**3.1**	C73
Hodgkin lymphoma	28	0	100	0	-	4	3	3	1	3	1	4	2	1	2	1	1	1	1	-	0.5	0.6	0.08	**0.8**	C81
Non-Hodgkin lymphoma	67	6	97	0	4	8	7	5	2	5	6	2	6	4	-	2	2	2	5	1	1.3	1.5	0.21	**1.8**	C82-85, C96
Multiple myeloma	6	0	83	0	-	2	-	-	-	-	3	-	-	1	-	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C90
Lymphoid leukaemia	15	0	47	0	1	6	7	-	-	1	-	-	-	-	-	-	-	-	-	-	0.3	0.3	0.01	**0.2**	C91
Myeloid leukaemia	3	0	67	0	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	**0.0**	C92-94
Leukaemia, unspecified	6	0	100	0	1	1	1	1	-	-	-	-	-	2	-	-	-	-	-	-	0.1	0.1	0.01	**0.1**	C95
Other and unspecified	302	5	83	5	7	4	12	5	15	17	18	23	16	26	32	30	30	24	20	18	5.6	6.8	1.42	**12.0**	O&U
All sites	4509	74	85	1	103	58	65	66	123	201	351	365	478	484	506	427	462	277	260	209	84.2		20.68	**179.3**	C00-96
All sites except C44	4412	73	85	1	101	58	62	63	120	194	347	359	471	475	490	417	456	269	253	204	82.4	100.0	20.22	**175.4**	C00-96 exc. C44
Average annual population					160770	135559	126952	171941	124833	96703	64570	47355	36981	29721	22625	15840	12974	8301	6888	9183	1071196				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

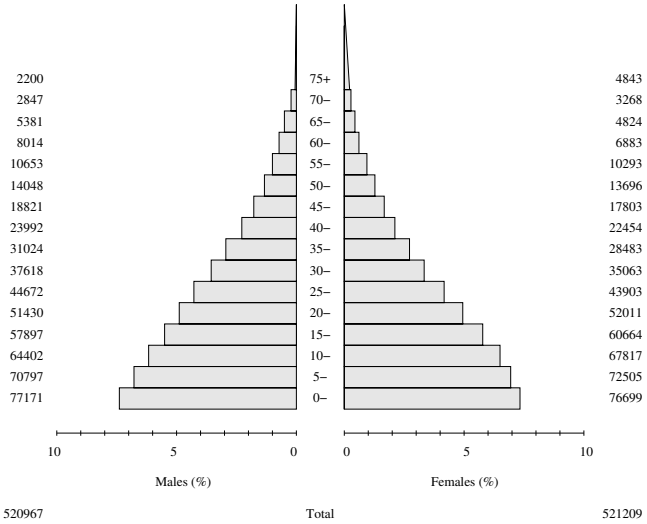
Niger, Niamey

The Registre des Cancers du Niger was founded in 1992, within the health sciences faculty of the University of Niamey. It is located in the University Hospital pathology department, which is a national referral centre for pathology services. The head of the pathology department serves as the registry director, and there is one full-time cancer registrar.

The Registre des Cancers du Niger data presented in this volume are for the registry's catchment population of Niamey, the capital city of the Niger. For the purpose of registration, a usual resident of Niamey is defined by ≥ 6 months of residence in the city.

The population of Niamey is estimated to have been 1 222 066 in 2010. The average annual population-at-risk estimates corresponding to the registry data presented in this volume are shown in the population pyramid.

Niger, Niamey (2006–2009)
Population pyramid (average annual person-years by sex and age group)



Source: Institut National de la Statistique (INS) of the Niger, annual estimates by region; estimates based on the 2001 census

During the first 6 years of operation, case finding was carried out solely by the cancer registry clerk. Medical students now provide some assistance with this task, searching for possible cancer cases in hospital services, in particular those within the National Hospital of Niamey, the University Hospital, and the main maternity hospital. Visits to the major services (surgery, urology, medicine, gynaecology, paediatrics, and the biology laboratory) are carried out every 2 weeks; the nurses in the services are encouraged to make note of cancer cases, and these records are then collected by the registrar. To obtain details about cancer cases, including the diagnosis and the patient's place of residence, the clerk also examines sources such as ward admission books, consultation registers, and department medical records (although information is often missing from department medical records). Other sources visited include public maternal and child health clinics. Some private clinics are occasionally also visited.

An important source of information is the pathology department, which provides histopathology and cytology services for the entire country. Although some specimens are sent abroad, the registry receives reports of all cancer cases diagnosed by the pathology services in the city, including the results of biochemical tests, such as human chorionic gonadotropin (hCG), prostate-specific antigen (PSA), and alpha-fetoprotein (AFP) tests.

Because cause of death is not recorded on death certificates in the Niger, death certificates are not used for cancer registration.

The registry uses IARC's CanReg4 software.

YEARS PRESENTED

2006–2009 (a 4-year period)

NOTES

Over most of the 10-year period of 2001–2010, there was a slow increase in the annual number of cases registered, until 2009, at which point the number decreased.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 51.4 cases per 100 000 person-years in males and 72.8 cases per 100 000 person-years in females. These values are about two thirds of the values for western Africa reported in GLOBOCAN 2012. The incidence of cancer at most sites is low, with a particularly low ASR of prostate cancer (3.5 cases per 100 000 person-years). The ASR of cancer of the cervix, at 8.3 cases per 100 000 person-years, is the lowest reported in this volume, with fewer registered cases of cancer of the cervix than cancer of the ovary. The incidence of lung cancer is very low, as is the incidence of Kaposi sarcoma (with only 4 cases reported: 2 in each sex).

The percentage of microscopically verified cases (MV%) is low overall, at about 40% in both sexes, and is very low for cancers at certain anatomical sites (e.g. 0% for central nervous system cancers and 18% for cancers of the cervix).

SUMMARY

The incidence rates are substantially lower than previously published findings for 1993–1999 (Parkin et al., 2003), which suggests some deterioration in the performance of the registry.

PUBLICATIONS AND ACHIEVEMENTS

The Registre des Cancers du Niger became a member of the African Cancer Registry Network (AFCRN) in 2012.

Djibo H, Mahazou A, Soumaila M, Philippon G, Rey JL, Nouhou H (2010). Relative frequency of malignant and benign tumors in Arlit, Niger. Analysis of data from anatomopathological examinations over a 15-year period. Med Trop (Mars). 70(5-6):509–12. [French] PMID:21520656

Garba SM, Zaki HM, Arfaoui A, Hami H, Soulaymani A, Nouhou H, et al. (2013). Epidemiology of cancers in Niger, 1992 to 2009. Bull Cancer. 100(2):127–33. [French] PMID:23420007

Nayama M, Nouhou H, Souna-Madougou K, Idi N, Garba M, Tahirou A, et al. (2006). Epidemiological and histological aspects of gynecologic and breast cancer in the pathology department of Niamey's Health Faculty, Niger. Mali Med. 21(3):43–9. [French] PMID:19435008

Nouhou H, Mahamadou H, Zaki H, Djibo H. Registre des cancers du Niger données d'enregistrement de 19 ans de fonctionnement (1992-2010).

Niger, Niamey (2006–2009)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	12	0	58		-	-	-	-	-	-	-	1	1	1	2	1	2	3	-	1	0.6	2.0	0.15	**1.4**	C00-06
Salivary gland	7	0	29		-	1	-	1	2	-	-	-	-	1	-	-	-	-	2	-	0.3	1.2	0.10	**0.6**	C07-08
Nasopharynx	5	0	40		-	-	-	-	-	-	-	-	-	3	-	1	-	-	1	-	0.2	0.8	0.08	**0.5**	C11
Other pharynx	7	0	57		-	-	-	-	-	-	-	1	-	-	4	1	1	-	-	-	0.3	1.2	0.07	**0.6**	C09-10, C12-14
Oesophagus	13	0	38		-	-	-	-	1	1	-	-	3	1	3	-	3	-	-	1	0.6	2.2	0.10	**1.2**	C15
Stomach	28	0	54		-	1	-	3	-	3	1	5	1	1	3	3	5	2	-	-	1.3	4.7	0.24	**2.2**	C16
Colon	31	0	48		-	-	-	-	4	1	3	5	4	3	1	4	2	3	-	1	1.5	5.2	0.24	**2.4**	C18
Rectum	17	0	35		-	-	-	-	2	1	-	4	-	4	-	3	2	-	1	-	0.8	2.8	0.16	**1.3**	C19-20
Anus	13	0	38		-	-	-	-	-	2	-	-	1	-	2	4	1	1	1	1	0.6	2.2	0.16	**1.4**	C21
Liver	97	0	6		-	-	-	-	1	2	7	17	6	13	11	13	13	6	4	4	4.7	16.2	0.99	**8.9**	C22
Gallbladder etc.	4	0	50		-	-	-	-	-	-	-	-	1	-	-	2	-	1	-	-	0.2	0.7	0.05	**0.4**	C23-24
Pancreas	21	0	14		-	-	-	-	-	-	-	-	2	3	2	2	4	2	4	2	1.0	3.5	0.36	**2.7**	C25
Larynx	12	0	58		-	-	-	-	-	1	1	1	2	1	1	-	1	3	1	-	0.6	2.0	0.17	**1.1**	C32
Trachea, bronchus, and lung	4	0	0		-	-	-	-	-	-	-	-	-	1	2	-	-	1	-	-	0.2	0.7	0.05	**0.4**	C33-34
Bone	47	0	43		1	1	10	5	4	5	5	2	3	2	2	3	2	1	1	-	2.3	7.8	0.26	**2.7**	C40-41
Melanoma of skin	4	0	100		-	-	-	-	-	1	-	-	-	-	-	-	1	2	-	-	0.2	0.7	0.06	**0.4**	C43
Non-melanoma skin	43	0	35		-	1	2	5	7	2	1	1	3	4	3	5	4	2	1	2	2.1		0.33	**3.4**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	2	0	100		-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C46
Connective and soft tissue	23	0	87		1	-	2	1	3	-	-	2	5	1	1	1	2	1	-	3	1.1	3.8	0.13	**2.0**	C47, C49
Breast	8	0	38		-	-	-	-	-	-	-	4	1	-	-	1	-	-	1	1	0.4	1.3	0.08	**0.8**	C50
Penis	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.0	0.2	0.02	**0.1**	C60
Prostate	23	0	83		-	-	-	-	-	-	-	-	-	-	2	1	5	6	6	3	1.1	3.8	0.51	**3.5**	C61
Testis	7	0	0		-	-	-	1	-	-	-	-	-	1	2	-	1	1	-	1	0.3	1.2	0.07	**0.8**	C62
Kidney and renal pelvis	17	0	35		1	4	-	-	1	-	-	-	-	-	3	2	3	2	-	1	0.8	2.8	0.15	**1.6**	C64-65
Bladder	22	0	50		-	-	-	-	1	-	-	1	1	3	5	3	2	2	-	4	1.1	3.7	0.19	**2.6**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	14	0	64		3	-	-	1	1	2	-	1	2	-	1	-	-	2	-	1	0.7	2.3	0.08	**1.1**	C69
Brain and nervous system	16	0	0		2	2	1	2	-	1	1	-	1	1	2	1	1	1	-	-	0.8	2.7	0.10	**1.0**	C70-72
Thyroid	8	0	88		-	-	-	-	-	1	1	-	2	-	2	2	-	-	-	-	0.4	1.3	0.06	**0.6**	C73
Hodgkin lymphoma	9	0	100		-	2	2	-	-	1	1	-	-	1	-	1	-	1	-	-	0.4	1.5	0.06	**0.5**	C81
Non-Hodgkin lymphoma	30	0	70		2	5	4	-	4	4	-	1	1	2	1	2	1	-	2	1	1.4	5.0	0.20	**2.0**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	6	0	33		-	-	-	1	-	-	2	-	-	-	-	2	-	-	-	1	0.3	1.0	0.03	**0.5**	C91
Myeloid leukaemia	12	0	0		-	-	1	-	2	2	3	-	1	-	1	1	1	-	-	-	0.6	2.0	0.06	**0.7**	C92-94
Leukaemia, unspecified	7	0	0		-	1	1	1	1	-	-	1	-	-	-	1	1	-	-	-	0.3	1.2	0.04	**0.4**	C95
Other and unspecified	72	0	33		2	2	4	4	8	2	7	7	8	7	4	6	4	5	1	1	3.5	12.0	0.52	**5.0**	O&U
All sites	642	0	39		12	20	27	25	42	32	34	54	50	54	60	66	62	49	26	29	30.8		5.86	**54.8**	C00-96
All sites except C44	599	0	40		12	19	25	20	35	30	33	53	47	50	57	61	58	47	25	27	28.7	100.0	5.53	**51.4**	C00-96 exc. C44
Average annual population					77171	70797	64402	57897	51430	44672	37618	31024	23992	18820	14048	10653	8014	5381	2847	2200	520966				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Niger, Niamey (2006–2009)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	13	0	92		-	-	-	-	1	-	-	1	2	1	1	1	1	2	2	1	0.6	1.5	0.19	**1.4**	C00-06
Salivary gland	5	0	20		-	-	-	-	-	-	-	2	1	2	-	-	-	-	-	-	0.2	0.6	0.03	**0.3**	C07-08
Nasopharynx	2	0	50		-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	0.1	0.2	0.00	**0.1**	C11
Other pharynx	4	0	50		-	1	-	-	-	-	-	1	-	-	-	1	-	1	-	-	0.2	0.4	0.04	**0.3**	C09-10, C12-14
Oesophagus	2	0	100		-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	0.1	0.2	0.01	**0.2**	C15
Stomach	15	0	20		-	1	-	2	-	-	-	2	1	-	-	1	3	1	4	-	0.7	1.7	0.27	**1.6**	C16
Colon	26	0	38		-	-	-	-	1	-	1	2	6	3	3	2	3	2	-	3	1.2	2.9	0.23	**2.4**	C18
Rectum	26	0	50		-	-	-	-	2	3	3	3	3	3	1	2	4	-	1	1	1.2	2.9	0.22	**2.1**	C19-20
Anus	4	0	50		-	-	-	-	1	1	-	-	-	-	1	-	-	-	-	1	0.2	0.4	0.01	**0.3**	C21
Liver	36	0	8		-	-	-	-	1	2	3	5	6	3	4	4	3	2	3	-	1.7	4.0	0.40	**3.1**	C22
Gallbladder etc.	4	0	25		-	-	-	-	-	-	1	-	-	2	1	-	-	-	-	-	0.2	0.4	0.03	**0.3**	C23-24
Pancreas	6	0	17		-	-	-	-	1	-	1	1	-	1	2	-	-	-	-	-	0.3	0.7	0.04	**0.4**	C25
Larynx	2	0	100		-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	0.1	0.2	0.01	**0.1**	C32
Trachea, bronchus, and lung	1	0	0		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C33-34
Bone	33	0	21		2	2	2	3	10	1	1	3	-	-	2	3	2	1	1	-	1.6	3.7	0.22	**2.0**	C40-41
Melanoma of skin	9	0	78		-	-	-	-	-	1	-	-	-	1	3	1	2	1	-	-	0.4	1.0	0.11	**0.9**	C43
Non-melanoma skin	48	0	52		4	1	-	3	2	3	4	3	4	4	3	8	6	1	-	2	2.3		0.36	**3.7**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	2	0	0		-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	0.1	0.2	0.01	**0.1**	C46
Connective and soft tissue	16	0	69		1	-	-	2	1	1	1	6	-	1	-	-	-	1	-	2	0.8	1.8	0.07	**1.0**	C47, C49
Breast	306	0	51		-	-	-	-	12	17	26	46	65	43	26	19	26	9	8	9	14.7	34.3	2.52	**24.3**	C50
Vulva	6	0	50		-	-	-	-	-	-	2	1	-	-	1	1	-	-	1	-	0.3	0.7	0.07	**0.5**	C51
Vagina	9	0	56		-	-	-	-	1	1	1	-	2	1	1	-	1	1	-	-	0.4	1.0	0.08	**0.7**	C52
Cervix uteri	88	0	18		-	-	-	-	1	4	6	7	14	13	12	5	17	4	4	1	4.2	9.9	0.97	**8.3**	C53
Uterus	42	0	62		-	-	-	-	2	1	4	1	7	5	3	6	4	5	2	2	2.0	4.7	0.48	**4.0**	C54-55
Ovary	91	0	33		-	-	1	-	6	7	3	12	15	10	10	5	7	7	3	5	4.4	10.2	0.83	**7.7**	C56
Placenta	1	0	100		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C58
Kidney and renal pelvis	7	0	71		-	1	-	-	-	-	1	1	-	-	2	-	-	-	1	1	0.3	0.8	0.07	**0.6**	C64-65
Bladder	9	0	33		-	-	-	-	-	-	-	-	-	2	-	-	3	3	-	1	0.4	1.0	0.15	**1.2**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	8	0	100		3	-	-	-	1	-	-	-	-	1	-	1	1	1	-	-	0.4	0.9	0.07	**0.6**	C69
Brain and nervous system	6	0	0		1	-	-	-	-	-	3	2	-	-	-	-	-	-	-	-	0.3	0.7	0.02	**0.3**	C70-72
Thyroid	13	0	46		-	-	-	2	-	1	4	1	2	1	1	-	1	-	-	-	0.6	1.5	0.07	**0.8**	C73
Hodgkin lymphoma	2	0	50		-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	0.1	0.2	0.01	**0.1**	C81
Non-Hodgkin lymphoma	22	0	86		1	1	2	2	2	2	1	3	1	2	3	2	-	-	-	-	1.1	2.5	0.11	**1.3**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	2	0	50		-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.1	0.2	0.02	**0.2**	C91
Myeloid leukaemia	7	0	0		-	-	-	-	1	-	1	1	1	-	-	3	-	-	-	-	0.3	0.8	0.05	**0.5**	C92-94
Leukaemia, unspecified	3	0	67		-	-	1	-	-	-	-	1	-	-	-	1	-	-	-	-	0.1	0.3	0.02	**0.2**	C95
Other and unspecified	65	0	18		1	-	2	6	6	4	5	8	8	4	4	4	6	3	4	-	3.1	7.3	0.59	**5.0**	O&U
All sites	941	0	42		13	8	9	21	53	50	75	114	138	105	86	70	91	45	34	29	45.1		8.39	**76.5**	C00-96
All sites except C44	893	0	42		9	7	9	18	51	47	71	111	134	101	83	62	85	44	34	27	42.8	100.0	8.03	**72.8**	C00-96 exc. C44
Average annual population					76699	72505	67817	60664	52011	43902	35063	28483	22454	17802	13696	10293	6883	4824	3268	4843	521206				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Nigeria, Abuja

The Abuja Cancer Registry (ABCR) is located in the National Hospital Abuja, in Nigeria's Federal Capital Territory. The ABCR was established in 2006 as a hospital-based registry, to determine the burden of cancer within the hospital. With the collaboration of the Federal Ministry of Health and the Nigerian National System of Cancer Registries, it became a population-based registry in January 2009.

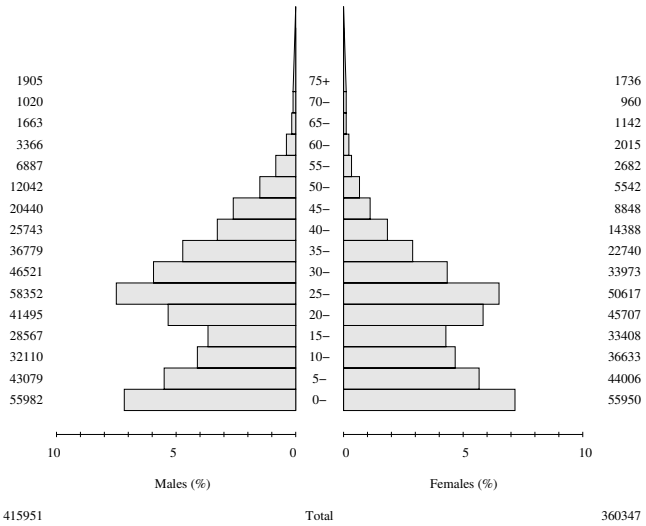
The National Hospital Abuja is one of the leading hospitals in the country, in particular with respect to cancer diagnostic and treatment services, including radiotherapy and nuclear medicine. Most cancer patients within the region (and many from elsewhere) are referred to the hospital. The Oncology Department and Medical Records Unit are important registry stakeholders.

The ABCR is staffed by a registrar and a data collection officer, with supervision from a three-member committee consisting of the registry director (an oncologist), the head of the Medical Records Unit, and a pathologist. Equipment, transport for data collection, and salaries are financed by the hospital.

The ABCR covers the entire population of Nigeria's Federal Capital Territory, which includes the city of Abuja (the nation's capital).

The total population of the area covered by the registry is estimated to have been 1.6 million in 2006 (at the census). The average annual population-at-risk estimates corresponding to the ABCR data presented in this volume are shown in the population pyramid.

Nigeria, Abuja Municipal Area (2013)
Population pyramid (average annual person-years by sex and age group)



Source: National Population Commission of Nigeria, 2006 Population and Housing Census (Abuja, April 2010), 2006 population estimates for Abuja Municipal Area

Most of the cancer management services in Abuja are located at the National Hospital Abuja. The registry uses all the information sources available at the hospital, including the pathology laboratory, medical records department, oncology department, inpatient wards, and outpatient clinics.

Data are collected from nine hospitals (both public and private) within the Federal Capital Territory, and four pathology laboratories supply pathology reports to the registry. The ABCR uses both active and passive methods of case finding. Registry staff members register cases from the oncology departments, inpatient wards, and outpatient clinics. All cancer cases identified at the various locations are registered, but cases in non-residents are excluded from analysis. Death certificates are accessed and abstracted.

Data are recorded on the cancer registry abstract form. The ABCR uses IARC's CanReg4 software for data processing and management.

YEARS PRESENTED

2013 (a 1-year period)

NOTES

Although the registry has recorded cases since 2009, only the data for 2013 are relatively complete; the average rate of registration for that year is 30 cases per month, compared with 12 cases per month for 2009–2011.

Within the population structure, as illustrated by the population pyramid, there is an obvious bulge in the cohort of 25- to 29-year-olds; this is largely due to the phenomenon of young people migrating to the city in search of economic opportunities.

The incidence rates reported in this volume are based on a total of only 378 registered cases. The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 99.9 cases per 100 000 person-years in males and 182.5 cases per 100 000 person-years in females, values higher than the values for western Africa reported in GLOBOCAN 2012. This high overall incidence is due in large part to the very high incidence rate of prostate cancer (ASR, 61.3 cases per 100 000 person-years) and breast cancer in females (ASR, 78.4 cases per 100 000 person-years). Only 5 cases of cancer in children aged 0–14 years were recorded.

The overall percentage of microscopically verified cases (MV%) in males (98%) is rather high.

SUMMARY

The high rates of cancers at some anatomical sites may be due to the inclusion of non-resident cases, but the rates of cancers at other anatomical sites seem low. However, the small numbers (based on only 1 year of registration) make interpretation difficult.

PUBLICATIONS AND ACHIEVEMENTS

The ABCR became a member of the African Cancer Registry Network (AFCRN) in 2012.

Akarolo-Anthony SN, Maso LD, Igbinoba F, Mbulaiteye SM, Adebamowo CA (2014). Cancer burden among HIV-positive persons in Nigeria: preliminary findings from the Nigerian AIDS-cancer match study. Infect Agent Cancer. 9(1):1. http://dx.doi.org/10.1186/1750-9378-9-1 PMID:24597902

al-Haddad BJ, Jedy-Agba E, Oga E, Ezeome ER, Obiorah CC, Okobia M, et al. (2015). Comparability, diagnostic validity and completeness of Nigerian cancer registries. Cancer Epidemiol. 39(3):456–64. http://dx.doi.org/10.1016/j.canep.2015.03.010 PMID:25863982

Jedy-Agba E, Curado MP, Ogunbiyi O, Oga E, Fabowale T, Igbinoba F, et al. (2012). Cancer incidence in Nigeria: a report from population-based cancer registries. Cancer Epidemiol. 36(5):e271–8. http://dx.doi.org/10.1016/j.canep.2012.04.007 PMID:22621842

Nigeria, Abuja (2013)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	3	0	100		-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	0.7	2.3	0.14	**1.3**	C00-06
Salivary gland	3	0	100		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	0.7	2.3	0.01	**2.2**	C07-08
Nasopharynx	4	1	100		-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	1.0	3.0	0.04	**0.6**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	2	0	100		-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	0.5	1.5	0.08	**0.7**	C15
Stomach	8	0	100		-	-	-	-	-	1	1	1	-	1	1	-	1	-	-	2	1.9	6.0	0.25	**4.4**	C16
Colon	9	1	100		-	-	-	-	-	-	1	-	1	-	1	3	2	-	-	-	2.2	6.8	0.66	**5.5**	C18
Rectum	2	0	100		-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	0.5	1.5	0.15	**1.2**	C19-20
Anus	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C21
Liver	2	0	100		-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	0.5	1.5	0.06	**0.6**	C22
Gallbladder etc.	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.2	0.8	0.15	**1.2**	C23-24
Pancreas	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C25
Larynx	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.2	0.8	0.04	**0.4**	C32
Trachea, bronchus, and lung	1	0	100		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0.2	0.8	0.02	**0.2**	C33-34
Bone	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C40-41
Melanoma of skin	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C43
Non-melanoma skin	10	0	90		-	-	-	-	-	1	3	1	1	1	-	-	1	-	-	2	2.4		0.25	**4.5**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	9	2	89		-	-	-	1	-	-	-	-	2	1	2	-	-	-	-	1	2.2	6.8	0.21	**3.8**	C46
Connective and soft tissue	7	0	100		-	-	-	-	-	1	1	2	-	-	1	1	-	1	-	-	1.7	5.3	0.46	**3.4**	C47, C49
Breast	4	0	100		-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	2	1.0	3.0	0.04	**2.5**	C50
Penis	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C60
Prostate	53	4	100		-	-	-	-	-	-	-	-	-	-	10	7	8	11	6	7	12.7	39.8	9.04	**61.3**	C61
Testis	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C62
Kidney and renal pelvis	3	0	100		-	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	0.7	2.3	0.16	**1.3**	C64-65
Bladder	4	0	100		-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	1.0	3.0	0.08	**0.9**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C69
Brain and nervous system	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.2	0.8	0.30	**1.8**	C70-72
Thyroid	1	0	100		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0.2	0.8	0.02	**0.2**	C73
Hodgkin lymphoma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C81
Non-Hodgkin lymphoma	2	1	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.5	1.5	0.02	**0.3**	C82-85, C96
Multiple myeloma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	3	0	67		-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-	0.7	2.3	0.04	**0.5**	C92-94
Leukaemia, unspecified	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C95
Other and unspecified	10	0	90		1	-	-	1	1	-	-	3	-	1	-	1	1	1	-	-	2.4	7.5	0.63	**5.1**	O&U
All sites	143	9	97		1	-	-	2	1	6	11	11	9	7	18	18	14	14	6	16	34.4		12.81	**104.2**	C00-96
All sites except C44	133	9	98		1	-	-	2	1	5	8	10	8	6	18	18	13	14	6	14	32.0	100.0	12.61	**99.9**	C00-96 exc. C44
Average annual population					55982	43079	32110	28567	41495	58352	46521	36779	25743	20440	12042	6887	3366	1663	1020	1905	415951				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Nigeria, Abuja (2013)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.3	0.4	0.09	**0.9**	C00-06
Salivary gland	2	0	100		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	0.6	0.9	0.03	**1.6**	C07-08
Nasopharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C15
Stomach	2	0	100		-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	0.6	0.9	0.26	**2.2**	C16
Colon	3	1	100		-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	0.8	1.3	0.39	**3.2**	C18
Rectum	3	0	100		-	-	-	-	-	1	-	-	1	1	-	-	-	-	-	-	0.8	1.3	0.10	**1.3**	C19-20
Anus	3	0	100		-	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	0.8	1.3	0.13	**1.5**	C21
Liver	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C22
Gallbladder etc.	1	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.3	0.4	0.09	**0.9**	C23-24
Pancreas	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C25
Larynx	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0.3	0.4	0.25	**2.0**	C32
Trachea, bronchus, and lung	3	0	100		-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	0.8	1.3	1.05	**5.6**	C33-34
Bone	3	0	100		-	-	-	-	-	2	-	-	1	-	-	-	-	-	-	-	0.8	1.3	0.05	**0.7**	C40-41
Melanoma of skin	1	0	100		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.3	0.4	0.02	**0.3**	C43
Non-melanoma skin	7	0	86		-	-	-	2	-	2	-	-	1	1	-	-	-	1	-	-	1.9		0.58	**4.6**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	4	0	75		-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	1.1	1.8	0.08	**1.0**	C46
Connective and soft tissue	4	0	100		-	1	-	-	-	1	-	-	1	1	-	-	-	-	-	-	1.1	1.8	0.11	**1.5**	C47, C49
Breast	125	3	89		-	-	-	-	2	5	22	26	23	10	15	6	5	2	4	2	34.7	54.8	9.22	**78.4**	C50
Vulva	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C51
Vagina	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C52
Cervix uteri	31	0	100		-	-	-	-	-	-	1	2	5	4	3	1	5	5	3	2	8.6	13.6	5.91	**41.3**	C53
Uterus	7	1	100		-	-	-	-	-	-	-	-	1	1	-	1	1	1	-	1	1.9	3.1	1.12	**9.7**	C54-55
Ovary	8	1	100		-	-	-	-	-	-	-	-	-	1	-	2	1	1	-	2	2.2	3.5	1.27	**12.1**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	4	0	100		1	-	-	-	-	1	1	-	-	-	-	-	-	1	-	-	1.1	1.8	0.47	**3.2**	C64-65
Bladder	1	0	100		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.3	0.4	0.19	**1.5**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	2	0	100		-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	0.6	0.9	0.10	**1.1**	C69
Brain and nervous system	2	0	50		-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	0.6	0.9	0.12	**1.3**	C70-72
Thyroid	1	0	100		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	0.3	0.4	0.19	**1.5**	C73
Hodgkin lymphoma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C81
Non-Hodgkin lymphoma	4	0	75		-	-	1	-	-	2	1	-	-	-	-	-	-	-	-	-	1.1	1.8	0.05	**0.7**	C82-85, C96
Multiple myeloma	2	1	100		-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0.6	0.9	0.18	**1.8**	C90
Lymphoid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C91
Myeloid leukaemia	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C92-94
Leukaemia, unspecified	1	0	100		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0.3	0.4	0.03	**0.4**	C95
Other and unspecified	9	0	89		-	1	-	-	-	1	-	1	1	-	2	2	-	-	1	-	2.5	3.9	1.15	**7.9**	O&U
All sites	235	7	92		1	2	1	2	2	18	28	31	39	19	27	14	15	12	9	8	65.2		23.20	**187.0**	C00-96
All sites except C44	228	7	92		1	2	1	-	2	16	28	31	38	18	27	14	15	11	9	8	63.3	100.0	22.62	**182.5**	C00-96 exc. C44
Average annual population					55950	44006	36633	33408	45707	50617	33973	22740	14388	8848	5542	2682	2015	1142	960	1736	360347				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Nigeria, Calabar

The Calabar Cancer Registry (CCR) started as a hospital-based registry in 1979 and became population-based in 2004. It is located in the pathology department of the University of Calabar Teaching Hospital (UCTH) in Calabar, Cross River State.

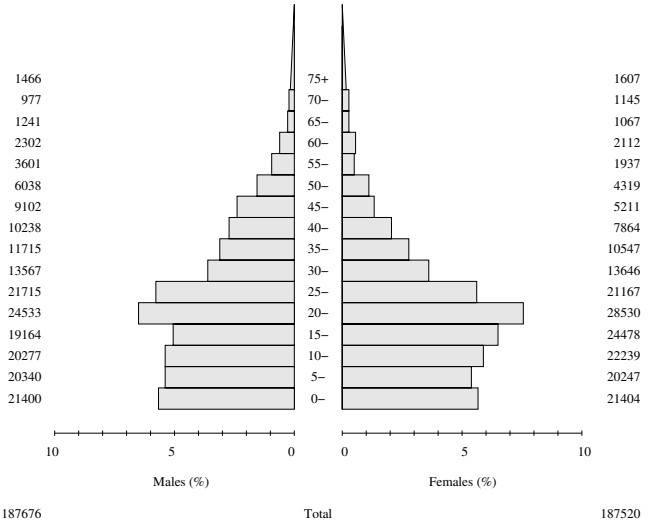
The registry received its first computer, index cards, registers, and office stationery from the National Headquarters of Cancer Registries in Nigeria, coordinated by Professor T.F. Solanke, in June 1994. This was followed by a grant from WHO/IARC for 2004–2006. In 2009, a computer and accessories were donated by the Nigerian Federal Ministry of Health. Since 2007, the registry has had no sustainable source of funding.

The CCR is staffed by a registry director (a consultant pathologist), a principal administrative officer (the acting registrar), a senior clerical officer (the data collector and data-entry clerk), and a medical social worker in charge of patient counselling. There is also an oncology nurse who counsels patients on the early warning signs of cancer and assists during the collection of cervical smears and breast biopsies in the cytology clinic.

The CCR covers 6 of the 18 local government areas of Cross River State: Akamkpa, Akpabuyo, Biase, Calabar Municipal, Calabar South, and Odukpani. The subset of registry data presented in this volume is for Calabar Municipal and Calabar South, for which population coverage is considered to be relatively complete.

The combined population of Calabar Municipal and Calabar South is estimated to have been 375 196 in 2006 (at the national census). The average annual population-at-risk estimates corresponding to the CCR data presented in this volume are shown in the population pyramid.

Nigeria, Calabar Municipal and Calabar South (2009–2013)
Population pyramid (average annual person-years by sex and age group)



Source: National Population Commission of Nigeria, 2006 Population and Housing Census (Abuja, April 2010), 2006 population estimates for the local government areas of Calabar Municipal and Calabar South

Registration is predominantly active, involving visits to all health institutions within the covered area. Regular visits are made to hospital wards, health records departments, and laboratories, including to the haematology clinic at the UCTH. Due to logistical constraints, data collection is limited to the health facilities located in only three local government areas: Akpabuyo, Calabar Municipal, and Calabar South.

Information is abstracted from patients' health records, laboratory reports, inpatient records, and clinic attendance records. The date the patient was last seen or the date of death is also obtained.

When applicable, autopsy records are also examined, for information on cancer-related deaths. Death registration is not mandatory in Nigeria; only death certificates issued by hospitals are used by the CCR to update vital status.

To maximize quality control, histological confirmation is obtained for registered cases. The registry director regularly cross-checks, validates, and updates all entries.

Cases are coded according to ICD-O-3. The registry uses IARC's CanReg4 software (and more recently, CanReg5) for data storage and management.

Access to the computerized registry data is restricted to a few authorized staff members. All paper files containing patient data are stored in locked cabinets. Strict confidentiality practices are maintained throughout the data handling process, and access to the cancer registry office and documents is restricted to CCR staff members. Requests for data must be submitted in writing and approved by the registry director.

YEARS PRESENTED

2009–2013 (a 5-year period)

NOTES

The rate of registration was relatively constant during the 5-year period analysed, aside from some marked monthly variation in 2009.

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 75.5 cases per 100 000 person-years in males and 85.4 cases per 100 000 person-years in females. The ASR in females is 75% of the value for western Africa reported in GLOBOCAN 2012. In males, prostate cancer predominates (accounting for almost half of registered cases), with a relatively high ASR, at 50.8 cases per 100 000 person-years. The incidence of cancers at most other anatomical sites (with the exception of Kaposi sarcoma) is low, with particularly low rates of liver and lung cancers. In females, breast cancer accounts for 42% of registered cases, with an ASR of 35.0 cases per 100 000 person-years, which is similar to the estimate for western Africa. Cervical cancer, which accounts for 20% of registered cases, has a relatively low ASR, at 21.0 cases per 100 000 person-years.

The percentage of microscopically verified cases (MV%) is high overall, at 99% in males and 94% in females. For cancers at many anatomical sites, the MV% is 100%, including prostate cancer (150 cases) and breast cancer in females (164 cases).

SUMMARY

The registry relies heavily on cases diagnosed by pathology, as evidenced by the fact that almost all cases are microscopically verified. Therefore, it is likely that the calculated rates are underestimates, in particular the rates of cancers that are typically diagnosed by other means (e.g. cancers of the lung, liver, and pancreas).

PUBLICATIONS AND ACHIEVEMENTS

The CCR became a member of the African Cancer Registry Network (AFCRN) in 2012.

Ebughe GA, Ekanem IO, Omotoso AJ, Inyama M, Agan TU, Ago BU, et al. (2012). Malignancies in AIDS patients: the experience of a tertiary hospital in a high prevalence zone. Infect Agent Cancer. 7 Suppl 1:17. http://dx.doi.org/10.1186/1750-9378-7-S1-P17

Ekanem IO, Parkin DM (2016). Five year cancer incidence in Calabar, Nigeria (2009-2013). Cancer Epidemiol. 42:167–72. http://dx.doi.org/10.1016/j.canep.2016.04.014 PMID:27164305

Inyama MA, Ibanga IA, Ebughe G, Bassey I, Ekanem IO, Asuquo ME (2012). AIDS-related lymphoma at the University of Calabar Teaching Hospital (Nigeria): a seven year review. Infect Agent Cancer. 7 Suppl 1:1. http://dx.doi.org/10.1186/1750-9378-7-S1-P1

Jedy-Agba E, Oga E, Odutola M, Igbinoba F, Ekanem I, Ezeome E, et al. (2015). Cancer incidence in Nigeria from 2009 to 2013. Ann Glob Health. 81(1):92. http://dx.doi.org/10.1016/j.aogh.2015.02.714

Jedy-Agba EE, Curado MP, Oga E, Samaila MO, Ezeome ER, Obiorah C, et al. (2012). The role of hospital-based cancer registries in low and middle income countries-The Nigerian Case Study. Cancer Epidemiol. 36(5):430–5. http://dx.doi.org/10.1016/j.canep.2012.05.010 PMID:22704971

Jedy-Agba EE, Oga EA, Odutola M, Abdullahi YM, Popoola A, Achara P, et al. (2015). Developing national cancer registration in developing countries - case study of the Nigerian national system of cancer registries. Front Public Health. 3:186. http://dx.doi.org/10.3389/fpubh.2015.00186 PMID:26284233

Nigeria, Calabar (2009–2013)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	2	0	50		-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	0.2	0.7	0.02	**0.2**	C00-06
Salivary gland	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C07-08
Nasopharynx	4	0	100		-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	0.4	1.3	0.02	**0.3**	C11
Other pharynx	2	0	100		-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	0.2	0.7	0.01	**0.2**	C09-10, C12-14
Oesophagus	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C15
Stomach	5	0	100		-	-	-	-	-	-	1	-	1	-	3	-	-	-	-	-	0.5	1.6	0.07	**0.7**	C16
Colon	11	0	100		-	-	-	-	-	-	1	1	1	2	2	2	1	1	-	-	1.2	3.6	0.26	**2.2**	C18
Rectum	3	0	100		-	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	0.3	1.0	0.12	**0.6**	C19-20
Anus	6	0	100		-	-	-	-	-	-	2	-	1	1	-	-	-	1	1	-	0.6	2.0	0.22	**1.3**	C21
Liver	5	0	100		-	-	1	-	1	1	-	1	-	-	1	-	-	-	-	-	0.5	1.6	0.04	**0.5**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.1	0.3	0.08	**0.5**	C25
Larynx	8	0	100		-	-	-	-	-	1	-	1	-	2	1	-	3	-	-	-	0.9	2.6	0.18	**1.6**	C32
Trachea, bronchus, and lung	2	0	100		-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	0.2	0.7	0.02	**0.3**	C33-34
Bone	6	0	100		-	-	1	1	-	1	-	-	-	2	-	-	-	-	-	1	0.6	2.0	0.04	**0.8**	C40-41
Melanoma of skin	3	0	100		-	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	0.3	1.0	0.10	**0.8**	C43
Non-melanoma skin	15	0	100		-	-	-	1	-	-	1	1	4	1	1	1	2	2	-	1	1.6		0.36	**3.2**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	15	0	100		-	1	-	-	-	2	1	2	1	3	1	2	-	2	-	-	1.6	4.9	0.31	**2.6**	C46
Connective and soft tissue	9	0	100		-	-	-	1	-	1	1	3	-	1	-	-	1	1	-	-	1.0	3.0	0.18	**1.5**	C47, C49
Breast	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0.1	0.3	0.08	**0.5**	C50
Penis	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C60
Prostate	150	0	100		-	1	-	-	-	-	-	-	1	3	6	12	39	31	18	39	16.0	49.2	6.51	**50.8**	C61
Testis	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C62
Kidney and renal pelvis	5	0	100		-	1	-	1	-	-	-	-	1	1	1	-	-	-	-	-	0.5	1.6	0.05	**0.6**	C64-65
Bladder	2	0	100		-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	0.2	0.7	0.00	**0.3**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	12	0	100		4	1	-	-	-	3	2	-	-	1	1	-	-	-	-	-	1.3	3.9	0.08	**1.2**	C69
Brain and nervous system	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C70-72
Thyroid	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C73
Hodgkin lymphoma	15	0	100		2	-	1	2	1	3	-	-	1	1	-	1	-	1	-	2	1.6	4.9	0.17	**2.3**	C81
Non-Hodgkin lymphoma	12	0	100		-	4	2	1	2	1	-	-	1	-	-	-	1	-	-	-	1.3	3.9	0.10	**1.3**	C82-85, C96
Multiple myeloma	1	0	100		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	0.1	0.3	0.00	**0.1**	C90
Lymphoid leukaemia	2	0	100		-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	0.2	0.7	0.11	**0.5**	C91
Myeloid leukaemia	1	0	0		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C92-94
Leukaemia, unspecified	5	0	60		1	1	-	-	-	1	-	-	1	1	-	-	-	-	-	-	0.5	1.6	0.03	**0.5**	C95
Other and unspecified	17	0	100		-	-	1	1	2	1	1	-	2	2	-	2	2	-	1	2	1.8	5.6	0.32	**3.1**	O&U
All sites	320	0	99		7	9	6	9	10	17	13	12	17	22	18	20	51	41	22	46	34.1		9.50	**78.8**	C00-96
All sites except C44	305	0	99		7	9	6	8	10	17	12	11	13	21	17	19	49	39	22	45	32.5	100.0	9.14	**75.5**	C00-96 exc. C44
Average annual population					21400	20340	20277	19164	24533	21715	13567	11715	10238	9102	6038	3601	2302	1241	977	1466	187676				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Nigeria, Calabar (2009–2013)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	2	0	100		-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	0.2	0.5	0.04	**0.4**	C00-06
Salivary gland	1	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.1	0.3	0.02	**0.2**	C07-08
Nasopharynx	4	0	100		-	-	-	-	-	2	-	1	1	-	-	-	-	-	-	-	0.4	1.0	0.03	**0.4**	C11
Other pharynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C09-10, C12-14
Oesophagus	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C15
Stomach	4	0	100		-	-	-	-	-	-	-	-	-	1	-	2	1	-	-	-	0.4	1.0	0.17	**1.4**	C16
Colon	7	0	100		-	-	-	-	-	1	1	1	1	-	1	2	-	-	-	-	0.7	1.8	0.16	**1.5**	C18
Rectum	1	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.1	0.3	0.02	**0.2**	C19-20
Anus	6	0	100		-	-	-	-	-	-	-	1	1	1	-	1	-	-	1	1	0.6	1.5	0.18	**1.5**	C21
Liver	9	0	100		1	1	-	-	-	-	2	-	-	1	1	1	2	-	-	-	1.0	2.3	0.21	**2.0**	C22
Gallbladder etc.	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C23-24
Pancreas	2	0	100		-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	0.2	0.5	0.14	**0.9**	C25
Larynx	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C32
Trachea, bronchus, and lung	1	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0.1	0.3	0.02	**0.2**	C33-34
Bone	2	0	100		-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	0.2	0.5	0.01	**0.1**	C40-41
Melanoma of skin	2	0	100		-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	0.2	0.5	0.00	**0.3**	C43
Non-melanoma skin	9	0	100		-	-	-	1	1	2	-	-	2	-	1	1	-	-	-	1	1.0		0.12	**1.5**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	6	0	100		-	-	-	-	1	3	1	1	-	-	-	-	-	-	-	-	0.6	1.5	0.03	**0.5**	C46
Connective and soft tissue	5	0	100		-	1	-	1	-	-	2	1	-	-	-	-	-	-	-	-	0.5	1.3	0.03	**0.5**	C47, C49
Breast	164	0	100		-	-	-	-	4	12	16	17	34	25	18	13	9	7	5	4	17.5	42.1	3.87	**35.0**	C50
Vulva	5	0	100		-	-	-	-	-	1	-	-	1	-	-	1	1	-	1	-	0.5	1.3	0.20	**1.4**	C51
Vagina	1	0	100		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C52
Cervix uteri	77	0	86		-	-	-	-	-	-	4	10	11	15	10	7	8	10	-	2	8.2	19.7	2.46	**21.0**	C53
Uterus	9	0	100		-	-	-	-	1	-	1	-	-	2	1	2	1	1	-	-	1.0	2.3	0.32	**2.6**	C54-55
Ovary	14	0	86		-	-	-	-	1	-	-	3	2	3	3	2	-	-	-	-	1.5	3.6	0.29	**2.9**	C56
Placenta	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C58
Kidney and renal pelvis	3	0	67		1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	0.3	0.8	0.01	**0.2**	C64-65
Bladder	2	0	100		-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	0.2	0.5	0.10	**0.7**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	14	0	93		6	2	-	1	1	3	-	1	-	-	-	-	-	-	-	-	1.5	3.6	0.07	**1.3**	C69
Brain and nervous system	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C70-72
Thyroid	1	0	100		-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C73
Hodgkin lymphoma	15	0	93		-	1	2	-	-	2	-	3	2	-	1	-	3	1	-	-	1.6	3.8	0.34	**3.0**	C81
Non-Hodgkin lymphoma	10	0	70		1	2	2	-	-	1	-	-	2	-	1	-	1	-	-	-	1.1	2.6	0.12	**1.5**	C82-85, C96
Multiple myeloma	3	0	0		-	-	-	-	1	-	-	-	-	-	-	-	1	1	-	-	0.3	0.8	0.14	**1.0**	C90
Lymphoid leukaemia	2	0	100		-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	0.2	0.5	0.10	**0.6**	C91
Myeloid leukaemia	1	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0.1	0.3	0.01	**0.1**	C92-94
Leukaemia, unspecified	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C95
Other and unspecified	17	0	100		-	2	-	-	1	3	-	-	2	1	3	-	1	1	2	1	1.8	4.4	0.46	**3.6**	O&U
All sites	399	0	94		9	9	4	3	15	31	29	42	60	52	41	32	29	24	9	10	42.6		9.70	**86.9**	C00-96
All sites except C44	390	0	94		9	9	4	2	14	29	29	42	58	52	40	31	29	24	9	9	41.6	100.0	9.58	**85.4**	C00-96 exc. C44
Average annual population					21404	20247	22239	24478	28530	21167	13646	10547	7864	5211	4319	1937	2112	1067	1145	1607	187520				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Nigeria, Ibadan

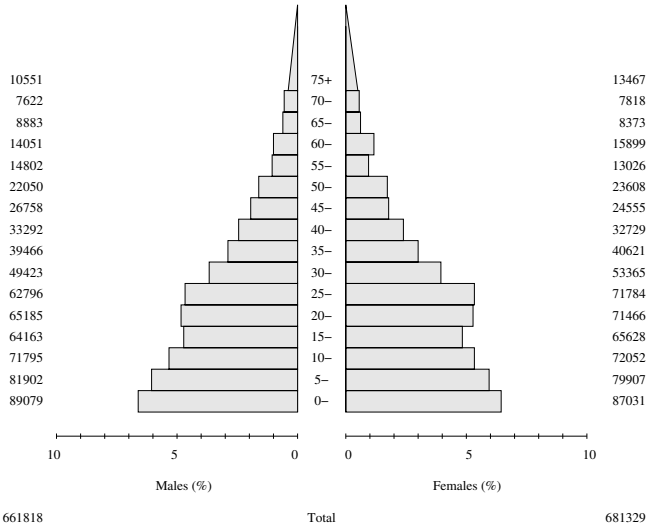
The Ibadan Cancer Registry (IBCR) was the second population-based cancer registry established in Africa. It was set up in April 1960 with the aim of determining the incidence rates of various cancers in Ibadan and the surrounding area, to provide baseline data for public health planners, physicians, and researchers. The registry is located in the pathology department of the University College Hospital (UCH) in Ibadan (the capital of Oyo State). It is funded in part by the UCH and the University of Ibadan's College of Medicine, as well as by grant support from IARC. The IBCR is staffed by a consultant pathologist (the registry's principal investigator) and six other employees: a registrar, a data collection officer, a secretary, a data clerk, and two computer analysts.

The IBCR data presented in this volume are for residents of the Ibadan metropolitan area, which consists of 11 local government areas (LGAs): Akinyele, Egbeda, Ibadan North, Ibadan North-East, Ibadan North-West, Ibadan South-East, Ibadan South-West, Ido, Lagelu, Oluyole, and Ona Ara. For the purpose of registration, residents are defined by ≥ 1 year of residence in the area.

The population of Oyo State is relatively homogeneous; it is inhabited mainly by the Yoruba ethnic group, which is primarily agrarian. Ibadan, the state's capital and administrative centre, is, however, also inhabited by members of other ethnic groups, who have immigrated for business, education, or other reasons. About 10% of the city's residents are of Hausa–Fulani, Igbo, or Efik–Ibibio descent. The population is about 55% Muslim and 45% Christian.

The population of the Ibadan metropolitan area is estimated to have been 2 549 265 in 2006 (at the census). The average annual population-at-risk estimates corresponding to the IBCR data presented in this volume are shown in the population pyramid.

Nigeria, Ibadan (2006–2009)
Population pyramid (average annual person-years by sex and age group)



Source: National Population Commission of Nigeria, 2006 Population and Housing Census (Abuja, April 2010), 2006 population estimates for the city of Ibadan

The registry collects cases from the local governments of the 11 LGAs within the Ibadan metropolitan area. The registry also receives cases from facilities such as the Baptist Medical Centre and the Ladoke Akintola University of Technology teaching hospital (in the Ogbomosho North LGA), the Obafemi Awolowo University Teaching Hospitals Complex (in the Ife North LGA), and many other public and private hospitals.

Specialist cancer treatment services, including radiotherapy, are available at the UCH. The UCH pathology laboratory provides histology, fine-needle aspiration cytology (FNAC), and other diagnostic cytology services, and is a major source of information for the registry. Registry staff members regularly visit the UCH haematology department to collect information from the reports on haematological malignancies. There are two state hospitals (Adeoyo Maternity Hospital and Ring Road Hospital) and several private hospitals that provide general medical, gynaecological, and paediatric services to the population. There are also two new private pathology laboratories in the registry area.

The IBCR uses active data collection. The registry collects cases from more than 30 data sources within general hospitals, teaching hospitals, pathology laboratories, and some private hospitals and clinics, as well as a hospice located within the UCH. During visits to these sources, registry staff members examine the records kept by the medical records departments and the registers of the individual departments that diagnose and treat cancer. This is done in order to identify and abstract information on cancer cases diagnosed by any method among residents of the registration area. Although cancer is not a notifiable disease in Nigeria, some registration forms are received from private practitioners. In addition to the monthly visits to hospitals outside the registration area, arrangements are being made to have the hospitals notify the registry of resident cancer cases directly. The registry is also in negotiation to obtain reports from the two new private laboratories operating within the registration area.

Death certificates are issued at UCH, but the death registration system in Oyo State is inadequate and incomplete.

The registry has used IARC's CanReg4 software for data entry and management since 1997. Cases are coded according to ICD-O-3. Ambiguous cases are clarified with the pathologists. Random checks for completeness and accuracy are performed via re-abstraction and recoding. The data are periodically reviewed to check for duplicate registrations and confirm multiple primaries. Registry staff members also review hospital mortality records to help ascertain cases.

Electronic data are password-protected, and access is restricted to authorized registry personnel.

YEARS PRESENTED
2006–2009 (a 4-year period)

NOTES
From the 10 years of data available (2003–2012), the period of 2006–2009 was selected for analysis, because the average rate of registration during those 4 years (78 cases per month) was significantly higher than the average rates during the 3-year periods before and after (59 and 56 cases per month, respectively).

The age-standardized incidence rate (ASR) of cancer at all anatomical sites combined (excluding non-melanoma skin cancer) is 84.9 cases per 100 000 person-years in males and 115.6 cases per 100 000 person-years in females. These values are very close to the values for western Africa reported in GLOBOCAN 2012. However, there is some variability by anatomical site, with fairly low rates of liver cancer and high rates of colorectal cancer and non-Hodgkin lymphoma.

The modest overall percentage of microscopically verified cases (MV%) is plausible (67% in males and 74% in females) and is consistent with the methods typically used to diagnose cases occurring at certain internal anatomical sites (e.g. the liver and pancreas). However, the very low percentage of cases diagnosed without tissue examination among leukaemias (12.5% in males and 5.9% in females) and lymphomas (slightly more than half) seems unlikely.

SUMMARY
In a report for 2009–2012, the registry staff described problems with case finding due to financial constraints; these problems likely result in some degree of underenumeration. The relative frequency of large bowel cancers in clinical experience in Ibadan has also been described (Irabor et al., 2010).

PUBLICATIONS AND ACHIEVEMENTS
IBCR data were featured in Volumes I–III of *Cancer Incidence in Five Continents* and Volumes I and II of *International Incidence of Childhood Cancer*. The registry has also participated in a variety of research studies. Listed here are some of the landmark publications directly derived from IBCR data.

Abioye AA (1981). The Ibadan Cancer Registry, 1960–1980. In: Olatunsbosun DA, editor. Cancer in Africa. Proceedings of a workshop of the West African College of Physicians, 6–9 July 1981, Monrovia, Liberia. Ibadan: Caxton Press (West Africa); pp. 1–32.

Akang EE (2000). Epidemiology of cancer in Ibadan: tumours in childhood. Arch Ibadan Med. 1(2):7–9. http://dx.doi.org/10.4314/aim.v1i2.34537

Attah B, Hendrickse ML (1977). Patient dynamics in cancer registration: Ibadan Cancer Registry. Nigerian Med J. 7(4).

Irabor DO, Arowolo A, Afolabi AA (2010). Colon and rectal cancer in Ibadan, Nigeria: an update. Colorectal Dis. 12(7 Online):e43–9. http://dx.doi.org/10.1111/j.1463-1318.2009.01928.x PMID:19438886

Ogunbiyi JO (2000). Epidemiology of cancer in Ibadan: tumours in adults. Archives of Ibadan Medicine. 1(2):9–12. http://dx.doi.org/10.4314/aim.v1i2.34538

Ogunbiyi JO, Fabowale AO, Ladipo AA (2010). Cancer incidence and top ten cancers in eleven local government areas in Ibadan and environs 2004–2008. Ibadan Cancer Registry Technical Report. October 2010.

Ojesina AI, Akang EE, Ojemakinde KO (2002). Decline in the frequency of Burkitt's lymphoma relative to other childhood malignancies in Ibadan, Nigeria. Ann Trop Paediatr. 22(2):159–63. http://dx.doi.org/10.1179/027249302125000887 PMID:12070951

Thomas JO (2000). Cancer registration and diagnosis in Ibadan. Archives of Ibadan Medicine. 1(2):5–6. http://dx.doi.org/10.4314/aim.v1i2.34536

Nigeria, Ibadan (2006–2009)

Number of cases by age group and summary rates of incidence: males

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	16	1	75		-	-	-	-	-	2	-	-	1	2	1	2	2	1	2	2	0.6	1.0	0.11	**0.9**	C00-06
Salivary gland	13	0	85		-	-	1	-	2	1	-	-	1	1	1	1	1	3	1	-	0.5	0.8	0.10	**0.7**	C07-08
Nasopharynx	37	0	86		-	-	1	5	4	7	2	3	5	-	3	1	4	1	-	1	1.4	2.4	0.14	**1.6**	C11
Other pharynx	7	0	71		-	-	-	-	1	-	-	1	1	1	-	2	-	1	-	-	0.3	0.5	0.04	**0.4**	C09-10, C12-14
Oesophagus	16	0	56		-	-	1	-	-	-	-	-	-	3	1	1	2	2	3	3	0.6	1.0	0.13	**1.0**	C15
Stomach	49	0	59		-	-	-	1	-	-	2	4	3	8	11	2	3	7	3	5	1.9	3.2	0.32	**2.8**	C16
Colon	51	0	82		-	-	1	-	1	3	6	3	1	2	7	2	3	13	5	4	1.9	3.3	0.40	**3.0**	C18
Rectum	69	0	70		-	-	-	-	2	2	3	5	9	10	5	12	6	6	3	6	2.6	4.5	0.43	**3.9**	C19-20
Anus	13	0	69		-	-	-	-	-	1	1	2	2	-	-	-	5	2	-	-	0.5	0.8	0.09	**0.8**	C21
Liver	122	1	16		-	1	5	-	2	8	16	16	8	14	17	3	9	11	4	7	4.6	7.9	0.64	**6.1**	C22
Gallbladder etc.	6	0	17		-	-	-	-	-	-	-	-	-	1	-	-	2	-	2	1	0.2	0.4	0.06	**0.4**	C23-24
Pancreas	34	0	15		-	-	-	-	-	-	2	1	2	1	2	5	7	7	6	1	1.3	2.2	0.33	**2.2**	C25
Larynx	39	0	87		1	-	-	-	-	-	-	1	3	3	9	7	4	3	6	2	1.5	2.5	0.32	**2.4**	C32
Trachea, bronchus, and lung	35	1	60		-	-	-	-	-	-	2	1	1	1	7	6	5	3	5	3	1.3	2.3	0.28	**2.1**	C33-34
Bone	61	1	80		1	1	7	3	4	11	2	2	3	1	7	4	2	2	5	5	2.3	3.9	0.28	**2.8**	C40-41
Melanoma of skin	8	0	88		-	-	-	-	-	-	-	-	-	2	-	1	1	2	-	2	0.3	0.5	0.05	**0.5**	C43
Non-melanoma skin	89	0	87		2	1	1	5	4	6	4	8	11	7	12	4	6	9	4	5	3.4		0.49	**4.6**	C44
Mesothelioma	1	0	100		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1	0.00	**0.0**	C45
Kaposi sarcoma	11	0	82		-	1	1	-	1	-	2	3	2	-	-	-	1	-	-	-	0.4	0.7	0.04	**0.4**	C46
Connective and soft tissue	64	0	66		3	1	4	4	9	9	3	7	3	5	3	1	3	3	2	4	2.4	4.1	0.25	**2.8**	C47, C49
Breast	23	0	48		-	-	-	-	-	-	-	1	1	3	3	1	6	1	1	6	0.9	1.5	0.13	**1.4**	C50
Penis	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C60
Prostate	438	0	79		-	-	-	-	-	-	-	-	3	5	28	36	73	65	96	132	16.5	28.3	3.64	**27.7**	C61
Testis	5	0	40		-	1	-	2	1	1	-	-	-	-	-	-	-	-	-	-	0.2	0.3	0.01	**0.2**	C62
Kidney and renal pelvis	14	0	71		3	1	2	1	-	-	1	-	-	2	1	-	3	-	-	-	0.5	0.9	0.06	**0.6**	C64-65
Bladder	31	0	84		1	-	-	-	1	-	-	-	3	3	1	4	2	3	6	7	1.2	2.0	0.23	**1.8**	C67
Ureter and other urinary	1	0	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	0.0	0.1	0.02	**0.1**	C66, C68
Eye	30	0	83		15	6	1	1	-	-	1	1	1	-	2	-	1	-	-	1	1.1	1.9	0.06	**1.1**	C69
Brain and nervous system	39	0	82		4	3	2	2	3	1	4	3	6	5	1	4	-	1	-	-	1.5	2.5	0.14	**1.7**	C70-72
Thyroid	12	0	75		-	-	-	-	2	1	1	2	-	3	1	-	-	1	-	1	0.5	0.8	0.05	**0.6**	C73
Hodgkin lymphoma	15	0	47		-	1	2	4	1	-	1	1	-	1	1	2	1	-	-	-	0.6	1.0	0.06	**0.7**	C81
Non-Hodgkin lymphoma	130	0	59		2	18	10	9	4	5	10	12	3	12	10	4	10	13	5	3	4.9	8.4	0.66	**6.2**	C82-85, C96
Multiple myeloma	14	0	21		-	-	-	-	-	-	-	-	3	1	1	1	2	4	1	1	0.5	0.9	0.12	**0.9**	C90
Lymphoid leukaemia	19	0	21		-	1	-	1	-	-	-	-	-	1	3	2	2	2	5	2	0.7	1.2	0.17	**1.2**	C91
Myeloid leukaemia	25	0	8		-	1	1	1	1	1	5	1	3	4	1	1	2	2	1	-	0.9	1.6	0.13	**1.2**	C92-94
Leukaemia, unspecified	4	0	0		1	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	0.2	0.3	0.02	**0.2**	C95
Other and unspecified	96	0	93		3	6	1	7	6	5	5	8	7	10	9	4	8	5	5	7	3.6	6.2	0.47	**4.7**	O&U
All sites	1637	4	68		37	43	42	46	49	64	73	86	86	112	149	113	177	173	172	211	61.8		10.46	**89.5**	C00-96
All sites except C44	1548	4	67		35	42	41	41	45	58	69	78	75	105	137	109	171	164	168	206	58.5	100.0	9.97	**84.9**	C00-96 exc. C44
Average annual population					89079	81902	71795	64163	65185	62796	49423	39466	33292	26758	22050	14802	14051	8883	7622	10551	661818				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

Nigeria, Ibadan (2006–2009)

Number of cases by age group and summary rates of incidence: females

Site	All ages	Age unk	MV %	DCO %	Age group (years) 0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	Crude rate	%	CR 74	ASR (W)	ICD-10
Mouth	19	0	100		2	-	1	-	1	-	-	1	-	-	2	2	4	1	1	4	0.7	0.9	0.10	**1.0**	C00-06
Salivary gland	10	0	90		-	-	-	-	1	-	1	-	3	2	-	1	1	-	-	1	0.4	0.5	0.04	**0.5**	C07-08
Nasopharynx	9	0	100		-	-	-	2	3	-	1	-	1	1	-	-	1	-	-	-	0.3	0.4	0.03	**0.4**	C11
Other pharynx	6	0	100		-	-	-	-	-	-	1	-	-	-	-	-	-	2	1	2	0.2	0.3	0.05	**0.3**	C09-10, C12-14
Oesophagus	7	0	71		-	-	-	-	-	-	1	-	1	1	-	-	1	1	1	1	0.3	0.3	0.05	**0.4**	C15
Stomach	24	0	62		-	-	-	-	-	1	3	1	2	3	2	2	3	2	1	4	0.9	1.1	0.13	**1.3**	C16
Colon	49	0	78		-	-	-	-	1	2	1	1	5	6	3	3	11	7	6	3	1.8	2.3	0.39	**2.9**	C18
Rectum	46	1	72		-	-	-	-	2	3	5	6	2	4	4	4	5	3	5	2	1.7	2.1	0.30	**2.4**	C19-20
Anus	17	0	82		-	-	-	-	-	3	1	1	1	-	3	2	2	1	2	1	0.6	0.8	0.11	**0.9**	C21
Liver	47	0	30		-	-	-	-	2	2	2	3	7	5	5	4	7	-	6	4	1.7	2.2	0.29	**2.4**	C22
Gallbladder etc.	2	0	100		-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	0.1	0.1	0.02	**0.1**	C23-24
Pancreas	21	0	29		-	-	-	-	-	-	1	3	2	-	3	3	6	-	2	1	0.8	1.0	0.14	**1.2**	C25
Larynx	7	0	100		-	-	-	-	-	-	-	-	-	-	-	1	3	1	1	1	0.3	0.3	0.06	**0.5**	C32
Trachea, bronchus, and lung	23	0	74		-	-	-	-	2	1	1	1	1	1	5	2	2	2	3	2	0.8	1.1	0.16	**1.2**	C33-34
Bone	49	0	86		1	-	3	2	6	7	3	7	3	3	2	2	4	2	1	3	1.8	2.3	0.20	**2.1**	C40-41
Melanoma of skin	14	0	50		-	-	-	-	-	-	1	-	2	1	1	-	2	3	1	3	0.5	0.6	0.10	**0.8**	C43
Non-melanoma skin	57	0	88		1	1	-	3	2	4	8	3	1	6	7	5	5	1	4	6	2.1		0.28	**2.7**	C44
Mesothelioma	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C45
Kaposi sarcoma	7	0	100		-	-	-	-	-	2	2	1	-	-	-	1	-	-	-	1	0.3	0.3	0.02	**0.3**	C46
Connective and soft tissue	47	0	72		6	-	1	-	3	3	6	1	5	3	5	4	6	-	2	2	1.7	2.2	0.22	**2.2**	C47, C49
Breast	747	4	74		-	-	1	-	8	25	66	86	101	130	108	75	59	36	24	24	27.4	34.3	4.23	**39.6**	C50
Vulva	5	0	100		-	1	-	-	-	-	2	-	-	-	1	-	1	-	-	-	0.2	0.2	0.02	**0.2**	C51
Vagina	7	0	86		-	-	-	-	-	-	-	-	-	1	2	-	2	2	-	-	0.3	0.3	0.06	**0.5**	C52
Cervix uteri	455	2	80		-	1	-	-	-	6	10	28	42	56	79	45	66	55	35	30	16.7	20.9	3.33	**27.0**	C53
Uterus	66	0	85		-	-	-	-	-	1	1	2	4	6	10	5	12	10	7	8	2.4	3.0	0.51	**4.0**	C54-55
Ovary	96	0	88		2	-	-	2	4	9	8	9	10	14	11	7	4	3	9	4	3.5	4.4	0.53	**4.7**	C56
Placenta	12	0	42		-	-	-	-	2	5	2	1	2	-	-	-	-	-	-	-	0.4	0.6	0.03	**0.4**	C58
Kidney and renal pelvis	19	0	74		4	-	-	1	2	-	2	2	-	1	2	1	3	-	1	-	0.7	0.9	0.09	**0.9**	C64-65
Bladder	13	0	77		-	-	-	-	1	-	-	-	1	2	3	2	-	1	1	2	0.5	0.6	0.08	**0.7**	C67
Ureter and other urinary	0	0	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	**0.0**	C66, C68
Eye	29	0	83		16	2	-	1	-	1	2	-	1	-	2	-	2	-	1	1	1.1	1.3	0.08	**1.1**	C69
Brain and nervous system	35	0	83		9	1	-	3	-	3	3	3	1	4	3	1	-	1	1	2	1.3	1.6	0.12	**1.5**	C70-72
Thyroid	46	0	78		-	1	3	1	6	-	4	6	2	4	4	7	3	2	2	1	1.7	2.1	0.25	**2.3**	C73
Hodgkin lymphoma	9	0	56		-	-	-	-	-	1	1	-	1	2	-	1	-	-	1	2	0.3	0.4	0.04	**0.4**	C81
Non-Hodgkin lymphoma	80	0	62		2	6	10	5	1	8	5	6	6	4	6	3	7	3	4	4	2.9	3.7	0.35	**3.5**	C82-85, C96
Multiple myeloma	14	0	7		-	-	-	-	-	-	-	1	-	1	1	2	1	4	2	2	0.5	0.6	0.13	**0.9**	C90
Lymphoid leukaemia	16	0	6		-	-	1	-	1	2	-	-	3	1	2	-	2	1	1	2	0.6	0.7	0.08	**0.8**	C91
Myeloid leukaemia	14	0	7		-	-	-	1	1	1	1	1	-	1	3	3	1	1	-	-	0.5	0.6	0.08	**0.8**	C92-94
Leukaemia, unspecified	4	0	0		-	-	-	-	1	-	1	1	-	1	-	-	-	-	-	-	0.1	0.2	0.01	**0.2**	C95
Other and unspecified	105	1	82		2	3	3	3	4	3	10	7	6	12	12	8	7	9	5	10	3.9	4.8	0.57	**5.3**	O&U
All sites	2233	8	74		45	16	23	24	54	93	156	182	216	277	291	196	233	154	132	133	81.9		13.30	**118.3**	C00-96
All sites except C44	2176	8	74		44	15	23	21	52	89	148	179	215	271	284	191	228	153	128	127	79.8	100.0	13.02	**115.6**	C00-96 exc. C44
Average annual population					87031	79907	72052	65628	71466	71784	53365	40621	32729	24555	23608	13026	15899	8373	7818	13467	681329				

For definitions and explanations of the terms and abbreviations used in this table, see the corresponding text in Chapter 2 (*Tables of incidence by registry*, p. 3).

CHAPTER 5
Data quality indicators tables

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

All sites

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	1227	54.1	n/a	1505	68.1	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	1282	84.3	n/a	2622	86.8	n/a
France, Réunion (2011)	1199	92.8	n/a	1007	96.1	n/a
Kenya, Eldoret (2008–2011)	1437	76.0	16.1	1486	77.7	13.1
Kenya, Nairobi (2007–2011)	4166	78.4	7.1	5660	79.8	5.5
Malawi, Blantyre (2009–2010)	1045	35.1	n/a	1348	47.5	n/a
Mauritius (2010–2012)	2363	91.9	n/a	3377	92.8	n/a
Mozambique, Beira (2009–2013)	971	97.9	n/a	1004	96.3	n/a
Seychelles (2009–2012)	352	82.4	4.5	261	86.6	2.7
Uganda, Kampala (2008–2012)	3586	54.2	n/a	4362	55.2	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	1127	61.7	15.7	1784	68.5	12.1
Zimbabwe, Harare: Black (2010–2012)	2344	68.9	14.0	3047	77.4	10.7
Africa, southern						
Botswana (2005–2008)	2921	74.5	n/a	3449	84.4	n/a
Namibia (2009)	1518	90.2	n/a	1256	94.3	n/a
South Africa (2007)	25335	100.0	n/a	26906	100.0	n/a
South Africa, Eastern Cape (2008–2012)	1230	54.7	n/a	2113	65.6	n/a
Africa, western						
Benin, Cotonou (2013–2015)	276	59.8	n/a	381	71.4	n/a
Côte d´Ivoire, Abidjan (2012–2013)	957	53.1	n/a	1524	65.3	n/a
The Gambia (2007–2011)	1332	16.2	n/a	1185	33.5	n/a
Guinea, Conakry (2001–2010)	1989	48.4	n/a	2892	64.0	n/a
Mali, Bamako (2010–2014)	3299	79.8	1.9	4509	85.0	1.2
Niger, Niamey (2006–2009)	642	39.3	n/a	941	42.2	n/a
Nigeria, Abuja (2013)	143	97.2	n/a	235	91.9	n/a
Nigeria, Calabar (2009–2013)	320	98.8	n/a	399	94.5	n/a
Nigeria, Ibadan (2006–2009)	1637	67.6	n/a	2233	74.4	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Lip, oral cavity, and pharynx, except nasopharynx (C00-14 exc. C11)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	21	76.2	n/a	15	80.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	38	92.1	n/a	38	94.7	n/a
France, Réunion (2011)	94	97.9	n/a	20	100.0	n/a
Kenya, Eldoret (2008–2011)	36	91.7	8.3	20	80.0	10.0
Kenya, Nairobi (2007–2011)	290	82.1	5.5	192	86.5	6.8
Malawi, Blantyre (2009–2010)	12	83.3	n/a	10	70.0	n/a
Mauritius (2010–2012)	163	99.4	n/a	74	98.6	n/a
Mozambique, Beira (2009–2013)	28	100.0	n/a	13	100.0	n/a
Seychelles (2009–2012)	56	94.6	1.8	7	100.0	0.0
Uganda, Kampala (2008–2012)	111	62.2	n/a	59	61.0	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	18	94.4	0.0	8	100.0	0.0
Zimbabwe, Harare: Black (2010–2012)	47	95.7	2.1	32	87.5	6.2
Africa, southern						
Botswana (2005–2008)	226	99.1	n/a	66	97.0	n/a
Namibia (2009)	94	97.9	n/a	44	97.7	n/a
South Africa (2007)	1119	100.0	n/a	472	100.0	n/a
South Africa, Eastern Cape (2008–2012)	97	85.6	n/a	34	67.6	n/a
Africa, western						
Benin, Cotonou (2013–2015)	2	100.0	n/a	6	50.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	31	54.8	n/a	33	63.6	n/a
The Gambia (2007–2011)	13	53.8	n/a	8	87.5	n/a
Guinea, Conakry (2001–2010)	52	80.8	n/a	55	87.3	n/a
Mali, Bamako (2010–2014)	87	92.0	0.0	93	84.9	3.2
Niger, Niamey (2006–2009)	26	50.0	n/a	22	68.2	n/a
Nigeria, Abuja (2013)	6	100.0	n/a	3	100.0	n/a
Nigeria, Calabar (2009–2013)	4	75.0	n/a	3	100.0	n/a
Nigeria, Ibadan (2006–2009)	36	77.8	n/a	35	97.1	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Nasopharynx (C11)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	6	83.3	n/a	4	75.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	23	95.7	n/a	16	87.5	n/a
France, Réunion (2011)	4	100.0	n/a	2	100.0	n/a
Kenya, Eldoret (2008–2011)	62	90.3	6.5	28	96.4	0.0
Kenya, Nairobi (2007–2011)	203	90.6	1.5	62	85.5	3.2
Malawi, Blantyre (2009–2010)	4	75.0	n/a	1	0.0	n/a
Mauritius (2010–2012)	18	94.4	n/a	2	100.0	n/a
Mozambique, Beira (2009–2013)	0	–	n/a	0	–	n/a
Seychelles (2009–2012)	0	–	–	0	–	–
Uganda, Kampala (2008–2012)	62	62.9	n/a	39	53.8	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	5	100.0	0.0	2	100.0	0.0
Zimbabwe, Harare: Black (2010–2012)	17	94.1	5.9	8	75.0	12.5
Africa, southern						
Botswana (2005–2008)	31	96.8	n/a	16	93.8	n/a
Namibia (2009)	8	100.0	n/a	4	100.0	n/a
South Africa (2007)	43	100.0	n/a	28	100.0	n/a
South Africa, Eastern Cape (2008–2012)	2	100.0	n/a	2	100.0	n/a
Africa, western						
Benin, Cotonou (2013–2015)	4	75.0	n/a	2	100.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	7	71.4	n/a	1	100.0	n/a
The Gambia (2007–2011)	1	0.0	n/a	0	–	n/a
Guinea, Conakry (2001–2010)	2	100.0	n/a	0	–	n/a
Mali, Bamako (2010–2014)	6	83.3	0.0	3	100.0	0.0
Niger, Niamey (2006–2009)	5	40.0	n/a	2	50.0	n/a
Nigeria, Abuja (2013)	4	100.0	n/a	0	–	n/a
Nigeria, Calabar (2009–2013)	4	100.0	n/a	4	100.0	n/a
Nigeria, Ibadan (2006–2009)	37	86.5	n/a	9	100.0	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Oesophagus (C15)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	7	42.9	n/a	2	50.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	39	87.2	n/a	61	75.4	n/a
France, Réunion (2011)	32	96.9	n/a	7	100.0	n/a
Kenya, Eldoret (2008–2011)	223	80.7	8.5	123	87.0	7.3
Kenya, Nairobi (2007–2011)	319	77.1	7.2	250	73.2	6.4
Malawi, Blantyre (2009–2010)	153	19.0	n/a	91	16.5	n/a
Mauritius (2010–2012)	62	100.0	n/a	28	92.9	n/a
Mozambique, Beira (2009–2013)	28	85.7	n/a	16	56.2	n/a
Seychelles (2009–2012)	12	91.7	0.0	3	100.0	0.0
Uganda, Kampala (2008–2012)	284	35.2	n/a	176	40.3	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	104	44.2	24.0	56	44.6	35.7
Zimbabwe, Harare: Black (2010–2012)	126	57.9	15.1	108	42.6	27.8
Africa, southern						
Botswana (2005–2008)	243	87.7	n/a	112	89.3	n/a
Namibia (2009)	11	90.9	n/a	1	100.0	n/a
South Africa (2007)	993	100.0	n/a	679	100.0	n/a
South Africa, Eastern Cape (2008–2012)	370	37.8	n/a	413	35.4	n/a
Africa, western						
Benin, Cotonou (2013–2015)	15	73.3	n/a	8	50.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	3	100.0	n/a	3	33.3	n/a
The Gambia (2007–2011)	22	13.6	n/a	9	0.0	n/a
Guinea, Conakry (2001–2010)	13	69.2	n/a	3	100.0	n/a
Mali, Bamako (2010–2014)	76	80.3	0.0	66	77.3	0.0
Niger, Niamey (2006–2009)	13	38.5	n/a	2	100.0	n/a
Nigeria, Abuja (2013)	2	100.0	n/a	0	–	n/a
Nigeria, Calabar (2009–2013)	0	–	n/a	0	–	n/a
Nigeria, Ibadan (2006–2009)	16	56.2	n/a	7	71.4	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Stomach (C16)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	39	56.4	n/a	28	50.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	51	68.6	n/a	38	78.9	n/a
France, Réunion (2011)	77	96.1	n/a	37	97.3	n/a
Kenya, Eldoret (2008–2011)	74	87.8	5.4	59	79.7	6.8
Kenya, Nairobi (2007–2011)	225	70.7	12.0	174	69.0	13.2
Malawi, Blantyre (2009–2010)	18	77.8	n/a	15	53.3	n/a
Mauritius (2010–2012)	139	96.4	n/a	77	97.4	n/a
Mozambique, Beira (2009–2013)	4	100.0	n/a	2	100.0	n/a
Seychelles (2009–2012)	6	83.3	0.0	5	100.0	0.0
Uganda, Kampala (2008–2012)	81	38.3	n/a	48	35.4	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	21	81.0	9.5	29	62.1	20.7
Zimbabwe, Harare: Black (2010–2012)	136	69.1	18.4	128	69.5	17.2
Africa, southern						
Botswana (2005–2008)	24	79.2	n/a	13	84.6	n/a
Namibia (2009)	25	100.0	n/a	15	100.0	n/a
South Africa (2007)	626	100.0	n/a	396	100.0	n/a
South Africa, Eastern Cape (2008–2012)	21	52.4	n/a	24	41.7	n/a
Africa, western						
Benin, Cotonou (2013–2015)	24	58.3	n/a	6	66.7	n/a
Côte d´Ivoire, Abidjan (2012–2013)	36	63.9	n/a	23	60.9	n/a
The Gambia (2007–2011)	39	30.8	n/a	12	41.7	n/a
Guinea, Conakry (2001–2010)	114	39.5	n/a	61	42.6	n/a
Mali, Bamako (2010–2014)	443	77.9	1.8	332	78.6	0.9
Niger, Niamey (2006–2009)	28	53.6	n/a	15	20.0	n/a
Nigeria, Abuja (2013)	8	100.0	n/a	2	100.0	n/a
Nigeria, Calabar (2009–2013)	5	100.0	n/a	4	100.0	n/a
Nigeria, Ibadan (2006–2009)	49	59.2	n/a	24	62.5	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Colon (C18)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	33	66.7	n/a	27	63.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	83	81.9	n/a	92	69.6	n/a
France, Réunion (2011)	79	100.0	n/a	75	96.0	n/a
Kenya, Eldoret (2008–2011)	31	74.2	6.5	23	78.3	17.4
Kenya, Nairobi (2007–2011)	223	68.2	8.5	158	77.2	7.0
Malawi, Blantyre (2009–2010)	14	64.3	n/a	10	60.0	n/a
Mauritius (2010–2012)	178	100.0	n/a	173	98.3	n/a
Mozambique, Beira (2009–2013)	0	–	n/a	2	100.0	n/a
Seychelles (2009–2012)	34	82.4	8.8	15	66.7	13.3
Uganda, Kampala (2008–2012)	62	46.8	n/a	62	46.8	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	33	84.8	12.1	27	77.8	7.4
Zimbabwe, Harare: Black (2010–2012)	60	81.7	10.0	56	75.0	14.3
Africa, southern						
Botswana (2005–2008)	39	97.4	n/a	42	92.9	n/a
Namibia (2009)	27	100.0	n/a	34	100.0	n/a
South Africa (2007)	722	100.0	n/a	612	100.0	n/a
South Africa, Eastern Cape (2008–2012)	21	52.4	n/a	30	50.0	n/a
Africa, western						
Benin, Cotonou (2013–2015)	10	60.0	n/a	10	80.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	40	67.5	n/a	26	65.4	n/a
The Gambia (2007–2011)	4	25.0	n/a	3	66.7	n/a
Guinea, Conakry (2001–2010)	27	81.5	n/a	13	100.0	n/a
Mali, Bamako (2010–2014)	111	79.3	0.9	114	84.2	0.0
Niger, Niamey (2006–2009)	31	48.4	n/a	26	38.5	n/a
Nigeria, Abuja (2013)	9	100.0	n/a	3	100.0	n/a
Nigeria, Calabar (2009–2013)	11	100.0	n/a	7	100.0	n/a
Nigeria, Ibadan (2006–2009)	51	82.4	n/a	49	77.6	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Liver (C22)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	165	36.4	n/a	70	32.9	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	46	54.3	n/a	47	42.6	n/a
France, Réunion (2011)	35	57.1	n/a	13	69.2	n/a
Kenya, Eldoret (2008–2011)	52	67.3	21.2	32	78.1	6.2
Kenya, Nairobi (2007–2011)	196	71.9	16.8	106	64.2	19.8
Malawi, Blantyre (2009–2010)	18	55.6	n/a	18	44.4	n/a
Mauritius (2010–2012)	31	93.5	n/a	18	88.9	n/a
Mozambique, Beira (2009–2013)	17	94.1	n/a	13	84.6	n/a
Seychelles (2009–2012)	7	42.9	28.6	2	50.0	50.0
Uganda, Kampala (2008–2012)	201	39.3	n/a	163	33.7	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	67	59.7	34.3	46	50.0	39.1
Zimbabwe, Harare: Black (2010–2012)	119	17.6	31.1	82	18.3	24.4
Africa, southern						
Botswana (2005–2008)	152	67.1	n/a	82	62.2	n/a
Namibia (2009)	29	55.2	n/a	19	84.2	n/a
South Africa (2007)	173	100.0	n/a	74	100.0	n/a
South Africa, Eastern Cape (2008–2012)	62	45.2	n/a	42	64.3	n/a
Africa, western						
Benin, Cotonou (2013–2015)	16	12.5	n/a	5	0.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	179	14.0	n/a	84	15.5	n/a
The Gambia (2007–2011)	774	0.8	n/a	270	2.2	n/a
Guinea, Conakry (2001–2010)	706	3.5	n/a	384	3.9	n/a
Mali, Bamako (2010–2014)	313	68.7	3.5	104	68.3	5.8
Niger, Niamey (2006–2009)	97	6.2	n/a	36	8.3	n/a
Nigeria, Abuja (2013)	2	100.0	n/a	0	–	n/a
Nigeria, Calabar (2009–2013)	5	100.0	n/a	9	100.0	n/a
Nigeria, Ibadan (2006–2009)	122	15.6	n/a	47	29.8	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Trachea, bronchus, and lung (C33-34)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	14	57.1	n/a	17	52.9	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	59	62.7	n/a	43	69.8	n/a
France, Réunion (2011)	167	85.6	n/a	42	92.9	n/a
Kenya, Eldoret (2008–2011)	21	47.6	42.9	6	33.3	66.7
Kenya, Nairobi (2007–2011)	116	71.6	8.6	74	70.3	10.8
Malawi, Blantyre (2009–2010)	8	37.5	n/a	4	25.0	n/a
Mauritius (2010–2012)	214	90.2	n/a	69	84.1	n/a
Mozambique, Beira (2009–2013)	1	100.0	n/a	1	100.0	n/a
Seychelles (2009–2012)	13	23.1	7.7	10	40.0	0.0
Uganda, Kampala (2008–2012)	43	18.6	n/a	50	28.0	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	22	59.1	27.3	9	33.3	22.2
Zimbabwe, Harare: Black (2010–2012)	95	41.1	31.6	37	45.9	32.4
Africa, southern						
Botswana (2005–2008)	149	84.6	n/a	42	76.2	n/a
Namibia (2009)	24	50.0	n/a	20	65.0	n/a
South Africa (2007)	1409	100.0	n/a	654	100.0	n/a
South Africa, Eastern Cape (2008–2012)	66	63.6	n/a	28	57.1	n/a
Africa, western						
Benin, Cotonou (2013–2015)	3	33.3	n/a	3	33.3	n/a
Côte d´Ivoire, Abidjan (2012–2013)	29	31.0	n/a	25	48.0	n/a
The Gambia (2007–2011)	78	6.4	n/a	13	7.7	n/a
Guinea, Conakry (2001–2010)	99	13.1	n/a	32	6.2	n/a
Mali, Bamako (2010–2014)	86	73.3	3.5	41	78.0	2.4
Niger, Niamey (2006–2009)	4	0.0	n/a	1	0.0	n/a
Nigeria, Abuja (2013)	1	100.0	n/a	3	100.0	n/a
Nigeria, Calabar (2009–2013)	2	100.0	n/a	1	100.0	n/a
Nigeria, Ibadan (2006–2009)	35	60.0	n/a	23	73.9	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Melanoma of skin (C43)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	21	38.1	n/a	23	43.5	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	9	100.0	n/a	2	100.0	n/a
France, Réunion (2011)	15	100.0	n/a	21	95.2	n/a
Kenya, Eldoret (2008–2011)	5	100.0	0.0	16	100.0	0.0
Kenya, Nairobi (2007–2011)	18	94.4	5.6	19	94.7	5.3
Malawi, Blantyre (2009–2010)	5	60.0	n/a	6	100.0	n/a
Mauritius (2010–2012)	5	100.0	n/a	8	100.0	n/a
Mozambique, Beira (2009–2013)	4	100.0	n/a	10	100.0	n/a
Seychelles (2009–2012)	1	100.0	0.0	1	100.0	0.0
Uganda, Kampala (2008–2012)	16	68.8	n/a	29	55.2	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	9	100.0	0.0	7	100.0	0.0
Zimbabwe, Harare: Black (2010–2012)	18	100.0	0.0	41	97.6	2.4
Africa, southern						
Botswana (2005–2008)	31	100.0	n/a	39	100.0	n/a
Namibia (2009)	25	100.0	n/a	20	100.0	n/a
South Africa (2007)	638	100.0	n/a	593	100.0	n/a
South Africa, Eastern Cape (2008–2012)	6	100.0	n/a	14	78.6	n/a
Africa, western						
Benin, Cotonou (2013–2015)	0	–	n/a	1	100.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	2	100.0	n/a	7	85.7	n/a
The Gambia (2007–2011)	5	100.0	n/a	11	90.9	n/a
Guinea, Conakry (2001–2010)	8	87.5	n/a	23	95.7	n/a
Mali, Bamako (2010–2014)	21	95.2	0.0	27	100.0	0.0
Niger, Niamey (2006–2009)	4	100.0	n/a	9	77.8	n/a
Nigeria, Abuja (2013)	0	–	n/a	1	100.0	n/a
Nigeria, Calabar (2009–2013)	3	100.0	n/a	2	100.0	n/a
Nigeria, Ibadan (2006–2009)	8	87.5	n/a	14	50.0	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Non-melanoma skin (C44)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	18	44.4	n/a	12	58.3	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	42	100.0	n/a	81	97.5	n/a
France, Réunion (2011)	40	100.0	n/a	36	100.0	n/a
Kenya, Eldoret (2008–2011)	25	100.0	0.0	30	100.0	0.0
Kenya, Nairobi (2007–2011)	112	90.2	4.5	117	93.2	0.0
Malawi, Blantyre (2009–2010)	16	87.5	n/a	27	88.9	n/a
Mauritius (2010–2012)	195	100.0	n/a	160	100.0	n/a
Mozambique, Beira (2009–2013)	49	100.0	n/a	52	92.3	n/a
Seychelles (2009–2012)	11	90.9	9.1	2	100.0	0.0
Uganda, Kampala (2008–2012)	61	68.9	n/a	52	67.3	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	29	96.6	0.0	38	94.7	0.0
Zimbabwe, Harare: Black (2010–2012)	65	100.0	0.0	72	98.6	1.4
Africa, southern						
Botswana (2005–2008)	112	100.0	n/a	98	99.0	n/a
Namibia (2009)	569	100.0	n/a	327	100.0	n/a
South Africa (2007)	7123	100.0	n/a	4797	100.0	n/a
South Africa, Eastern Cape (2008–2012)	12	83.3	n/a	11	81.8	n/a
Africa, western						
Benin, Cotonou (2013–2015)	5	80.0	n/a	6	100.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	20	35.0	n/a	26	57.7	n/a
The Gambia (2007–2011)	16	75.0	n/a	9	66.7	n/a
Guinea, Conakry (2001–2010)	81	90.1	n/a	55	89.1	n/a
Mali, Bamako (2010–2014)	94	93.6	0.0	97	90.7	0.0
Niger, Niamey (2006–2009)	43	34.9	n/a	48	52.1	n/a
Nigeria, Abuja (2013)	10	90.0	n/a	7	85.7	n/a
Nigeria, Calabar (2009–2013)	15	100.0	n/a	9	100.0	n/a
Nigeria, Ibadan (2006–2009)	89	86.5	n/a	57	87.7	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Kaposi sarcoma (C46)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	14	35.7	n/a	13	38.5	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	17	82.4	n/a	9	66.7	n/a
France, Réunion (2011)	1	100.0	n/a	0	–	n/a
Kenya, Eldoret (2008–2011)	98	81.6	8.2	65	70.8	7.7
Kenya, Nairobi (2007–2011)	175	84.6	14.9	102	81.4	16.7
Malawi, Blantyre (2009–2010)	453	11.7	n/a	223	13.5	n/a
Mauritius (2010–2012)	0	–	n/a	0	–	n/a
Mozambique, Beira (2009–2013)	613	99.7	n/a	293	100.0	n/a
Seychelles (2009–2012)	0	–	–	0	–	–
Uganda, Kampala (2008–2012)	911	71.6	n/a	651	71.3	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	184	20.7	14.7	100	28.0	15.0
Zimbabwe, Harare: Black (2010–2012)	293	46.1	6.8	182	46.7	6.6
Africa, southern						
Botswana (2005–2008)	773	25.7	n/a	595	31.8	n/a
Namibia (2009)	185	50.3	n/a	78	73.1	n/a
South Africa (2007)	1365	100.0	n/a	1092	100.0	n/a
South Africa, Eastern Cape (2008–2012)	85	47.1	n/a	81	44.4	n/a
Africa, western						
Benin, Cotonou (2013–2015)	0	–	n/a	0	–	n/a
Côte d´Ivoire, Abidjan (2012–2013)	16	93.8	n/a	22	90.9	n/a
The Gambia (2007–2011)	7	28.6	n/a	3	66.7	n/a
Guinea, Conakry (2001–2010)	24	83.3	n/a	11	81.8	n/a
Mali, Bamako (2010–2014)	52	96.2	0.0	25	80.0	4.0
Niger, Niamey (2006–2009)	2	100.0	n/a	2	0.0	n/a
Nigeria, Abuja (2013)	9	88.9	n/a	4	75.0	n/a
Nigeria, Calabar (2009–2013)	15	100.0	n/a	6	100.0	n/a
Nigeria, Ibadan (2006–2009)	11	81.8	n/a	7	100.0	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Breast (C50)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	22	77.3	n/a	491	85.5	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	49	91.8	n/a	849	92.3	n/a
France, Réunion (2011)	4	75.0	n/a	332	99.4	n/a
Kenya, Eldoret (2008–2011)	13	84.6	0.0	187	86.6	4.8
Kenya, Nairobi (2007–2011)	72	73.6	8.3	1529	82.3	3.9
Malawi, Blantyre (2009–2010)	2	50.0	n/a	96	41.7	n/a
Mauritius (2010–2012)	12	100.0	n/a	1266	99.7	n/a
Mozambique, Beira (2009–2013)	6	100.0	n/a	81	97.5	n/a
Seychelles (2009–2012)	1	100.0	0.0	74	87.8	1.4
Uganda, Kampala (2008–2012)	30	43.3	n/a	619	53.0	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	7	100.0	0.0	231	73.6	12.1
Zimbabwe, Harare: Black (2010–2012)	14	85.7	0.0	427	87.1	8.0
Africa, southern						
Botswana (2005–2008)	21	100.0	n/a	510	98.4	n/a
Namibia (2009)	9	100.0	n/a	272	98.2	n/a
South Africa (2007)	121	100.0	n/a	5636	100.0	n/a
South Africa, Eastern Cape (2008–2012)	17	82.4	n/a	306	82.4	n/a
Africa, western						
Benin, Cotonou (2013–2015)	6	83.3	n/a	153	66.7	n/a
Côte d´Ivoire, Abidjan (2012–2013)	12	83.3	n/a	536	79.3	n/a
The Gambia (2007–2011)	2	50.0	n/a	163	69.9	n/a
Guinea, Conakry (2001–2010)	15	86.7	n/a	446	73.5	n/a
Mali, Bamako (2010–2014)	33	97.0	0.0	944	91.1	0.8
Niger, Niamey (2006–2009)	8	37.5	n/a	306	51.0	n/a
Nigeria, Abuja (2013)	4	100.0	n/a	125	88.8	n/a
Nigeria, Calabar (2009–2013)	1	100.0	n/a	164	100.0	n/a
Nigeria, Ibadan (2006–2009)	23	47.8	n/a	747	73.8	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Cervix uteri (C53)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)			n/a	331	70.1	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)			n/a	340	93.5	n/a
France, Réunion (2011)			n/a	60	100.0	n/a
Kenya, Eldoret (2008–2011)				237	83.5	3.4
Kenya, Nairobi (2007–2011)				1139	80.2	3.5
Malawi, Blantyre (2009–2010)			n/a	489	45.2	n/a
Mauritius (2010–2012)			n/a	262	98.5	n/a
Mozambique, Beira (2009–2013)			n/a	302	96.0	n/a
Seychelles (2009–2012)				28	96.4	0.0
Uganda, Kampala (2008–2012)			n/a	1057	55.1	n/a
Zimbabwe, Bulawayo: Black (2011–2013)				657	69.6	6.4
Zimbabwe, Harare: Black (2010–2012)				862	86.2	7.0
Africa, southern						
Botswana (2005–2008)			n/a	795	97.2	n/a
Namibia (2009)			n/a	162	92.0	n/a
South Africa (2007)			n/a	4889	100.0	n/a
South Africa, Eastern Cape (2008–2012)			n/a	734	78.1	n/a
Africa, western						
Benin, Cotonou (2013–2015)			n/a	63	85.7	n/a
Côte d´Ivoire, Abidjan (2012–2013)			n/a	276	67.0	n/a
The Gambia (2007–2011)			n/a	439	23.2	n/a
Guinea, Conakry (2001–2010)			n/a	1251	71.4	n/a
Mali, Bamako (2010–2014)				1140	86.1	0.5
Niger, Niamey (2006–2009)			n/a	88	18.2	n/a
Nigeria, Abuja (2013)			n/a	31	100.0	n/a
Nigeria, Calabar (2009–2013)			n/a	77	85.7	n/a
Nigeria, Ibadan (2006–2009)			n/a	455	79.8	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Uterus (C54-55)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)			n/a	40	47.5	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)			n/a	56	87.5	n/a
France, Réunion (2011)			n/a	34	100.0	n/a
Kenya, Eldoret (2008–2011)				36	86.1	5.6
Kenya, Nairobi (2007–2011)				154	86.4	1.9
Malawi, Blantyre (2009–2010)			n/a	19	89.5	n/a
Mauritius (2010–2012)			n/a	205	99.0	n/a
Mozambique, Beira (2009–2013)			n/a	10	100.0	n/a
Seychelles (2009–2012)				13	84.6	7.7
Uganda, Kampala (2008–2012)			n/a	87	65.5	n/a
Zimbabwe, Bulawayo: Black (2011–2013)				64	57.8	10.9
Zimbabwe, Harare: Black (2010–2012)				77	79.2	11.7
Africa, southern						
Botswana (2005–2008)			n/a	101	97.0	n/a
Namibia (2009)			n/a	32	100.0	n/a
South Africa (2007)			n/a	955	100.0	n/a
South Africa, Eastern Cape (2008–2012)			n/a	67	59.7	n/a
Africa, western						
Benin, Cotonou (2013–2015)			n/a	12	91.7	n/a
Côte d´Ivoire, Abidjan (2012–2013)			n/a	43	60.5	n/a
The Gambia (2007–2011)			n/a	29	20.7	n/a
Guinea, Conakry (2001–2010)			n/a	67	68.7	n/a
Mali, Bamako (2010–2014)				97	83.5	1.0
Niger, Niamey (2006–2009)			n/a	42	61.9	n/a
Nigeria, Abuja (2013)			n/a	7	100.0	n/a
Nigeria, Calabar (2009–2013)			n/a	9	100.0	n/a
Nigeria, Ibadan (2006–2009)			n/a	66	84.8	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Ovary (C56)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)			n/a	88	42.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)			n/a	166	68.7	n/a
France, Réunion (2011)			n/a	36	97.2	n/a
Kenya, Eldoret (2008–2011)				41	73.2	9.8
Kenya, Nairobi (2007–2011)				195	64.6	7.2
Malawi, Blantyre (2009–2010)			n/a	22	90.9	n/a
Mauritius (2010–2012)			n/a	157	92.4	n/a
Mozambique, Beira (2009–2013)			n/a	10	100.0	n/a
Seychelles (2009–2012)				9	77.8	11.1
Uganda, Kampala (2008–2012)			n/a	143	46.9	n/a
Zimbabwe, Bulawayo: Black (2011–2013)				49	59.2	18.4
Zimbabwe, Harare: Black (2010–2012)				72	61.1	16.7
Africa, southern						
Botswana (2005–2008)			n/a	76	90.8	n/a
Namibia (2009)			n/a	26	76.9	n/a
South Africa (2007)			n/a	406	100.0	n/a
South Africa, Eastern Cape (2008–2012)			n/a	58	63.8	n/a
Africa, western						
Benin, Cotonou (2013–2015)			n/a	12	66.7	n/a
Côte d´Ivoire, Abidjan (2012–2013)			n/a	68	51.5	n/a
The Gambia (2007–2011)			n/a	24	62.5	n/a
Guinea, Conakry (2001–2010)			n/a	91	83.5	n/a
Mali, Bamako (2010–2014)				126	87.3	2.4
Niger, Niamey (2006–2009)			n/a	91	33.0	n/a
Nigeria, Abuja (2013)			n/a	8	100.0	n/a
Nigeria, Calabar (2009–2013)			n/a	14	85.7	n/a
Nigeria, Ibadan (2006–2009)			n/a	96	87.5	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Prostate (C61)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	527	50.7	n/a			n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	84	77.4	n/a			n/a
France, Réunion (2011)	289	97.2	n/a			n/a
Kenya, Eldoret (2008–2011)	114	72.8	14.9			
Kenya, Nairobi (2007–2011)	683	74.7	6.3			
Malawi, Blantyre (2009–2010)	41	41.5	n/a			n/a
Mauritius (2010–2012)	297	94.9	n/a			n/a
Mozambique, Beira (2009–2013)	8	75.0	n/a			n/a
Seychelles (2009–2012)	103	74.8	5.8			
Uganda, Kampala (2008–2012)	515	50.5	n/a			n/a
Zimbabwe, Bulawayo: Black (2011–2013)	204	45.1	24.5			
Zimbabwe, Harare: Black (2010–2012)	533	68.5	21.0			
Africa, southern						
Botswana (2005–2008)	210	95.2	n/a			n/a
Namibia (2009)	222	94.6	n/a			n/a
South Africa (2007)	4293	100.0	n/a			n/a
South Africa, Eastern Cape (2008–2012)	182	30.8	n/a			n/a
Africa, western						
Benin, Cotonou (2013–2015)	75	53.3	n/a			n/a
Côte d´Ivoire, Abidjan (2012–2013)	251	66.5	n/a			n/a
The Gambia (2007–2011)	103	30.1	n/a			n/a
Guinea, Conakry (2001–2010)	357	80.7	n/a			n/a
Mali, Bamako (2010–2014)	354	79.1	1.4			
Niger, Niamey (2006–2009)	23	82.6	n/a			n/a
Nigeria, Abuja (2013)	53	100.0	n/a			n/a
Nigeria, Calabar (2009–2013)	150	100.0	n/a			n/a
Nigeria, Ibadan (2006–2009)	438	79.2	n/a			n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Bladder (C67)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	12	50.0	n/a	21	47.6	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	57	77.2	n/a	23	73.9	n/a
France, Réunion (2011)	42	83.3	n/a	16	93.8	n/a
Kenya, Eldoret (2008–2011)	16	100.0	0.0	11	90.9	0.0
Kenya, Nairobi (2007–2011)	70	78.6	8.6	35	82.9	11.4
Malawi, Blantyre (2009–2010)	35	22.9	n/a	37	67.6	n/a
Mauritius (2010–2012)	105	96.2	n/a	31	100.0	n/a
Mozambique, Beira (2009–2013)	15	73.3	n/a	14	100.0	n/a
Seychelles (2009–2012)	9	77.8	0.0	4	75.0	0.0
Uganda, Kampala (2008–2012)	32	40.6	n/a	27	55.6	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	10	40.0	20.0	6	33.3	16.7
Zimbabwe, Harare: Black (2010–2012)	40	42.5	25.0	44	56.8	27.3
Africa, southern						
Botswana (2005–2008)	18	77.8	n/a	15	100.0	n/a
Namibia (2009)	31	100.0	n/a	14	100.0	n/a
South Africa (2007)	666	100.0	n/a	227	100.0	n/a
South Africa, Eastern Cape (2008–2012)	9	66.7	n/a	7	71.4	n/a
Africa, western						
Benin, Cotonou (2013–2015)	7	14.3	n/a	2	100.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	16	25.0	n/a	9	22.2	n/a
The Gambia (2007–2011)	21	28.6	n/a	9	33.3	n/a
Guinea, Conakry (2001–2010)	23	91.3	n/a	10	100.0	n/a
Mali, Bamako (2010–2014)	260	72.3	1.2	169	73.4	1.2
Niger, Niamey (2006–2009)	22	50.0	n/a	9	33.3	n/a
Nigeria, Abuja (2013)	4	100.0	n/a	1	100.0	n/a
Nigeria, Calabar (2009–2013)	2	100.0	n/a	2	100.0	n/a
Nigeria, Ibadan (2006–2009)	31	83.9	n/a	13	76.9	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Conjunctiva: squamous cell carcinoma*

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	3	100.0	n/a	3	66.7	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	11	100.0	n/a	7	100.0	n/a
France, Réunion (2011)	0	–	n/a	0	–	n/a
Kenya, Eldoret (2008–2011)	18	100.0	0.0	13	100.0	0.0
Kenya, Nairobi (2007–2011)	58	94.8	0.0	102	95.1	0.0
Malawi, Blantyre (2009–2010)	14	57.1	n/a	22	95.5	n/a
Mauritius (2010–2012)	1	100.0	n/a	1	100.0	n/a
Mozambique, Beira (2009–2013)	5	80.0	n/a	12	83.3	n/a
Seychelles (2009–2012)	0	–	–	1	100.0	0.0
Uganda, Kampala (2008–2012)	76	93.4	n/a	77	92.2	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	30	93.3	0.0	33	97.0	0.0
Zimbabwe, Harare: Black (2010–2012)	44	100.0	0.0	52	100.0	0.0
Africa, southern						
Botswana (2005–2008)	109	100.0	n/a	153	99.3	n/a
Namibia (2009)	25	100.0	n/a	23	95.7	n/a
South Africa (2007)	111	100.0	n/a	161	100.0	n/a
South Africa, Eastern Cape (2008–2012)	3	100.0	n/a	10	100.0	n/a
Africa, western						
Benin, Cotonou (2013–2015)	0	–	n/a	0	–	n/a
Côte d´Ivoire, Abidjan (2012–2013)	7	100.0	n/a	11	90.9	n/a
The Gambia (2007–2011)	3	100.0	n/a	2	100.0	n/a
Guinea, Conakry (2001–2010)	8	37.5	n/a	6	0.0	n/a
Mali, Bamako (2010–2014)	16	100.0	0.0	25	100.0	0.0
Niger, Niamey (2006–2009)	3	100.0	n/a	1	100.0	n/a
Nigeria, Abuja (2013)	0	–	n/a	2	100.0	n/a
Nigeria, Calabar (2009–2013)	6	100.0	n/a	4	100.0	n/a
Nigeria, Ibadan (2006–2009)	2	100.0	n/a	5	100.0	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

*Includes malignant neoplasm of conjunctiva (C69.0) with unspecified histology or carcinoma NOS (M8000-8034) and squamous cell carcinoma (M8070) of eye NOS (C69.9).

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Brain and nervous system (C70-72)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	7	14.3	n/a	10	20.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	29	69.0	n/a	20	30.0	n/a
France, Réunion (2011)	11	72.7	n/a	9	55.6	n/a
Kenya, Eldoret (2008–2011)	28	82.1	7.1	18	72.2	16.7
Kenya, Nairobi (2007–2011)	94	66.0	7.4	110	70.9	5.5
Malawi, Blantyre (2009–2010)	2	100.0	n/a	3	100.0	n/a
Mauritius (2010–2012)	54	83.3	n/a	52	80.8	n/a
Mozambique, Beira (2009–2013)	2	100.0	n/a	1	100.0	n/a
Seychelles (2009–2012)	1	0.0	0.0	2	0.0	0.0
Uganda, Kampala (2008–2012)	55	29.1	n/a	54	16.7	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	2	50.0	50.0	6	16.7	66.7
Zimbabwe, Harare: Black (2010–2012)	40	37.5	32.5	45	40.0	33.3
Africa, southern						
Botswana (2005–2008)	22	81.8	n/a	21	95.2	n/a
Namibia (2009)	14	57.1	n/a	11	63.6	n/a
South Africa (2007)	158	100.0	n/a	129	100.0	n/a
South Africa, Eastern Cape (2008–2012)	4	75.0	n/a	9	33.3	n/a
Africa, western						
Benin, Cotonou (2013–2015)	2	0.0	n/a	1	0.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	8	50.0	n/a	7	42.9	n/a
The Gambia (2007–2011)	8	75.0	n/a	5	60.0	n/a
Guinea, Conakry (2001–2010)	0	–	n/a	0	–	n/a
Mali, Bamako (2010–2014)	22	50.0	18.2	24	50.0	12.5
Niger, Niamey (2006–2009)	16	0.0	n/a	6	0.0	n/a
Nigeria, Abuja (2013)	1	100.0	n/a	2	50.0	n/a
Nigeria, Calabar (2009–2013)	0	–	n/a	0	–	n/a
Nigeria, Ibadan (2006–2009)	39	82.1	n/a	35	82.9	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Thyroid (C73)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	2	50.0	n/a	10	60.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	37	86.5	n/a	92	91.3	n/a
France, Réunion (2011)	7	85.7	n/a	9	100.0	n/a
Kenya, Eldoret (2008–2011)	8	75.0	12.5	19	94.7	0.0
Kenya, Nairobi (2007–2011)	20	85.0	0.0	84	86.9	2.4
Malawi, Blantyre (2009–2010)	1	0.0	n/a	8	87.5	n/a
Mauritius (2010–2012)	21	95.2	n/a	36	94.4	n/a
Mozambique, Beira (2009–2013)	0	–	n/a	7	85.7	n/a
Seychelles (2009–2012)	0	–	–	7	85.7	0.0
Uganda, Kampala (2008–2012)	16	37.5	n/a	44	75.0	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	4	75.0	25.0	23	65.2	21.7
Zimbabwe, Harare: Black (2010–2012)	5	80.0	0.0	43	72.1	20.9
Africa, southern						
Botswana (2005–2008)	9	88.9	n/a	23	95.7	n/a
Namibia (2009)	2	100.0	n/a	13	100.0	n/a
South Africa (2007)	79	100.0	n/a	225	100.0	n/a
South Africa, Eastern Cape (2008–2012)	3	66.7	n/a	15	66.7	n/a
Africa, western						
Benin, Cotonou (2013–2015)	2	100.0	n/a	3	100.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	2	0.0	n/a	19	52.6	n/a
The Gambia (2007–2011)	8	50.0	n/a	13	92.3	n/a
Guinea, Conakry (2001–2010)	11	81.8	n/a	18	55.6	n/a
Mali, Bamako (2010–2014)	35	94.3	2.9	76	97.4	0.0
Niger, Niamey (2006–2009)	8	87.5	n/a	13	46.2	n/a
Nigeria, Abuja (2013)	1	100.0	n/a	1	100.0	n/a
Nigeria, Calabar (2009–2013)	0	–	n/a	1	100.0	n/a
Nigeria, Ibadan (2006–2009)	12	75.0	n/a	46	78.3	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Lymphoma, including Hodgkin lymphoma (C81-85, C96)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	32	93.8	n/a	36	83.3	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	147	91.2	n/a	100	94.0	n/a
France, Réunion (2011)	38	97.4	n/a	41	100.0	n/a
Kenya, Eldoret (2008–2011)	127	88.2	3.9	79	87.3	2.5
Kenya, Nairobi (2007–2011)	264	95.5	3.0	207	94.7	2.4
Malawi, Blantyre (2009–2010)	101	85.1	n/a	77	77.9	n/a
Mauritius (2010–2012)	90	100.0	n/a	65	100.0	n/a
Mozambique, Beira (2009–2013)	79	100.0	n/a	46	100.0	n/a
Seychelles (2009–2012)	14	100.0	0.0	14	100.0	0.0
Uganda, Kampala (2008–2012)	322	57.8	n/a	254	65.0	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	136	96.3	2.2	146	95.2	4.1
Zimbabwe, Harare: Black (2010–2012)	216	98.6	0.5	206	96.1	2.4
Africa, southern						
Botswana (2005–2008)	213	98.1	n/a	209	97.1	n/a
Namibia (2009)	34	100.0	n/a	27	96.3	n/a
South Africa (2007)	1005	100.0	n/a	867	100.0	n/a
South Africa, Eastern Cape (2008–2012)	26	80.8	n/a	31	74.2	n/a
Africa, western						
Benin, Cotonou (2013–2015)	9	55.6	n/a	8	62.5	n/a
Côte d´Ivoire, Abidjan (2012–2013)	71	91.5	n/a	42	88.1	n/a
The Gambia (2007–2011)	77	49.4	n/a	45	57.8	n/a
Guinea, Conakry (2001–2010)	134	91.8	n/a	85	87.1	n/a
Mali, Bamako (2010–2014)	184	97.8	0.0	95	97.9	0.0
Niger, Niamey (2006–2009)	39	76.9	n/a	24	83.3	n/a
Nigeria, Abuja (2013)	2	100.0	n/a	4	75.0	n/a
Nigeria, Calabar (2009–2013)	27	100.0	n/a	25	84.0	n/a
Nigeria, Ibadan (2006–2009)	145	57.9	n/a	89	61.8	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

Number of cases, percentage of microscopically verified cases (MV%), and percentage of death-certificate-only cases (DCO%), by registry population and sex

Leukaemia (C91-95)

	Males			Females		
	Cases	MV%	DCO%	Cases	MV%	DCO%
Africa, central						
Congo, Brazzaville (2009–2013)	73	100.0	n/a	57	100.0	n/a
Africa, eastern						
Ethiopia, Addis Ababa (2012–2013)	127	95.3	n/a	126	96.0	n/a
France, Réunion (2011)	45	100.0	n/a	28	100.0	n/a
Kenya, Eldoret (2008–2011)	88	90.9	8.0	68	94.1	4.4
Kenya, Nairobi (2007–2011)	137	92.7	7.3	105	86.7	13.3
Malawi, Blantyre (2009–2010)	5	40.0	n/a	4	25.0	n/a
Mauritius (2010–2012)	63	100.0	n/a	51	100.0	n/a
Mozambique, Beira (2009–2013)	1	0.0	n/a	1	0.0	n/a
Seychelles (2009–2012)	11	90.9	0.0	7	85.7	14.3
Uganda, Kampala (2008–2012)	113	26.5	n/a	92	23.9	n/a
Zimbabwe, Bulawayo: Black (2011–2013)	24	95.8	4.2	18	88.9	11.1
Zimbabwe, Harare: Black (2010–2012)	47	91.5	8.5	39	97.4	2.6
Africa, southern						
Botswana (2005–2008)	55	98.2	n/a	61	100.0	n/a
Namibia (2009)	13	100.0	n/a	11	100.0	n/a
South Africa (2007)	358	100.0	n/a	288	100.0	n/a
South Africa, Eastern Cape (2008–2012)	11	90.9	n/a	6	0.0	n/a
Africa, western						
Benin, Cotonou (2013–2015)	16	100.0	n/a	15	100.0	n/a
Côte d´Ivoire, Abidjan (2012–2013)	13	69.2	n/a	10	100.0	n/a
The Gambia (2007–2011)	6	0.0	n/a	4	0.0	n/a
Guinea, Conakry (2001–2010)	15	100.0	n/a	5	100.0	n/a
Mali, Bamako (2010–2014)	38	84.2	0.0	24	62.5	0.0
Niger, Niamey (2006–2009)	25	8.0	n/a	12	25.0	n/a
Nigeria, Abuja (2013)	3	66.7	n/a	1	100.0	n/a
Nigeria, Calabar (2009–2013)	8	62.5	n/a	3	100.0	n/a
Nigeria, Ibadan (2006–2009)	48	12.5	n/a	34	5.9	n/a

n/a, not applicable: these registries do not include DCO cases in their databases.

CHAPTER 6
Summary tables

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

All sites (C00-96)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	1227	**73.9**	*2.31*	8.91	*0.35*	1505	**68.9**	*1.92*	7.76	*0.26*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	1282	**66.9**	*2.00*	7.56	*0.28*	2622	**127.8**	*2.69*	13.95	*0.35*
France, Réunion (2011)	1199	**265.8**	*7.76*	32.42	*1.15*	1007	**183.8**	*5.98*	20.68	*0.80*
Kenya, Eldoret (2008–2011)	1437	**154.9**	*4.63*	17.93	*0.71*	1486	**162.8**	*4.80*	18.84	*0.69*
Kenya, Nairobi (2007–2011)	4166	**162.6**	*3.14*	20.05	*0.53*	5660	**226.3**	*3.75*	27.99	*0.60*
Malawi, Blantyre (2009–2010)	1045	**158.1**	*5.86*	16.46	*0.81*	1348	**227.0**	*7.16*	23.98	*0.94*
Mauritius (2010–2012)	2363	**119.8**	*2.56*	13.60	*0.37*	3377	**139.8**	*2.50*	15.76	*0.33*
Mozambique, Beira (2009–2013)	971	**117.7**	*4.41*	11.24	*0.54*	1004	**134.3**	*4.88*	13.09	*0.60*
Seychelles (2009–2012)	352	**208.4**	*11.33*	24.77	*1.71*	261	**122.7**	*7.98*	13.75	*1.06*
Uganda, Kampala (2008–2012)	3586	**187.0**	*4.04*	22.76	*0.64*	4362	**190.6**	*3.57*	21.25	*0.49*
Zimbabwe, Bulawayo: Black (2011–2013)	1127	**227.7**	*7.29*	25.54	*1.13*	1784	**277.0**	*6.98*	31.20	*1.00*
Zimbabwe, Harare: Black (2010–2012)	2344	**272.2**	*6.33*	30.59	*0.99*	3047	**297.1**	*6.05*	33.58	*0.89*
Africa, southern										
Botswana (2005–2008)	2921	**116.1**	*2.29*	12.75	*0.32*	3449	**110.9**	*2.00*	11.75	*0.26*
Namibia (2009)	1518	**279.6**	*7.48*	30.82	*1.06*	1256	**168.1**	*4.90*	19.07	*0.68*
South Africa (2007)	25335	**158.0**	*1.03*	18.15	*0.15*	26906	**116.4**	*0.72*	12.70	*0.10*
South Africa, Eastern Cape (2008–2012)	1230	**77.9**	*2.28*	8.80	*0.30*	2113	**82.0**	*1.84*	9.17	*0.23*
Africa, western										
Benin, Cotonou (2013–2015)	276	**129.5**	*9.20*	15.52	*1.46*	381	**117.1**	*6.94*	13.49	*0.96*
Côte d´Ivoire, Abidjan (2012–2013)	957	**69.9**	*2.75*	8.78	*0.46*	1524	**113.3**	*3.55*	13.80	*0.55*
The Gambia (2007–2011)	1332	**60.0**	*1.95*	6.38	*0.26*	1185	**51.9**	*1.93*	5.47	*0.25*
Guinea, Conakry (2001–2010)	1989	**89.8**	*2.50*	10.09	*0.34*	2892	**103.4**	*2.36*	11.92	*0.33*
Mali, Bamako (2010–2014)	3299	**125.1**	*2.44*	14.26	*0.36*	4509	**179.3**	*2.94*	20.68	*0.41*
Niger, Niamey (2006–2009)	642	**54.8**	*2.50*	5.86	*0.33*	941	**76.5**	*2.75*	8.39	*0.38*
Nigeria, Abuja (2013)	143	**104.2**	*11.55*	12.81	*1.90*	235	**187.0**	*16.75*	23.20	*2.63*
Nigeria, Calabar (2009–2013)	320	**78.8**	*5.06*	9.50	*0.79*	399	**86.9**	*5.15*	9.70	*0.70*
Nigeria, Ibadan (2006–2009)	1637	**89.5**	*2.32*	10.46	*0.34*	2233	**118.3**	*2.64*	13.30	*0.35*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

All sites except C44 (C00-96 exc. C44)

	Males				Females			
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	1209	**73.2**	*2.30*	8.84	*0.35*	1493	**68.5**	*1.92*	7.70	*0.26*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	1240	**64.7**	*1.97*	7.31	*0.27*	2541	**123.8**	*2.64*	13.50	*0.34*
France, Réunion (2011)	1159	**257.4**	*7.64*	31.79	*1.14*	971	**178.5**	*5.90*	20.29	*0.79*
Kenya, Eldoret (2008–2011)	1412	**152.4**	*4.59*	17.70	*0.71*	1456	**159.3**	*4.75*	18.40	*0.68*
Kenya, Nairobi (2007–2011)	4054	**159.2**	*3.11*	19.60	*0.52*	5543	**221.3**	*3.71*	27.37	*0.59*
Malawi, Blantyre (2009–2010)	1029	**155.2**	*5.80*	16.14	*0.80*	1321	**223.0**	*7.10*	23.66	*0.93*
Mauritius (2010–2012)	2168	**109.9**	*2.43*	12.46	*0.35*	3217	**133.3**	*2.42*	15.04	*0.32*
Mozambique, Beira (2009–2013)	922	**110.3**	*4.24*	10.50	*0.52*	952	**125.7**	*4.70*	12.15	*0.57*
Seychelles (2009–2012)	341	**202.3**	*11.18*	24.21	*1.69*	259	**121.6**	*7.93*	13.60	*1.05*
Uganda, Kampala (2008–2012)	3525	**183.9**	*4.00*	22.38	*0.64*	4310	**188.6**	*3.55*	21.04	*0.49*
Zimbabwe, Bulawayo: Black (2011–2013)	1098	**221.9**	*7.20*	24.79	*1.11*	1746	**270.9**	*6.90*	30.57	*0.98*
Zimbabwe, Harare: Black (2010–2012)	2279	**265.3**	*6.25*	29.93	*0.98*	2975	**290.5**	*5.98*	32.83	*0.88*
Africa, southern										
Botswana (2005–2008)	2809	**111.5**	*2.25*	12.23	*0.31*	3351	**107.8**	*1.98*	11.42	*0.25*
Namibia (2009)	949	**166.9**	*5.70*	17.88	*0.78*	929	**120.9**	*4.11*	13.31	*0.55*
South Africa (2007)	18212	**111.2**	*0.86*	13.00	*0.13*	22109	**95.2**	*0.65*	10.45	*0.09*
South Africa, Eastern Cape (2008–2012)	1218	**77.1**	*2.27*	8.72	*0.29*	2102	**81.6**	*1.84*	9.11	*0.23*
Africa, western										
Benin, Cotonou (2013–2015)	271	**128.0**	*9.16*	15.46	*1.46*	375	**115.0**	*6.86*	13.26	*0.95*
Côte d´Ivoire, Abidjan (2012–2013)	937	**68.8**	*2.73*	8.63	*0.45*	1498	**111.5**	*3.53*	13.60	*0.55*
The Gambia (2007–2011)	1316	**59.2**	*1.94*	6.31	*0.26*	1176	**51.6**	*1.93*	5.43	*0.25*
Guinea, Conakry (2001–2010)	1908	**87.1**	*2.47*	9.82	*0.34*	2837	**101.0**	*2.32*	11.62	*0.33*
Mali, Bamako (2010–2014)	3205	**121.7**	*2.40*	13.85	*0.36*	4412	**175.4**	*2.90*	20.22	*0.40*
Niger, Niamey (2006–2009)	599	**51.4**	*2.42*	5.53	*0.33*	893	**72.8**	*2.68*	8.03	*0.37*
Nigeria, Abuja (2013)	133	**99.9**	*11.42*	12.61	*1.90*	228	**182.5**	*16.52*	22.62	*2.59*
Nigeria, Calabar (2009–2013)	305	**75.5**	*4.97*	9.14	*0.78*	390	**85.4**	*5.11*	9.58	*0.70*
Nigeria, Ibadan (2006–2009)	1548	**84.9**	*2.26*	9.97	*0.33*	2176	**115.6**	*2.62*	13.02	*0.35*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Mouth (C00-06)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	9	**0.5**	*0.19*	0.07	*0.03*	9	**0.4**	*0.15*	0.04	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	24	**1.3**	*0.29*	0.15	*0.04*	27	**1.4**	*0.27*	0.14	*0.04*
France, Réunion (2011)	42	**8.9**	*1.39*	0.98	*0.18*	15	**2.5**	*0.68*	0.27	*0.10*
Kenya, Eldoret (2008–2011)	20	**2.4**	*0.59*	0.27	*0.09*	14	**2.0**	*0.57*	0.29	*0.10*
Kenya, Nairobi (2007–2011)	212	**7.5**	*0.64*	0.91	*0.10*	125	**6.1**	*0.66*	0.87	*0.12*
Malawi, Blantyre (2009–2010)	6	**1.3**	*0.58*	0.12	*0.07*	3	**0.3**	*0.21*	0.02	*0.02*
Mauritius (2010–2012)	111	**5.3**	*0.52*	0.64	*0.08*	55	**2.3**	*0.31*	0.25	*0.04*
Mozambique, Beira (2009–2013)	12	**2.7**	*0.84*	0.27	*0.11*	7	**1.0**	*0.43*	0.10	*0.04*
Seychelles (2009–2012)	27	**14.3**	*2.80*	1.36	*0.30*	5	**2.5**	*1.20*	0.26	*0.14*
Uganda, Kampala (2008–2012)	69	**4.1**	*0.61*	0.55	*0.10*	33	**1.7**	*0.37*	0.22	*0.06*
Zimbabwe, Bulawayo: Black (2011–2013)	9	**2.0**	*0.72*	0.27	*0.13*	6	**1.0**	*0.45*	0.11	*0.06*
Zimbabwe, Harare: Black (2010–2012)	23	**2.6**	*0.59*	0.29	*0.09*	15	**1.8**	*0.48*	0.18	*0.06*
Africa, southern										
Botswana (2005–2008)	135	**6.5**	*0.58*	0.78	*0.08*	40	**1.4**	*0.23*	0.17	*0.04*
Namibia (2009)	55	**10.2**	*1.41*	1.16	*0.19*	28	**4.0**	*0.77*	0.49	*0.11*
South Africa (2007)	812	**5.0**	*0.18*	0.59	*0.03*	344	**1.5**	*0.08*	0.18	*0.01*
South Africa, Eastern Cape (2008–2012)	74	**5.0**	*0.60*	0.60	*0.08*	26	**0.9**	*0.18*	0.12	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	2	**0.5**	*0.36*	0.05	*0.04*	4	**2.1**	*1.09*	0.38	*0.19*
Côte d´Ivoire, Abidjan (2012–2013)	14	**0.7**	*0.25*	0.10	*0.05*	22	**1.7**	*0.45*	0.19	*0.06*
The Gambia (2007–2011)	10	**0.4**	*0.24*	0.07	*0.05*	7	**0.3**	*0.19*	0.03	*0.02*
Guinea, Conakry (2001–2010)	32	**1.1**	*0.26*	0.10	*0.03*	41	**1.7**	*0.33*	0.21	*0.05*
Mali, Bamako (2010–2014)	56	**2.1**	*0.32*	0.24	*0.05*	60	**2.4**	*0.33*	0.26	*0.04*
Niger, Niamey (2006–2009)	12	**1.4**	*0.42*	0.15	*0.05*	13	**1.4**	*0.41*	0.19	*0.07*
Nigeria, Abuja (2013)	3	**1.3**	*0.77*	0.14	*0.09*	1	**0.9**	*0.90*	0.09	*0.09*
Nigeria, Calabar (2009–2013)	2	**0.2**	*0.14*	0.02	*0.01*	2	**0.4**	*0.28*	0.04	*0.03*
Nigeria, Ibadan (2006–2009)	16	**0.9**	*0.25*	0.11	*0.04*	19	**1.0**	*0.24*	0.10	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Salivary gland (C07-08)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	10	**0.7**	*0.23*	0.05	*0.02*	5	**0.3**	*0.13*	0.04	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	11	**0.6**	*0.18*	0.06	*0.02*	8	**0.4**	*0.14*	0.04	*0.02*
France, Réunion (2011)	2	**0.4**	*0.27*	0.03	*0.02*	4	**0.9**	*0.45*	0.08	*0.05*
Kenya, Eldoret (2008–2011)	3	**0.4**	*0.21*	0.03	*0.02*	2	**0.1**	*0.07*	0.01	*0.00*
Kenya, Nairobi (2007–2011)	25	**1.0**	*0.25*	0.15	*0.05*	26	**1.0**	*0.25*	0.11	*0.04*
Malawi, Blantyre (2009–2010)	6	**0.6**	*0.27*	0.04	*0.02*	7	**1.7**	*0.71*	0.20	*0.10*
Mauritius (2010–2012)	15	**0.8**	*0.21*	0.11	*0.04*	9	**0.4**	*0.14*	0.04	*0.02*
Mozambique, Beira (2009–2013)	11	**2.1**	*0.67*	0.28	*0.11*	6	**0.5**	*0.25*	0.04	*0.02*
Seychelles (2009–2012)	1	**0.5**	*0.53*	0.07	*0.07*	1	**0.4**	*0.44*	0.04	*0.04*
Uganda, Kampala (2008–2012)	21	**1.0**	*0.28*	0.12	*0.04*	12	**0.3**	*0.12*	0.03	*0.01*
Zimbabwe, Bulawayo: Black (2011–2013)	7	**1.5**	*0.60*	0.18	*0.10*	2	**0.2**	*0.13*	0.01	*0.01*
Zimbabwe, Harare: Black (2010–2012)	14	**1.3**	*0.41*	0.14	*0.06*	11	**1.0**	*0.33*	0.13	*0.05*
Africa, southern										
Botswana (2005–2008)	24	**1.0**	*0.22*	0.11	*0.03*	18	**0.6**	*0.15*	0.07	*0.02*
Namibia (2009)	15	**2.7**	*0.72*	0.27	*0.09*	9	**1.2**	*0.41*	0.16	*0.07*
South Africa (2007)	89	**0.5**	*0.06*	0.06	*0.01*	68	**0.3**	*0.03*	0.03	*0.00*
South Africa, Eastern Cape (2008–2012)	3	**0.1**	*0.06*	0.00	*0.00*	5	**0.2**	*0.08*	0.02	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)	12	**0.7**	*0.24*	0.08	*0.03*	9	**0.6**	*0.28*	0.08	*0.04*
The Gambia (2007–2011)	2	**0.1**	*0.07*	0.01	*0.01*	1	**0.0**	*0.04*	0.00	*0.00*
Guinea, Conakry (2001–2010)	8	**0.3**	*0.11*	0.03	*0.01*	8	**0.3**	*0.14*	0.02	*0.01*
Mali, Bamako (2010–2014)	18	**0.6**	*0.16*	0.06	*0.02*	18	**0.8**	*0.22*	0.11	*0.03*
Niger, Niamey (2006–2009)	7	**0.6**	*0.27*	0.10	*0.06*	5	**0.3**	*0.16*	0.03	*0.01*
Nigeria, Abuja (2013)	3	**2.2**	*1.49*	0.01	*0.01*	2	**1.6**	*1.23*	0.03	*0.03*
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-	1	**0.2**	*0.23*	0.02	*0.02*
Nigeria, Ibadan (2006–2009)	13	**0.7**	*0.22*	0.10	*0.03*	10	**0.5**	*0.16*	0.04	*0.02*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Pharynx, except nasopharynx (C09-10, C12-14)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	2	**0.1**	*0.05*	0.01	*0.00*	1	**0.0**	*0.02*	0.00	*0.00*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	3	**0.1**	*0.09*	0.01	*0.01*	3	**0.2**	*0.11*	0.01	*0.01*
France, Réunion (2011)	50	**11.1**	*1.58*	1.57	*0.25*	1	**0.2**	*0.19*	0.02	*0.02*
Kenya, Eldoret (2008–2011)	13	**1.9**	*0.56*	0.25	*0.08*	4	**0.6**	*0.31*	0.09	*0.05*
Kenya, Nairobi (2007–2011)	53	**2.1**	*0.35*	0.24	*0.05*	41	**1.7**	*0.31*	0.22	*0.05*
Malawi, Blantyre (2009–2010)	0	**-**	-	–	-	0	**-**	-	–	-
Mauritius (2010–2012)	37	**1.7**	*0.28*	0.15	*0.03*	10	**0.4**	*0.13*	0.05	*0.02*
Mozambique, Beira (2009–2013)	5	**0.8**	*0.41*	0.09	*0.05*	0	**-**	-	–	-
Seychelles (2009–2012)	28	**16.3**	*3.14*	1.96	*0.44*	1	**0.5**	*0.54*	0.07	*0.07*
Uganda, Kampala (2008–2012)	21	**1.4**	*0.34*	0.15	*0.04*	14	**0.5**	*0.19*	0.07	*0.03*
Zimbabwe, Bulawayo: Black (2011–2013)	2	**0.5**	*0.35*	0.07	*0.06*	0	**-**	-	–	-
Zimbabwe, Harare: Black (2010–2012)	10	**1.3**	*0.48*	0.22	*0.09*	6	**0.5**	*0.25*	0.07	*0.05*
Africa, southern										
Botswana (2005–2008)	67	**3.3**	*0.42*	0.43	*0.06*	8	**0.3**	*0.11*	0.04	*0.02*
Namibia (2009)	24	**4.7**	*0.99*	0.54	*0.13*	7	**1.1**	*0.41*	0.14	*0.07*
South Africa (2007)	218	**1.3**	*0.09*	0.17	*0.01*	60	**0.3**	*0.03*	0.03	*0.00*
South Africa, Eastern Cape (2008–2012)	20	**1.4**	*0.31*	0.16	*0.04*	3	**0.1**	*0.06*	0.01	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	2	**0.5**	*0.36*	0.05	*0.03*
Côte d´Ivoire, Abidjan (2012–2013)	5	**0.4**	*0.20*	0.05	*0.03*	2	**0.1**	*0.04*	0.00	*0.00*
The Gambia (2007–2011)	1	**0.0**	*0.05*	0.01	*0.01*	0	**-**	-	–	-
Guinea, Conakry (2001–2010)	12	**0.3**	*0.10*	0.03	*0.01*	6	**0.2**	*0.13*	0.01	*0.01*
Mali, Bamako (2010–2014)	13	**0.6**	*0.17*	0.04	*0.02*	15	**0.5**	*0.15*	0.04	*0.01*
Niger, Niamey (2006–2009)	7	**0.6**	*0.24*	0.07	*0.03*	4	**0.3**	*0.19*	0.04	*0.03*
Nigeria, Abuja (2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	2	**0.2**	*0.13*	0.01	*0.01*	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	7	**0.4**	*0.15*	0.04	*0.02*	6	**0.3**	*0.15*	0.05	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Nasopharynx (C11)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	6	**0.3**	*0.14*	0.04	*0.02*	4	**0.1**	*0.09*	0.01	*0.01*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	23	**1.1**	*0.25*	0.14	*0.04*	16	**0.7**	*0.21*	0.09	*0.03*
France, Réunion (2011)	4	**0.9**	*0.46*	0.10	*0.06*	2	**0.4**	*0.31*	0.05	*0.04*
Kenya, Eldoret (2008–2011)	62	**5.2**	*0.77*	0.46	*0.08*	28	**2.3**	*0.52*	0.23	*0.07*
Kenya, Nairobi (2007–2011)	203	**4.2**	*0.40*	0.46	*0.06*	62	**2.0**	*0.33*	0.22	*0.05*
Malawi, Blantyre (2009–2010)	4	**0.6**	*0.32*	0.05	*0.03*	1	**0.4**	*0.37*	0.05	*0.05*
Mauritius (2010–2012)	18	**1.0**	*0.24*	0.12	*0.03*	2	**0.1**	*0.05*	0.00	*0.00*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Seychelles (2009–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Uganda, Kampala (2008–2012)	62	**2.8**	*0.48*	0.32	*0.07*	39	**1.9**	*0.38*	0.21	*0.05*
Zimbabwe, Bulawayo: Black (2011–2013)	5	**0.9**	*0.45*	0.11	*0.06*	2	**0.1**	*0.10*	0.01	*0.01*
Zimbabwe, Harare: Black (2010–2012)	17	**1.4**	*0.42*	0.18	*0.07*	8	**0.7**	*0.27*	0.08	*0.04*
Africa, southern										
Botswana (2005–2008)	31	**1.1**	*0.22*	0.12	*0.03*	16	**0.5**	*0.13*	0.05	*0.02*
Namibia (2009)	8	**1.0**	*0.40*	0.08	*0.03*	4	**0.4**	*0.21*	0.04	*0.02*
South Africa (2007)	43	**0.2**	*0.03*	0.02	*0.00*	28	**0.1**	*0.02*	0.01	*0.00*
South Africa, Eastern Cape (2008–2012)	2	**0.1**	*0.10*	0.02	*0.01*	2	**0.1**	*0.07*	0.01	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	4	**0.7**	*0.36*	0.05	*0.03*	2	**0.3**	*0.24*	0.03	*0.02*
Côte d´Ivoire, Abidjan (2012–2013)	7	**0.3**	*0.17*	0.02	*0.01*	1	**0.0**	*0.02*	0.00	*0.00*
The Gambia (2007–2011)	1	**0.0**	*0.02*	0.00	*0.00*	0	**-**	-	–	-
Guinea, Conakry (2001–2010)	2	**0.2**	*0.11*	0.03	*0.02*	0	**-**	-	–	-
Mali, Bamako (2010–2014)	6	**0.2**	*0.09*	0.02	*0.01*	3	**0.1**	*0.08*	0.02	*0.01*
Niger, Niamey (2006–2009)	5	**0.5**	*0.24*	0.08	*0.05*	2	**0.1**	*0.05*	0.00	*0.00*
Nigeria, Abuja (2013)	4	**0.6**	*0.33*	0.04	*0.03*	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	4	**0.3**	*0.17*	0.02	*0.01*	4	**0.4**	*0.22*	0.03	*0.02*
Nigeria, Ibadan (2006–2009)	37	**1.6**	*0.28*	0.14	*0.03*	9	**0.4**	*0.12*	0.03	*0.01*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Oesophagus (C15)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	7	**0.5**	*0.18*	0.06	*0.03*	2	**0.1**	*0.09*	0.02	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	39	**2.2**	*0.37*	0.25	*0.05*	61	**3.8**	*0.50*	0.49	*0.07*
France, Réunion (2011)	32	**7.0**	*1.25*	0.91	*0.18*	7	**1.1**	*0.43*	0.12	*0.06*
Kenya, Eldoret (2008–2011)	223	**28.7**	*2.07*	3.51	*0.31*	123	**17.1**	*1.67*	2.33	*0.27*
Kenya, Nairobi (2007–2011)	319	**14.1**	*0.94*	1.70	*0.15*	250	**14.0**	*1.01*	1.92	*0.18*
Malawi, Blantyre (2009–2010)	153	**30.3**	*2.83*	3.27	*0.38*	91	**19.4**	*2.28*	2.33	*0.34*
Mauritius (2010–2012)	62	**3.2**	*0.42*	0.39	*0.06*	28	**1.0**	*0.20*	0.09	*0.02*
Mozambique, Beira (2009–2013)	28	**5.5**	*1.15*	0.56	*0.14*	16	**3.3**	*0.88*	0.34	*0.13*
Seychelles (2009–2012)	12	**7.5**	*2.19*	1.13	*0.41*	3	**1.9**	*1.11*	0.27	*0.16*
Uganda, Kampala (2008–2012)	284	**22.9**	*1.48*	2.91	*0.23*	176	**12.1**	*1.00*	1.51	*0.15*
Zimbabwe, Bulawayo: Black (2011–2013)	104	**23.8**	*2.43*	2.59	*0.39*	56	**10.3**	*1.44*	1.16	*0.21*
Zimbabwe, Harare: Black (2010–2012)	126	**16.4**	*1.59*	1.91	*0.25*	108	**13.1**	*1.32*	1.48	*0.20*
Africa, southern										
Botswana (2005–2008)	243	**11.4**	*0.76*	1.34	*0.11*	112	**3.9**	*0.40*	0.50	*0.06*
Namibia (2009)	11	**2.4**	*0.74*	0.28	*0.10*	1	**0.1**	*0.14*	–	-
South Africa (2007)	993	**6.2**	*0.21*	0.75	*0.03*	679	**3.1**	*0.12*	0.39	*0.02*
South Africa, Eastern Cape (2008–2012)	370	**23.8**	*1.26*	2.86	*0.17*	413	**14.6**	*0.75*	1.81	*0.11*
Africa, western										
Benin, Cotonou (2013–2015)	15	**6.9**	*1.97*	0.92	*0.32*	8	**3.6**	*1.39*	0.29	*0.15*
Côte d´Ivoire, Abidjan (2012–2013)	3	**0.2**	*0.13*	0.02	*0.01*	3	**0.3**	*0.17*	0.03	*0.02*
The Gambia (2007–2011)	22	**1.0**	*0.26*	0.08	*0.02*	9	**0.5**	*0.17*	0.04	*0.02*
Guinea, Conakry (2001–2010)	13	**0.8**	*0.25*	0.08	*0.03*	3	**0.1**	*0.05*	0.01	*0.01*
Mali, Bamako (2010–2014)	76	**2.6**	*0.34*	0.28	*0.05*	66	**2.7**	*0.36*	0.31	*0.05*
Niger, Niamey (2006–2009)	13	**1.2**	*0.38*	0.10	*0.03*	2	**0.2**	*0.12*	0.01	*0.01*
Nigeria, Abuja (2013)	2	**0.7**	*0.59*	0.08	*0.07*	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	16	**1.0**	*0.25*	0.13	*0.04*	7	**0.4**	*0.16*	0.05	*0.02*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Stomach (C16)

	Males				Females			
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	39	**2.0**	*0.35*	0.22	*0.04*	28	**1.5**	*0.30*	0.22	*0.05*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	51	**3.0**	*0.44*	0.37	*0.06*	38	**2.2**	*0.38*	0.28	*0.05*
France, Réunion (2011)	77	**16.8**	*1.93*	2.10	*0.30*	37	**6.3**	*1.08*	0.71	*0.16*
Kenya, Eldoret (2008–2011)	74	**9.8**	*1.22*	1.12	*0.19*	59	**7.9**	*1.10*	1.00	*0.17*
Kenya, Nairobi (2007–2011)	225	**9.2**	*0.75*	1.22	*0.13*	174	**9.7**	*0.84*	1.26	*0.14*
Malawi, Blantyre (2009–2010)	18	**4.4**	*1.08*	0.44	*0.14*	15	**3.5**	*0.98*	0.48	*0.16*
Mauritius (2010–2012)	139	**7.0**	*0.61*	0.86	*0.09*	77	**3.2**	*0.37*	0.39	*0.05*
Mozambique, Beira (2009–2013)	4	**0.8**	*0.43*	0.10	*0.05*	2	**0.4**	*0.32*	0.05	*0.04*
Seychelles (2009–2012)	6	**3.7**	*1.53*	0.46	*0.23*	5	**3.2**	*1.45*	0.44	*0.21*
Uganda, Kampala (2008–2012)	81	**6.4**	*0.80*	0.96	*0.14*	48	**3.3**	*0.51*	0.44	*0.08*
Zimbabwe, Bulawayo: Black (2011–2013)	21	**4.8**	*1.08*	0.56	*0.16*	29	**5.7**	*1.10*	0.70	*0.17*
Zimbabwe, Harare: Black (2010–2012)	136	**18.7**	*1.70*	2.40	*0.28*	128	**16.3**	*1.52*	2.23	*0.27*
Africa, southern										
Botswana (2005–2008)	24	**1.1**	*0.23*	0.13	*0.03*	13	**0.4**	*0.13*	0.06	*0.02*
Namibia (2009)	25	**5.0**	*1.02*	0.51	*0.14*	15	**2.0**	*0.54*	0.23	*0.07*
South Africa (2007)	626	**4.0**	*0.17*	0.44	*0.02*	396	**1.8**	*0.09*	0.22	*0.01*
South Africa, Eastern Cape (2008–2012)	21	**1.4**	*0.32*	0.15	*0.04*	24	**0.8**	*0.18*	0.09	*0.02*
Africa, western										
Benin, Cotonou (2013–2015)	24	**11.3**	*2.59*	1.51	*0.40*	6	**2.4**	*1.06*	0.29	*0.17*
Côte d´Ivoire, Abidjan (2012–2013)	36	**2.8**	*0.54*	0.39	*0.09*	23	**2.8**	*0.64*	0.39	*0.10*
The Gambia (2007–2011)	39	**2.2**	*0.40*	0.28	*0.06*	12	**0.8**	*0.27*	0.09	*0.03*
Guinea, Conakry (2001–2010)	114	**4.7**	*0.52*	0.58	*0.08*	61	**2.8**	*0.41*	0.37	*0.06*
Mali, Bamako (2010–2014)	443	**19.1**	*0.98*	2.34	*0.15*	332	**15.3**	*0.89*	1.83	*0.13*
Niger, Niamey (2006–2009)	28	**2.2**	*0.45*	0.24	*0.06*	15	**1.6**	*0.45*	0.27	*0.09*
Nigeria, Abuja (2013)	8	**4.4**	*1.98*	0.25	*0.16*	2	**2.2**	*1.99*	0.26	*0.25*
Nigeria, Calabar (2009–2013)	5	**0.7**	*0.32*	0.07	*0.03*	4	**1.4**	*0.73*	0.17	*0.09*
Nigeria, Ibadan (2006–2009)	49	**2.8**	*0.42*	0.32	*0.06*	24	**1.3**	*0.27*	0.13	*0.04*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Colorectum (C18-20)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	68	**3.3**	*0.43*	0.40	*0.06*	59	**2.9**	*0.41*	0.36	*0.06*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	137	**7.4**	*0.68*	0.90	*0.10*	138	**7.1**	*0.65*	0.83	*0.09*
France, Réunion (2011)	130	**28.9**	*2.56*	3.62	*0.38*	123	**22.8**	*2.11*	2.92	*0.31*
Kenya, Eldoret (2008–2011)	52	**6.5**	*0.98*	0.85	*0.16*	35	**4.0**	*0.74*	0.44	*0.10*
Kenya, Nairobi (2007–2011)	359	**13.5**	*0.88*	1.68	*0.15*	254	**11.2**	*0.84*	1.36	*0.13*
Malawi, Blantyre (2009–2010)	22	**5.1**	*1.19*	0.67	*0.19*	17	**3.6**	*0.97*	0.48	*0.15*
Mauritius (2010–2012)	301	**14.9**	*0.88*	1.80	*0.13*	276	**11.1**	*0.68*	1.26	*0.10*
Mozambique, Beira (2009–2013)	3	**0.9**	*0.51*	0.14	*0.08*	3	**0.6**	*0.38*	0.08	*0.06*
Seychelles (2009–2012)	55	**32.4**	*4.47*	4.17	*0.71*	34	**14.2**	*2.62*	1.57	*0.38*
Uganda, Kampala (2008–2012)	122	**8.3**	*0.89*	1.02	*0.13*	131	**7.9**	*0.78*	1.06	*0.12*
Zimbabwe, Bulawayo: Black (2011–2013)	54	**11.4**	*1.64*	1.40	*0.25*	41	**7.2**	*1.19*	0.92	*0.19*
Zimbabwe, Harare: Black (2010–2012)	107	**13.6**	*1.46*	1.72	*0.24*	103	**11.6**	*1.24*	1.30	*0.18*
Africa, southern										
Botswana (2005–2008)	76	**3.5**	*0.42*	0.43	*0.06*	66	**2.3**	*0.29*	0.24	*0.04*
Namibia (2009)	44	**8.1**	*1.27*	0.90	*0.18*	51	**7.3**	*1.05*	1.03	*0.18*
South Africa (2007)	1139	**7.4**	*0.23*	0.88	*0.03*	974	**4.3**	*0.14*	0.48	*0.02*
South Africa, Eastern Cape (2008–2012)	36	**2.4**	*0.42*	0.22	*0.04*	49	**1.8**	*0.26*	0.20	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	21	**8.8**	*2.19*	1.23	*0.36*	14	**3.8**	*1.13*	0.39	*0.13*
Côte d´Ivoire, Abidjan (2012–2013)	51	**3.2**	*0.57*	0.40	*0.09*	54	**4.5**	*0.70*	0.51	*0.10*
The Gambia (2007–2011)	27	**1.2**	*0.26*	0.14	*0.04*	14	**0.7**	*0.24*	0.09	*0.04*
Guinea, Conakry (2001–2010)	44	**1.5**	*0.29*	0.19	*0.05*	34	**1.4**	*0.30*	0.17	*0.04*
Mali, Bamako (2010–2014)	246	**8.8**	*0.63*	1.00	*0.09*	218	**9.6**	*0.70*	1.14	*0.10*
Niger, Niamey (2006–2009)	48	**3.8**	*0.61*	0.40	*0.08*	52	**4.4**	*0.67*	0.45	*0.08*
Nigeria, Abuja (2013)	11	**6.7**	*2.40*	0.80	*0.30*	6	**4.1**	*2.58*	0.44	*0.31*
Nigeria, Calabar (2009–2013)	14	**2.8**	*0.87*	0.38	*0.15*	8	**1.7**	*0.71*	0.18	*0.08*
Nigeria, Ibadan (2006–2009)	120	**6.9**	*0.65*	0.82	*0.09*	95	**5.3**	*0.58*	0.69	*0.09*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Colon (C18)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	33	**1.6**	*0.31*	0.21	*0.05*	27	**1.3**	*0.27*	0.15	*0.04*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	83	**4.7**	*0.55*	0.58	*0.08*	92	**4.8**	*0.54*	0.56	*0.07*
France, Réunion (2011)	79	**17.3**	*1.97*	2.11	*0.29*	75	**13.8**	*1.64*	1.82	*0.25*
Kenya, Eldoret (2008–2011)	31	**3.9**	*0.77*	0.50	*0.12*	23	**2.7**	*0.62*	0.30	*0.09*
Kenya, Nairobi (2007–2011)	223	**8.3**	*0.69*	1.00	*0.11*	158	**6.7**	*0.63*	0.76	*0.09*
Malawi, Blantyre (2009–2010)	14	**3.1**	*0.92*	0.36	*0.12*	10	**2.2**	*0.79*	0.34	*0.14*
Mauritius (2010–2012)	178	**8.6**	*0.66*	1.02	*0.10*	173	**7.0**	*0.54*	0.84	*0.08*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	2	**0.3**	*0.20*	0.02	*0.02*
Seychelles (2009–2012)	34	**20.1**	*3.54*	2.54	*0.56*	15	**6.6**	*1.84*	0.77	*0.27*
Uganda, Kampala (2008–2012)	62	**4.2**	*0.63*	0.50	*0.09*	62	**4.2**	*0.59*	0.60	*0.09*
Zimbabwe, Bulawayo: Black (2011–2013)	33	**6.3**	*1.16*	0.68	*0.15*	27	**4.9**	*0.99*	0.63	*0.15*
Zimbabwe, Harare: Black (2010–2012)	60	**7.6**	*1.10*	0.92	*0.17*	56	**6.8**	*0.96*	0.76	*0.13*
Africa, southern										
Botswana (2005–2008)	39	**1.9**	*0.31*	0.23	*0.04*	42	**1.5**	*0.24*	0.15	*0.03*
Namibia (2009)	27	**4.7**	*0.95*	0.48	*0.12*	34	**4.9**	*0.86*	0.70	*0.15*
South Africa (2007)	722	**4.8**	*0.18*	0.56	*0.03*	612	**2.7**	*0.11*	0.31	*0.02*
South Africa, Eastern Cape (2008–2012)	21	**1.4**	*0.32*	0.14	*0.04*	30	**1.1**	*0.21*	0.13	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	10	**3.9**	*1.44*	0.61	*0.28*	10	**3.0**	*1.05*	0.32	*0.13*
Côte d´Ivoire, Abidjan (2012–2013)	40	**2.4**	*0.49*	0.31	*0.09*	26	**2.0**	*0.46*	0.20	*0.05*
The Gambia (2007–2011)	4	**0.2**	*0.08*	0.01	*0.01*	3	**0.1**	*0.12*	0.02	*0.01*
Guinea, Conakry (2001–2010)	27	**0.9**	*0.22*	0.10	*0.03*	13	**0.6**	*0.20*	0.06	*0.02*
Mali, Bamako (2010–2014)	111	**4.3**	*0.45*	0.48	*0.07*	114	**5.5**	*0.55*	0.71	*0.08*
Niger, Niamey (2006–2009)	31	**2.4**	*0.49*	0.24	*0.06*	26	**2.4**	*0.49*	0.23	*0.06*
Nigeria, Abuja (2013)	9	**5.5**	*2.27*	0.66	*0.28*	3	**3.2**	*2.99*	0.39	*0.37*
Nigeria, Calabar (2009–2013)	11	**2.2**	*0.76*	0.26	*0.10*	7	**1.5**	*0.67*	0.16	*0.08*
Nigeria, Ibadan (2006–2009)	51	**3.0**	*0.44*	0.40	*0.07*	49	**2.9**	*0.44*	0.39	*0.07*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Rectum (C19-20)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	35	**1.7**	*0.31*	0.19	*0.04*	32	**1.7**	*0.31*	0.21	*0.05*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	54	**2.7**	*0.40*	0.32	*0.06*	46	**2.3**	*0.36*	0.27	*0.05*
France, Réunion (2011)	51	**11.6**	*1.63*	1.51	*0.25*	48	**9.0**	*1.34*	1.09	*0.19*
Kenya, Eldoret (2008–2011)	21	**2.6**	*0.61*	0.35	*0.10*	12	**1.3**	*0.42*	0.14	*0.05*
Kenya, Nairobi (2007–2011)	136	**5.2**	*0.55*	0.68	*0.09*	96	**4.5**	*0.55*	0.60	*0.09*
Malawi, Blantyre (2009–2010)	8	**1.9**	*0.75*	0.32	*0.14*	7	**1.4**	*0.57*	0.14	*0.06*
Mauritius (2010–2012)	123	**6.3**	*0.57*	0.78	*0.09*	103	**4.1**	*0.41*	0.43	*0.05*
Mozambique, Beira (2009–2013)	3	**0.9**	*0.51*	0.14	*0.08*	1	**0.3**	*0.32*	0.05	*0.05*
Seychelles (2009–2012)	21	**12.3**	*2.73*	1.63	*0.44*	19	**7.6**	*1.87*	0.79	*0.26*
Uganda, Kampala (2008–2012)	60	**4.1**	*0.62*	0.52	*0.09*	69	**3.7**	*0.51*	0.46	*0.08*
Zimbabwe, Bulawayo: Black (2011–2013)	21	**5.0**	*1.16*	0.72	*0.20*	14	**2.3**	*0.67*	0.29	*0.11*
Zimbabwe, Harare: Black (2010–2012)	47	**6.0**	*0.96*	0.80	*0.16*	47	**4.8**	*0.78*	0.53	*0.12*
Africa, southern										
Botswana (2005–2008)	37	**1.6**	*0.29*	0.20	*0.04*	24	**0.8**	*0.17*	0.09	*0.02*
Namibia (2009)	17	**3.4**	*0.85*	0.43	*0.12*	17	**2.4**	*0.60*	0.33	*0.10*
South Africa (2007)	417	**2.6**	*0.13*	0.32	*0.02*	362	**1.6**	*0.09*	0.17	*0.01*
South Africa, Eastern Cape (2008–2012)	15	**1.0**	*0.26*	0.08	*0.03*	19	**0.7**	*0.16*	0.07	*0.02*
Africa, western										
Benin, Cotonou (2013–2015)	11	**4.9**	*1.65*	0.62	*0.22*	4	**0.8**	*0.42*	0.07	*0.04*
Côte d´Ivoire, Abidjan (2012–2013)	11	**0.8**	*0.29*	0.09	*0.04*	28	**2.4**	*0.53*	0.31	*0.08*
The Gambia (2007–2011)	23	**1.0**	*0.25*	0.13	*0.04*	11	**0.6**	*0.21*	0.08	*0.03*
Guinea, Conakry (2001–2010)	17	**0.6**	*0.18*	0.10	*0.04*	21	**0.8**	*0.22*	0.11	*0.03*
Mali, Bamako (2010–2014)	135	**4.5**	*0.44*	0.51	*0.06*	104	**4.2**	*0.44*	0.43	*0.05*
Niger, Niamey (2006–2009)	17	**1.3**	*0.36*	0.16	*0.06*	26	**2.1**	*0.45*	0.22	*0.06*
Nigeria, Abuja (2013)	2	**1.2**	*0.82*	0.15	*0.10*	3	**1.3**	*0.81*	0.10	*0.07*
Nigeria, Calabar (2009–2013)	3	**0.6**	*0.43*	0.12	*0.10*	1	**0.2**	*0.23*	0.02	*0.02*
Nigeria, Ibadan (2006–2009)	69	**3.9**	*0.48*	0.43	*0.06*	46	**2.4**	*0.38*	0.30	*0.06*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Anus (C21)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	6	**0.3**	*0.13*	0.03	*0.02*	13	**0.7**	*0.21*	0.08	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	6	**0.2**	*0.10*	0.03	*0.02*	8	**0.3**	*0.12*	0.02	*0.01*
France, Réunion (2011)	2	**0.4**	*0.31*	0.05	*0.04*	9	**1.7**	*0.59*	0.20	*0.07*
Kenya, Eldoret (2008–2011)	3	**0.2**	*0.11*	0.01	*0.01*	0	**-**	-	–	-
Kenya, Nairobi (2007–2011)	7	**0.4**	*0.15*	0.03	*0.02*	22	**0.9**	*0.24*	0.11	*0.04*
Malawi, Blantyre (2009–2010)	0	**-**	-	–	-	3	**0.5**	*0.32*	0.05	*0.03*
Mauritius (2010–2012)	7	**0.4**	*0.14*	0.05	*0.02*	6	**0.3**	*0.10*	0.03	*0.01*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	1	**0.1**	*0.07*	0.00	*0.00*
Seychelles (2009–2012)	0	**-**	-	–	-	1	**0.5**	*0.48*	0.05	*0.05*
Uganda, Kampala (2008–2012)	4	**0.3**	*0.19*	0.04	*0.02*	6	**0.2**	*0.09*	0.01	*0.01*
Zimbabwe, Bulawayo: Black (2011–2013)	7	**1.7**	*0.67*	0.28	*0.13*	6	**0.9**	*0.37*	0.10	*0.06*
Zimbabwe, Harare: Black (2010–2012)	13	**1.5**	*0.49*	0.23	*0.09*	12	**1.1**	*0.33*	0.08	*0.03*
Africa, southern										
Botswana (2005–2008)	9	**0.4**	*0.12*	0.03	*0.01*	8	**0.3**	*0.10*	0.03	*0.01*
Namibia (2009)	4	**0.6**	*0.33*	0.07	*0.04*	7	**1.1**	*0.42*	0.20	*0.08*
South Africa (2007)	62	**0.3**	*0.05*	0.04	*0.01*	79	**0.3**	*0.04*	0.04	*0.01*
South Africa, Eastern Cape (2008–2012)	5	**0.3**	*0.15*	0.04	*0.02*	2	**0.1**	*0.06*	0.01	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	5	**0.9**	*0.46*	0.08	*0.04*	2	**0.9**	*0.70*	0.10	*0.09*
Côte d´Ivoire, Abidjan (2012–2013)	3	**0.0**	*0.03*	0.00	*0.00*	15	**1.1**	*0.38*	0.16	*0.07*
The Gambia (2007–2011)	2	**0.1**	*0.06*	0.01	*0.01*	2	**0.2**	*0.20*	–	-
Guinea, Conakry (2001–2010)	16	**0.6**	*0.17*	0.08	*0.03*	10	**0.3**	*0.11*	0.04	*0.02*
Mali, Bamako (2010–2014)	28	**1.0**	*0.21*	0.12	*0.03*	18	**0.7**	*0.18*	0.08	*0.03*
Niger, Niamey (2006–2009)	13	**1.4**	*0.42*	0.16	*0.06*	4	**0.3**	*0.15*	0.01	*0.01*
Nigeria, Abuja (2013)	0	**-**	-	–	-	3	**1.5**	*1.01*	0.13	*0.10*
Nigeria, Calabar (2009–2013)	6	**1.3**	*0.67*	0.22	*0.13*	6	**1.5**	*0.67*	0.18	*0.10*
Nigeria, Ibadan (2006–2009)	13	**0.8**	*0.22*	0.09	*0.03*	17	**0.9**	*0.23*	0.11	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Liver (C22)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	165	**6.2**	*0.56*	0.75	*0.09*	70	**2.6**	*0.35*	0.28	*0.05*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	46	**2.5**	*0.39*	0.26	*0.05*	47	**2.7**	*0.41*	0.34	*0.06*
France, Réunion (2011)	35	**7.7**	*1.32*	0.93	*0.19*	13	**2.4**	*0.68*	0.34	*0.11*
Kenya, Eldoret (2008–2011)	52	**5.9**	*0.91*	0.75	*0.14*	32	**4.0**	*0.78*	0.50	*0.12*
Kenya, Nairobi (2007–2011)	196	**7.2**	*0.64*	0.91	*0.11*	106	**5.0**	*0.58*	0.63	*0.09*
Malawi, Blantyre (2009–2010)	18	**2.0**	*0.54*	0.13	*0.04*	18	**2.5**	*0.69*	0.28	*0.12*
Mauritius (2010–2012)	31	**1.6**	*0.29*	0.23	*0.05*	18	**0.8**	*0.19*	0.12	*0.03*
Mozambique, Beira (2009–2013)	17	**2.8**	*0.76*	0.36	*0.12*	13	**1.9**	*0.58*	0.15	*0.05*
Seychelles (2009–2012)	7	**4.1**	*1.62*	0.45	*0.20*	2	**0.9**	*0.63*	0.08	*0.06*
Uganda, Kampala (2008–2012)	201	**10.0**	*0.92*	1.19	*0.14*	163	**8.4**	*0.78*	0.94	*0.11*
Zimbabwe, Bulawayo: Black (2011–2013)	67	**13.9**	*1.81*	1.55	*0.27*	46	**7.7**	*1.18*	0.86	*0.17*
Zimbabwe, Harare: Black (2010–2012)	119	**12.6**	*1.32*	1.36	*0.20*	82	**9.7**	*1.15*	1.02	*0.16*
Africa, southern										
Botswana (2005–2008)	152	**6.9**	*0.58*	0.82	*0.09*	82	**2.7**	*0.31*	0.29	*0.04*
Namibia (2009)	29	**5.1**	*0.99*	0.67	*0.16*	19	**2.6**	*0.61*	0.30	*0.08*
South Africa (2007)	173	**0.9**	*0.07*	0.10	*0.01*	74	**0.3**	*0.04*	0.03	*0.00*
South Africa, Eastern Cape (2008–2012)	62	**3.9**	*0.51*	0.40	*0.06*	42	**1.6**	*0.25*	0.20	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	16	**7.4**	*2.20*	0.47	*0.18*	5	**2.1**	*1.05*	0.25	*0.13*
Côte d´Ivoire, Abidjan (2012–2013)	179	**9.9**	*0.92*	1.10	*0.13*	84	**7.4**	*0.96*	0.96	*0.16*
The Gambia (2007–2011)	774	**32.3**	*1.35*	3.24	*0.17*	270	**12.5**	*0.94*	1.39	*0.13*
Guinea, Conakry (2001–2010)	706	**27.6**	*1.20*	3.36	*0.17*	384	**15.6**	*0.91*	1.84	*0.12*
Mali, Bamako (2010–2014)	313	**11.5**	*0.72*	1.32	*0.10*	104	**4.0**	*0.43*	0.41	*0.06*
Niger, Niamey (2006–2009)	97	**8.9**	*1.01*	0.99	*0.13*	36	**3.1**	*0.57*	0.40	*0.09*
Nigeria, Abuja (2013)	2	**0.6**	*0.45*	0.06	*0.04*	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	5	**0.5**	*0.24*	0.04	*0.02*	9	**2.0**	*0.78*	0.21	*0.09*
Nigeria, Ibadan (2006–2009)	122	**6.1**	*0.59*	0.64	*0.07*	47	**2.4**	*0.37*	0.29	*0.05*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Gallbladder etc. (C23-24)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	1	**0.1**	*0.07*	0.01	*0.01*	6	**0.4**	*0.15*	0.06	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	8	**0.4**	*0.15*	0.04	*0.02*	26	**1.5**	*0.30*	0.15	*0.04*
France, Réunion (2011)	9	**2.0**	*0.68*	0.30	*0.12*	24	**4.1**	*0.88*	0.53	*0.14*
Kenya, Eldoret (2008–2011)	2	**0.3**	*0.23*	0.06	*0.05*	8	**1.0**	*0.39*	0.12	*0.06*
Kenya, Nairobi (2007–2011)	35	**2.0**	*0.37*	0.30	*0.07*	36	**2.1**	*0.40*	0.30	*0.07*
Malawi, Blantyre (2009–2010)	0	**-**	-	–	-	0	**-**	-	–	-
Mauritius (2010–2012)	15	**0.7**	*0.21*	0.08	*0.03*	23	**0.9**	*0.20*	0.09	*0.03*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Seychelles (2009–2012)	1	**0.5**	*0.53*	0.07	*0.07*	2	**0.9**	*0.63*	0.15	*0.12*
Uganda, Kampala (2008–2012)	2	**0.1**	*0.07*	0.00	*0.00*	3	**0.1**	*0.07*	0.00	*0.00*
Zimbabwe, Bulawayo: Black (2011–2013)	0	**-**	-	–	-	4	**0.7**	*0.39*	0.12	*0.07*
Zimbabwe, Harare: Black (2010–2012)	14	**1.9**	*0.52*	0.13	*0.07*	13	**1.6**	*0.46*	0.13	*0.07*
Africa, southern										
Botswana (2005–2008)	4	**0.2**	*0.10*	0.02	*0.01*	9	**0.3**	*0.10*	0.04	*0.02*
Namibia (2009)	2	**0.4**	*0.25*	0.04	*0.02*	2	**0.3**	*0.22*	0.05	*0.04*
South Africa (2007)	62	**0.4**	*0.05*	0.05	*0.01*	95	**0.4**	*0.05*	0.04	*0.01*
South Africa, Eastern Cape (2008–2012)	0	**-**	-	–	-	3	**0.1**	*0.05*	0.00	*0.00*
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	2	**0.9**	*0.65*	0.15	*0.11*
Côte d´Ivoire, Abidjan (2012–2013)	3	**0.3**	*0.18*	0.04	*0.03*	10	**1.0**	*0.35*	0.10	*0.04*
The Gambia (2007–2011)	1	**0.0**	*0.05*	0.00	*0.00*	0	**-**	-	–	-
Guinea, Conakry (2001–2010)	2	**0.1**	*0.04*	0.01	*0.00*	1	**0.0**	*0.02*	0.00	*0.00*
Mali, Bamako (2010–2014)	4	**0.2**	*0.10*	0.02	*0.02*	12	**0.6**	*0.17*	0.08	*0.03*
Niger, Niamey (2006–2009)	4	**0.4**	*0.20*	0.05	*0.03*	4	**0.3**	*0.16*	0.03	*0.01*
Nigeria, Abuja (2013)	1	**1.2**	*1.19*	0.15	*0.15*	1	**0.9**	*0.90*	0.09	*0.09*
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	6	**0.4**	*0.16*	0.06	*0.03*	2	**0.1**	*0.09*	0.02	*0.02*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Pancreas (C25)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	18	**0.9**	*0.23*	0.10	*0.03*	22	**1.2**	*0.26*	0.11	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	13	**0.8**	*0.22*	0.08	*0.03*	18	**0.9**	*0.23*	0.10	*0.03*
France, Réunion (2011)	24	**5.1**	*1.04*	0.61	*0.16*	24	**4.6**	*0.95*	0.74	*0.17*
Kenya, Eldoret (2008–2011)	17	**2.6**	*0.67*	0.41	*0.12*	21	**2.8**	*0.68*	0.30	*0.09*
Kenya, Nairobi (2007–2011)	85	**4.0**	*0.50*	0.45	*0.08*	78	**4.1**	*0.54*	0.55	*0.09*
Malawi, Blantyre (2009–2010)	3	**0.8**	*0.50*	0.15	*0.10*	1	**0.1**	*0.08*	0.01	*0.01*
Mauritius (2010–2012)	49	**2.4**	*0.34*	0.29	*0.05*	28	**1.1**	*0.22*	0.12	*0.03*
Mozambique, Beira (2009–2013)	1	**0.3**	*0.25*	0.03	*0.03*	1	**0.2**	*0.18*	0.02	*0.02*
Seychelles (2009–2012)	5	**2.8**	*1.28*	0.28	*0.16*	1	**0.4**	*0.41*	0.03	*0.03*
Uganda, Kampala (2008–2012)	35	**2.3**	*0.45*	0.27	*0.06*	35	**2.1**	*0.40*	0.27	*0.06*
Zimbabwe, Bulawayo: Black (2011–2013)	12	**2.7**	*0.85*	0.45	*0.17*	17	**3.4**	*0.86*	0.52	*0.15*
Zimbabwe, Harare: Black (2010–2012)	32	**4.8**	*0.88*	0.58	*0.14*	40	**5.5**	*0.90*	0.67	*0.14*
Africa, southern										
Botswana (2005–2008)	29	**1.3**	*0.24*	0.15	*0.04*	35	**1.2**	*0.22*	0.14	*0.03*
Namibia (2009)	14	**2.8**	*0.76*	0.33	*0.12*	2	**0.3**	*0.22*	0.05	*0.04*
South Africa (2007)	86	**0.6**	*0.06*	0.08	*0.01*	96	**0.4**	*0.04*	0.06	*0.01*
South Africa, Eastern Cape (2008–2012)	11	**0.7**	*0.22*	0.11	*0.04*	10	**0.4**	*0.13*	0.05	*0.02*
Africa, western										
Benin, Cotonou (2013–2015)	6	**2.8**	*1.27*	0.37	*0.17*	8	**3.3**	*1.25*	0.43	*0.17*
Côte d´Ivoire, Abidjan (2012–2013)	34	**2.5**	*0.53*	0.36	*0.10*	20	**2.2**	*0.55*	0.30	*0.08*
The Gambia (2007–2011)	13	**0.7**	*0.20*	0.09	*0.03*	12	**0.8**	*0.24*	0.08	*0.03*
Guinea, Conakry (2001–2010)	15	**0.5**	*0.14*	0.06	*0.02*	9	**0.2**	*0.09*	0.02	*0.01*
Mali, Bamako (2010–2014)	87	**3.5**	*0.41*	0.43	*0.06*	53	**2.6**	*0.38*	0.31	*0.05*
Niger, Niamey (2006–2009)	21	**2.7**	*0.62*	0.36	*0.10*	6	**0.4**	*0.17*	0.04	*0.02*
Nigeria, Abuja (2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	1	**0.5**	*0.48*	0.08	*0.08*	2	**0.9**	*0.68*	0.14	*0.11*
Nigeria, Ibadan (2006–2009)	34	**2.2**	*0.39*	0.33	*0.06*	21	**1.2**	*0.26*	0.14	*0.04*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Larynx (C32)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	21	**1.2**	*0.28*	0.16	*0.04*	5	**0.3**	*0.14*	0.04	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	9	**0.6**	*0.19*	0.08	*0.03*	1	**0.1**	*0.05*	0.00	*0.00*
France, Réunion (2011)	23	**5.2**	*1.09*	0.72	*0.16*	3	**0.6**	*0.36*	0.10	*0.06*
Kenya, Eldoret (2008–2011)	13	**2.1**	*0.59*	0.32	*0.10*	4	**0.7**	*0.39*	0.09	*0.05*
Kenya, Nairobi (2007–2011)	81	**3.9**	*0.50*	0.49	*0.08*	25	**1.3**	*0.31*	0.17	*0.05*
Malawi, Blantyre (2009–2010)	6	**1.7**	*0.82*	0.26	*0.13*	1	**0.2**	*0.24*	0.02	*0.02*
Mauritius (2010–2012)	72	**3.7**	*0.44*	0.51	*0.07*	8	**0.3**	*0.11*	0.03	*0.02*
Mozambique, Beira (2009–2013)	4	**0.8**	*0.47*	0.14	*0.09*	1	**0.3**	*0.29*	0.07	*0.07*
Seychelles (2009–2012)	16	**9.8**	*2.52*	1.45	*0.41*	3	**1.7**	*0.98*	0.19	*0.12*
Uganda, Kampala (2008–2012)	34	**2.8**	*0.52*	0.34	*0.07*	9	**0.5**	*0.22*	0.08	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	9	**2.3**	*0.77*	0.29	*0.11*	0	**-**	-	–	-
Zimbabwe, Harare: Black (2010–2012)	39	**5.6**	*0.96*	0.74	*0.15*	2	**0.2**	*0.15*	0.01	*0.01*
Africa, southern										
Botswana (2005–2008)	82	**4.1**	*0.47*	0.51	*0.07*	8	**0.2**	*0.09*	0.02	*0.01*
Namibia (2009)	21	**4.5**	*1.00*	0.54	*0.13*	8	**1.1**	*0.41*	0.09	*0.04*
South Africa (2007)	458	**2.8**	*0.14*	0.35	*0.02*	64	**0.3**	*0.04*	0.03	*0.00*
South Africa, Eastern Cape (2008–2012)	51	**3.3**	*0.48*	0.40	*0.06*	9	**0.4**	*0.13*	0.04	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	2	**1.1**	*0.80*	0.12	*0.10*	0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)	19	**1.6**	*0.41*	0.19	*0.06*	4	**0.1**	*0.06*	0.01	*0.01*
The Gambia (2007–2011)	3	**0.2**	*0.10*	0.02	*0.01*	1	**-**	-	–	-
Guinea, Conakry (2001–2010)	35	**1.3**	*0.26*	0.19	*0.04*	10	**0.5**	*0.17*	0.08	*0.03*
Mali, Bamako (2010–2014)	36	**1.8**	*0.33*	0.27	*0.06*	10	**0.4**	*0.14*	0.04	*0.02*
Niger, Niamey (2006–2009)	12	**1.1**	*0.36*	0.17	*0.06*	2	**0.1**	*0.10*	0.01	*0.01*
Nigeria, Abuja (2013)	1	**0.4**	*0.42*	0.04	*0.04*	1	**2.0**	*1.99*	0.25	*0.25*
Nigeria, Calabar (2009–2013)	8	**1.6**	*0.66*	0.18	*0.08*	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	39	**2.4**	*0.39*	0.32	*0.06*	7	**0.5**	*0.18*	0.06	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Trachea, bronchus, and lung (C33-34)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	14	**0.9**	*0.26*	0.14	*0.04*	17	**1.0**	*0.26*	0.12	*0.04*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	59	**3.5**	*0.47*	0.43	*0.07*	43	**2.5**	*0.39*	0.31	*0.06*
France, Réunion (2011)	167	**36.3**	*2.84*	4.63	*0.44*	42	**7.0**	*1.13*	0.80	*0.17*
Kenya, Eldoret (2008–2011)	21	**2.3**	*0.55*	0.24	*0.08*	6	**1.0**	*0.41*	0.14	*0.06*
Kenya, Nairobi (2007–2011)	116	**5.5**	*0.59*	0.72	*0.10*	74	**4.0**	*0.54*	0.52	*0.09*
Malawi, Blantyre (2009–2010)	8	**1.9**	*0.70*	0.20	*0.08*	4	**1.1**	*0.62*	0.19	*0.11*
Mauritius (2010–2012)	214	**10.7**	*0.75*	1.23	*0.11*	69	**2.8**	*0.35*	0.34	*0.05*
Mozambique, Beira (2009–2013)	1	**0.2**	*0.16*	0.02	*0.02*	1	**0.1**	*0.08*	0.00	*0.00*
Seychelles (2009–2012)	13	**7.5**	*2.11*	0.78	*0.31*	10	**3.8**	*1.26*	0.28	*0.12*
Uganda, Kampala (2008–2012)	43	**2.8**	*0.51*	0.39	*0.08*	50	**3.3**	*0.51*	0.43	*0.08*
Zimbabwe, Bulawayo: Black (2011–2013)	22	**4.8**	*1.07*	0.49	*0.15*	9	**1.6**	*0.54*	0.20	*0.09*
Zimbabwe, Harare: Black (2010–2012)	95	**13.4**	*1.43*	1.47	*0.22*	37	**4.6**	*0.80*	0.62	*0.14*
Africa, southern										
Botswana (2005–2008)	149	**7.3**	*0.62*	0.93	*0.09*	42	**1.5**	*0.25*	0.18	*0.04*
Namibia (2009)	24	**5.0**	*1.04*	0.67	*0.17*	20	**2.9**	*0.67*	0.32	*0.08*
South Africa (2007)	1409	**8.9**	*0.25*	1.11	*0.04*	654	**3.0**	*0.12*	0.38	*0.02*
South Africa, Eastern Cape (2008–2012)	66	**4.2**	*0.53*	0.50	*0.07*	28	**1.0**	*0.20*	0.13	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	3	**0.9**	*0.53*	0.09	*0.05*	3	**1.0**	*0.64*	0.18	*0.14*
Côte d´Ivoire, Abidjan (2012–2013)	29	**2.3**	*0.51*	0.31	*0.09*	25	**2.9**	*0.63*	0.36	*0.11*
The Gambia (2007–2011)	78	**4.5**	*0.55*	0.54	*0.08*	13	**0.7**	*0.25*	0.12	*0.05*
Guinea, Conakry (2001–2010)	99	**3.5**	*0.38*	0.44	*0.06*	32	**1.2**	*0.23*	0.14	*0.03*
Mali, Bamako (2010–2014)	86	**3.8**	*0.44*	0.46	*0.06*	41	**1.8**	*0.31*	0.21	*0.04*
Niger, Niamey (2006–2009)	4	**0.4**	*0.20*	0.05	*0.03*	1	**0.0**	*0.04*	0.00	*0.00*
Nigeria, Abuja (2013)	1	**0.2**	*0.23*	0.02	*0.02*	3	**5.6**	*3.47*	1.05	*0.69*
Nigeria, Calabar (2009–2013)	2	**0.3**	*0.19*	0.02	*0.02*	1	**0.2**	*0.23*	0.02	*0.02*
Nigeria, Ibadan (2006–2009)	35	**2.1**	*0.38*	0.28	*0.06*	23	**1.2**	*0.27*	0.16	*0.04*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Bone (C40-41)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	13	**0.4**	*0.11*	0.03	*0.01*	25	**0.7**	*0.15*	0.04	*0.01*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	21	**0.7**	*0.17*	0.06	*0.02*	32	**1.3**	*0.27*	0.14	*0.03*
France, Réunion (2011)	5	**1.2**	*0.53*	0.08	*0.04*	2	**0.4**	*0.30*	0.05	*0.03*
Kenya, Eldoret (2008–2011)	36	**2.7**	*0.53*	0.27	*0.08*	22	**1.6**	*0.40*	0.14	*0.05*
Kenya, Nairobi (2007–2011)	123	**2.7**	*0.34*	0.30	*0.05*	93	**2.3**	*0.35*	0.23	*0.05*
Malawi, Blantyre (2009–2010)	20	**2.4**	*0.68*	0.28	*0.11*	24	**3.0**	*0.73*	0.29	*0.11*
Mauritius (2010–2012)	16	**0.9**	*0.22*	0.07	*0.02*	8	**0.4**	*0.14*	0.03	*0.01*
Mozambique, Beira (2009–2013)	3	**0.3**	*0.15*	0.02	*0.01*	4	**0.7**	*0.44*	0.13	*0.09*
Seychelles (2009–2012)	2	**1.1**	*0.82*	0.07	*0.05*	0	**-**	-	–	-
Uganda, Kampala (2008–2012)	59	**1.5**	*0.29*	0.17	*0.05*	49	**0.8**	*0.16*	0.06	*0.02*
Zimbabwe, Bulawayo: Black (2011–2013)	8	**1.2**	*0.49*	0.13	*0.07*	8	**0.9**	*0.32*	0.06	*0.02*
Zimbabwe, Harare: Black (2010–2012)	28	**1.5**	*0.37*	0.12	*0.04*	25	**2.0**	*0.48*	0.21	*0.07*
Africa, southern										
Botswana (2005–2008)	27	**0.8**	*0.16*	0.06	*0.02*	27	**0.7**	*0.14*	0.06	*0.02*
Namibia (2009)	13	**1.3**	*0.39*	0.07	*0.03*	6	**0.7**	*0.30*	0.08	*0.04*
South Africa (2007)	113	**0.5**	*0.04*	0.03	*0.00*	97	**0.4**	*0.04*	0.03	*0.00*
South Africa, Eastern Cape (2008–2012)	16	**1.0**	*0.26*	0.10	*0.03*	11	**0.4**	*0.12*	0.03	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	7	**1.5**	*0.81*	0.15	*0.09*	5	**0.9**	*0.46*	0.08	*0.04*
Côte d´Ivoire, Abidjan (2012–2013)	39	**1.6**	*0.37*	0.20	*0.07*	32	**1.8**	*0.43*	0.22	*0.07*
The Gambia (2007–2011)	25	**0.9**	*0.23*	0.08	*0.03*	12	**0.4**	*0.18*	0.02	*0.01*
Guinea, Conakry (2001–2010)	22	**0.5**	*0.18*	0.05	*0.03*	11	**0.3**	*0.11*	0.03	*0.02*
Mali, Bamako (2010–2014)	108	**3.0**	*0.34*	0.30	*0.05*	114	**3.4**	*0.38*	0.35	*0.05*
Niger, Niamey (2006–2009)	47	**2.7**	*0.45*	0.26	*0.06*	33	**2.0**	*0.42*	0.22	*0.06*
Nigeria, Abuja (2013)	0	**-**	-	–	-	3	**0.7**	*0.47*	0.05	*0.04*
Nigeria, Calabar (2009–2013)	6	**0.8**	*0.36*	0.04	*0.02*	2	**0.1**	*0.10*	0.01	*0.01*
Nigeria, Ibadan (2006–2009)	61	**2.8**	*0.38*	0.28	*0.05*	49	**2.1**	*0.32*	0.20	*0.04*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Melanoma of skin (C43)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	21	**1.5**	*0.33*	0.23	*0.06*	23	**1.4**	*0.29*	0.15	*0.04*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	9	**0.5**	*0.17*	0.07	*0.03*	2	**0.1**	*0.07*	0.01	*0.01*
France, Réunion (2011)	15	**3.2**	*0.84*	0.36	*0.11*	21	**3.8**	*0.87*	0.30	*0.08*
Kenya, Eldoret (2008–2011)	5	**0.4**	*0.21*	0.04	*0.02*	16	**2.3**	*0.60*	0.31	*0.10*
Kenya, Nairobi (2007–2011)	18	**0.8**	*0.24*	0.12	*0.04*	19	**1.0**	*0.26*	0.12	*0.04*
Malawi, Blantyre (2009–2010)	5	**1.2**	*0.57*	0.11	*0.06*	6	**1.0**	*0.49*	0.15	*0.09*
Mauritius (2010–2012)	5	**0.3**	*0.21*	0.03	*0.03*	8	**0.3**	*0.12*	0.03	*0.01*
Mozambique, Beira (2009–2013)	4	**0.8**	*0.44*	0.10	*0.05*	10	**1.6**	*0.58*	0.18	*0.08*
Seychelles (2009–2012)	1	**0.4**	*0.45*	0.04	*0.04*	1	**0.4**	*0.44*	0.11	*0.11*
Uganda, Kampala (2008–2012)	16	**1.3**	*0.37*	0.17	*0.06*	29	**1.7**	*0.38*	0.18	*0.05*
Zimbabwe, Bulawayo: Black (2011–2013)	9	**1.8**	*0.65*	0.23	*0.12*	7	**1.2**	*0.46*	0.17	*0.08*
Zimbabwe, Harare: Black (2010–2012)	18	**1.9**	*0.51*	0.22	*0.08*	41	**5.0**	*0.82*	0.53	*0.13*
Africa, southern										
Botswana (2005–2008)	31	**1.2**	*0.24*	0.11	*0.03*	39	**1.5**	*0.25*	0.18	*0.03*
Namibia (2009)	25	**4.8**	*0.99*	0.59	*0.15*	20	**2.8**	*0.65*	0.29	*0.08*
South Africa (2007)	638	**3.8**	*0.16*	0.43	*0.02*	593	**2.5**	*0.11*	0.27	*0.01*
South Africa, Eastern Cape (2008–2012)	6	**0.4**	*0.16*	0.05	*0.02*	14	**0.5**	*0.13*	0.06	*0.02*
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	1	**0.2**	*0.15*	0.01	*0.01*
Côte d´Ivoire, Abidjan (2012–2013)	2	**0.2**	*0.12*	0.02	*0.01*	7	**0.6**	*0.26*	0.08	*0.05*
The Gambia (2007–2011)	5	**0.3**	*0.17*	0.06	*0.04*	11	**0.6**	*0.24*	0.07	*0.03*
Guinea, Conakry (2001–2010)	8	**0.3**	*0.13*	0.05	*0.03*	23	**1.3**	*0.31*	0.18	*0.05*
Mali, Bamako (2010–2014)	21	**0.8**	*0.19*	0.09	*0.03*	27	**1.4**	*0.27*	0.18	*0.04*
Niger, Niamey (2006–2009)	4	**0.4**	*0.24*	0.06	*0.04*	9	**0.9**	*0.33*	0.11	*0.04*
Nigeria, Abuja (2013)	0	**-**	-	–	-	1	**0.3**	*0.26*	0.02	*0.02*
Nigeria, Calabar (2009–2013)	3	**0.8**	*0.51*	0.10	*0.06*	2	**0.3**	*0.26*	0.00	*0.00*
Nigeria, Ibadan (2006–2009)	8	**0.5**	*0.19*	0.05	*0.02*	14	**0.8**	*0.23*	0.10	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Non-melanoma skin (C44)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	18	**0.7**	*0.20*	0.07	*0.02*	12	**0.4**	*0.15*	0.06	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	42	**2.2**	*0.36*	0.24	*0.05*	81	**4.1**	*0.49*	0.45	*0.06*
France, Réunion (2011)	40	**8.5**	*1.35*	0.63	*0.15*	36	**5.3**	*0.93*	0.39	*0.11*
Kenya, Eldoret (2008–2011)	25	**2.5**	*0.55*	0.23	*0.08*	30	**3.5**	*0.71*	0.44	*0.11*
Kenya, Nairobi (2007–2011)	112	**3.5**	*0.44*	0.44	*0.08*	117	**5.0**	*0.57*	0.62	*0.10*
Malawi, Blantyre (2009–2010)	16	**2.9**	*0.84*	0.32	*0.12*	27	**4.0**	*0.86*	0.32	*0.08*
Mauritius (2010–2012)	195	**9.9**	*0.86*	1.14	*0.13*	160	**6.4**	*0.66*	0.71	*0.09*
Mozambique, Beira (2009–2013)	49	**7.5**	*1.22*	0.74	*0.15*	52	**8.6**	*1.32*	0.94	*0.17*
Seychelles (2009–2012)	11	**6.1**	*1.88*	0.57	*0.25*	2	**1.1**	*0.80*	0.15	*0.12*
Uganda, Kampala (2008–2012)	61	**3.1**	*0.52*	0.38	*0.08*	52	**1.9**	*0.35*	0.20	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	29	**5.8**	*1.16*	0.75	*0.20*	38	**6.1**	*1.06*	0.63	*0.15*
Zimbabwe, Harare: Black (2010–2012)	65	**6.9**	*0.98*	0.66	*0.14*	72	**6.6**	*0.91*	0.75	*0.15*
Africa, southern										
Botswana (2005–2008)	112	**4.6**	*0.47*	0.52	*0.06*	98	**3.1**	*0.34*	0.33	*0.05*
Namibia (2009)	569	**112.6**	*4.85*	12.94	*0.72*	327	**47.2**	*2.67*	5.75	*0.40*
South Africa (2007)	7123	**46.7**	*0.57*	5.15	*0.08*	4797	**21.2**	*0.31*	2.26	*0.04*
South Africa, Eastern Cape (2008–2012)	12	**0.8**	*0.25*	0.08	*0.02*	11	**0.4**	*0.14*	0.06	*0.02*
Africa, western										
Benin, Cotonou (2013–2015)	5	**1.5**	*0.93*	0.05	*0.03*	6	**2.1**	*1.03*	0.23	*0.12*
Côte d´Ivoire, Abidjan (2012–2013)	20	**1.1**	*0.35*	0.16	*0.07*	26	**1.8**	*0.45*	0.19	*0.07*
The Gambia (2007–2011)	16	**0.8**	*0.28*	0.06	*0.03*	9	**0.3**	*0.15*	0.04	*0.03*
Guinea, Conakry (2001–2010)	81	**2.7**	*0.39*	0.27	*0.05*	55	**2.4**	*0.39*	0.30	*0.06*
Mali, Bamako (2010–2014)	94	**3.5**	*0.40*	0.41	*0.06*	97	**3.9**	*0.44*	0.47	*0.06*
Niger, Niamey (2006–2009)	43	**3.4**	*0.61*	0.33	*0.07*	48	**3.7**	*0.60*	0.36	*0.07*
Nigeria, Abuja (2013)	10	**4.5**	*1.96*	0.25	*0.15*	7	**4.6**	*2.78*	0.58	*0.44*
Nigeria, Calabar (2009–2013)	15	**3.2**	*0.98*	0.36	*0.14*	9	**1.5**	*0.59*	0.12	*0.06*
Nigeria, Ibadan (2006–2009)	89	**4.6**	*0.51*	0.49	*0.07*	57	**2.7**	*0.38*	0.28	*0.05*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Mesothelioma (C45)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	0	**-**	-	–	-	2	**0.1**	*0.10*	0.02	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	1	**0.0**	*0.04*	0.00	*0.00*	2	**0.1**	*0.08*	0.01	*0.01*
France, Réunion (2011)	0	**-**	-	–	-	0	**-**	-	–	-
Kenya, Eldoret (2008–2011)	1	**0.2**	*0.21*	0.03	*0.03*	0	**-**	-	–	-
Kenya, Nairobi (2007–2011)	1	**0.0**	*0.02*	0.00	*0.00*	0	**-**	-	–	-
Malawi, Blantyre (2009–2010)	0	**-**	-	–	-	0	**-**	-	–	-
Mauritius (2010–2012)	2	**0.1**	*0.08*	0.02	*0.02*	1	**0.1**	*0.05*	0.01	*0.01*
Mozambique, Beira (2009–2013)	1	**0.2**	*0.16*	0.02	*0.02*	1	**0.3**	*0.25*	–	-
Seychelles (2009–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Uganda, Kampala (2008–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Zimbabwe, Bulawayo: Black (2011–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Zimbabwe, Harare: Black (2010–2012)	3	**0.5**	*0.28*	0.05	*0.05*	0	**-**	-	–	-
Africa, southern										
Botswana (2005–2008)	2	**0.1**	*0.05*	0.00	*0.00*	1	**0.0**	*0.04*	0.00	*0.00*
Namibia (2009)	0	**-**	-	–	-	0	**-**	-	–	-
South Africa (2007)	102	**0.7**	*0.07*	0.09	*0.01*	40	**0.2**	*0.03*	0.03	*0.00*
South Africa, Eastern Cape (2008–2012)	0	**-**	-	–	-	1	**0.0**	*0.04*	0.01	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)	1	**0.0**	*0.02*	0.00	*0.00*	1	**0.1**	*0.10*	0.01	*0.01*
The Gambia (2007–2011)	0	**-**	-	–	-	0	**-**	-	–	-
Guinea, Conakry (2001–2010)	0	**-**	-	–	-	0	**-**	-	–	-
Mali, Bamako (2010–2014)	2	**0.1**	*0.08*	0.02	*0.01*	1	**0.1**	*0.06*	0.01	*0.01*
Niger, Niamey (2006–2009)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Abuja (2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	1	**0.0**	*0.03*	0.00	*0.00*	0	**-**	-	–	-

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Kaposi sarcoma (C46)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	14	**0.6**	*0.16*	0.06	*0.02*	13	**0.4**	*0.13*	0.04	*0.01*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	17	**0.6**	*0.17*	0.06	*0.02*	9	**0.3**	*0.10*	0.02	*0.01*
France, Réunion (2011)	1	**0.2**	*0.24*	0.02	*0.02*	0	**-**	-	–	-
Kenya, Eldoret (2008–2011)	98	**7.0**	*0.80*	0.63	*0.08*	65	**4.7**	*0.66*	0.43	*0.07*
Kenya, Nairobi (2007–2011)	175	**3.2**	*0.34*	0.30	*0.05*	102	**1.8**	*0.25*	0.19	*0.04*
Malawi, Blantyre (2009–2010)	453	**55.5**	*3.06*	5.08	*0.34*	223	**28.9**	*2.28*	2.55	*0.23*
Mauritius (2010–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Mozambique, Beira (2009–2013)	613	**63.6**	*2.91*	5.35	*0.29*	293	**27.5**	*1.81*	2.22	*0.17*
Seychelles (2009–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Uganda, Kampala (2008–2012)	911	**25.2**	*1.14*	2.38	*0.15*	651	**14.8**	*0.79*	1.31	*0.09*
Zimbabwe, Bulawayo: Black (2011–2013)	184	**26.8**	*2.17*	2.76	*0.28*	100	**12.0**	*1.31*	1.11	*0.14*
Zimbabwe, Harare: Black (2010–2012)	293	**20.1**	*1.44*	1.93	*0.19*	182	**9.7**	*0.88*	0.84	*0.10*
Africa, southern										
Botswana (2005–2008)	773	**24.3**	*0.93*	2.19	*0.09*	595	**15.4**	*0.65*	1.26	*0.06*
Namibia (2009)	185	**23.2**	*1.82*	2.06	*0.18*	78	**7.7**	*0.90*	0.66	*0.09*
South Africa (2007)	1365	**5.7**	*0.16*	0.50	*0.02*	1092	**4.1**	*0.13*	0.33	*0.01*
South Africa, Eastern Cape (2008–2012)	85	**5.8**	*0.64*	0.51	*0.06*	81	**3.6**	*0.40*	0.29	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)	16	**0.7**	*0.22*	0.08	*0.03*	22	**0.5**	*0.13*	0.04	*0.01*
The Gambia (2007–2011)	7	**0.3**	*0.19*	0.01	*0.01*	3	**0.1**	*0.05*	0.01	*0.00*
Guinea, Conakry (2001–2010)	24	**0.9**	*0.23*	0.11	*0.04*	11	**0.3**	*0.11*	0.03	*0.01*
Mali, Bamako (2010–2014)	52	**1.7**	*0.27*	0.15	*0.03*	25	**0.7**	*0.16*	0.07	*0.02*
Niger, Niamey (2006–2009)	2	**0.1**	*0.07*	0.01	*0.01*	2	**0.1**	*0.07*	0.01	*0.01*
Nigeria, Abuja (2013)	9	**3.8**	*1.70*	0.21	*0.09*	4	**1.0**	*0.55*	0.08	*0.04*
Nigeria, Calabar (2009–2013)	15	**2.6**	*0.84*	0.31	*0.12*	6	**0.5**	*0.20*	0.03	*0.01*
Nigeria, Ibadan (2006–2009)	11	**0.4**	*0.13*	0.04	*0.01*	7	**0.3**	*0.11*	0.02	*0.01*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Connective and soft tissue (C47, C49)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	24	**0.9**	*0.22*	0.12	*0.04*	24	**0.9**	*0.21*	0.10	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	56	**2.3**	*0.34*	0.22	*0.04*	53	**2.2**	*0.33*	0.22	*0.04*
France, Réunion (2011)	5	**1.4**	*0.63*	0.13	*0.06*	3	**0.7**	*0.43*	0.03	*0.02*
Kenya, Eldoret (2008–2011)	36	**2.6**	*0.51*	0.28	*0.08*	34	**2.6**	*0.53*	0.23	*0.06*
Kenya, Nairobi (2007–2011)	83	**1.7**	*0.26*	0.19	*0.05*	69	**1.4**	*0.25*	0.13	*0.03*
Malawi, Blantyre (2009–2010)	17	**2.0**	*0.65*	0.18	*0.09*	17	**1.8**	*0.51*	0.12	*0.04*
Mauritius (2010–2012)	36	**1.9**	*0.31*	0.16	*0.03*	26	**1.3**	*0.28*	0.13	*0.03*
Mozambique, Beira (2009–2013)	12	**1.5**	*0.49*	0.15	*0.06*	10	**1.5**	*0.54*	0.18	*0.09*
Seychelles (2009–2012)	1	**0.7**	*0.74*	0.09	*0.09*	2	**1.1**	*0.82*	0.23	*0.16*
Uganda, Kampala (2008–2012)	64	**1.8**	*0.34*	0.18	*0.05*	60	**1.6**	*0.28*	0.14	*0.03*
Zimbabwe, Bulawayo: Black (2011–2013)	15	**2.8**	*0.77*	0.39	*0.14*	16	**2.2**	*0.58*	0.19	*0.08*
Zimbabwe, Harare: Black (2010–2012)	28	**1.9**	*0.44*	0.13	*0.04*	42	**3.8**	*0.68*	0.41	*0.08*
Africa, southern										
Botswana (2005–2008)	42	**1.7**	*0.27*	0.20	*0.04*	49	**1.5**	*0.23*	0.16	*0.03*
Namibia (2009)	15	**2.5**	*0.69*	0.28	*0.09*	13	**1.5**	*0.44*	0.15	*0.05*
South Africa (2007)	294	**1.5**	*0.09*	0.16	*0.01*	255	**1.1**	*0.07*	0.11	*0.01*
South Africa, Eastern Cape (2008–2012)	14	**0.8**	*0.23*	0.08	*0.03*	14	**0.5**	*0.14*	0.04	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	4	**1.1**	*0.77*	0.12	*0.09*	2	**0.6**	*0.41*	0.06	*0.05*
Côte d´Ivoire, Abidjan (2012–2013)	25	**1.2**	*0.31*	0.13	*0.04*	28	**1.9**	*0.47*	0.24	*0.08*
The Gambia (2007–2011)	13	**0.6**	*0.21*	0.05	*0.02*	15	**0.5**	*0.15*	0.04	*0.02*
Guinea, Conakry (2001–2010)	32	**1.0**	*0.27*	0.07	*0.03*	20	**0.7**	*0.19*	0.09	*0.03*
Mali, Bamako (2010–2014)	98	**3.1**	*0.36*	0.25	*0.04*	70	**2.5**	*0.35*	0.27	*0.05*
Niger, Niamey (2006–2009)	23	**2.0**	*0.51*	0.13	*0.04*	16	**1.0**	*0.28*	0.07	*0.03*
Nigeria, Abuja (2013)	7	**3.4**	*1.96*	0.46	*0.31*	4	**1.5**	*0.84*	0.11	*0.07*
Nigeria, Calabar (2009–2013)	9	**1.5**	*0.65*	0.18	*0.09*	5	**0.5**	*0.21*	0.03	*0.02*
Nigeria, Ibadan (2006–2009)	64	**2.8**	*0.37*	0.25	*0.04*	47	**2.2**	*0.34*	0.22	*0.04*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Breast (C50)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	22	**1.3**	*0.30*	0.16	*0.05*	491	**20.7**	*1.01*	2.21	*0.13*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	49	**2.8**	*0.42*	0.33	*0.06*	849	**39.1**	*1.44*	3.90	*0.17*
France, Réunion (2011)	4	**0.8**	*0.41*	0.06	*0.06*	332	**61.4**	*3.43*	6.54	*0.42*
Kenya, Eldoret (2008–2011)	13	**1.8**	*0.53*	0.21	*0.08*	187	**21.8**	*1.79*	2.34	*0.23*
Kenya, Nairobi (2007–2011)	72	**2.9**	*0.41*	0.35	*0.07*	1529	**59.7**	*1.89*	7.31	*0.29*
Malawi, Blantyre (2009–2010)	2	**0.6**	*0.42*	0.08	*0.08*	96	**19.0**	*2.16*	2.07	*0.29*
Mauritius (2010–2012)	12	**0.6**	*0.18*	0.09	*0.03*	1266	**51.7**	*1.48*	5.77	*0.19*
Mozambique, Beira (2009–2013)	6	**1.1**	*0.47*	0.13	*0.06*	81	**14.7**	*1.79*	1.59	*0.22*
Seychelles (2009–2012)	1	**0.4**	*0.45*	0.04	*0.04*	74	**33.8**	*4.12*	3.82	*0.55*
Uganda, Kampala (2008–2012)	30	**2.2**	*0.47*	0.31	*0.08*	619	**30.6**	*1.44*	3.30	*0.18*
Zimbabwe, Bulawayo: Black (2011–2013)	7	**1.5**	*0.61*	0.14	*0.09*	231	**37.3**	*2.58*	4.34	*0.37*
Zimbabwe, Harare: Black (2010–2012)	14	**1.7**	*0.49*	0.19	*0.07*	427	**42.3**	*2.28*	5.07	*0.34*
Africa, southern										
Botswana (2005–2008)	21	**0.9**	*0.21*	0.11	*0.03*	510	**18.2**	*0.85*	2.04	*0.11*
Namibia (2009)	9	**1.5**	*0.54*	0.17	*0.08*	272	**36.7**	*2.29*	4.09	*0.30*
South Africa (2007)	121	**0.8**	*0.07*	0.09	*0.01*	5636	**24.5**	*0.33*	2.71	*0.04*
South Africa, Eastern Cape (2008–2012)	17	**1.2**	*0.28*	0.14	*0.04*	306	**12.4**	*0.73*	1.32	*0.08*
Africa, western										
Benin, Cotonou (2013–2015)	6	**2.9**	*1.25*	0.45	*0.20*	153	**40.2**	*3.74*	4.33	*0.48*
Côte d´Ivoire, Abidjan (2012–2013)	12	**1.0**	*0.32*	0.12	*0.04*	536	**36.5**	*1.93*	4.29	*0.28*
The Gambia (2007–2011)	2	**0.1**	*0.07*	0.01	*0.01*	163	**6.5**	*0.64*	0.61	*0.07*
Guinea, Conakry (2001–2010)	15	**0.8**	*0.25*	0.09	*0.03*	446	**14.8**	*0.87*	1.62	*0.12*
Mali, Bamako (2010–2014)	33	**1.2**	*0.23*	0.11	*0.02*	944	**37.0**	*1.30*	4.13	*0.17*
Niger, Niamey (2006–2009)	8	**0.8**	*0.32*	0.08	*0.05*	306	**24.3**	*1.51*	2.52	*0.19*
Nigeria, Abuja (2013)	4	**2.5**	*1.52*	0.04	*0.03*	125	**78.4**	*9.74*	9.22	*1.51*
Nigeria, Calabar (2009–2013)	1	**0.5**	*0.48*	0.08	*0.08*	164	**35.0**	*3.18*	3.87	*0.43*
Nigeria, Ibadan (2006–2009)	23	**1.4**	*0.29*	0.13	*0.03*	747	**39.6**	*1.52*	4.23	*0.19*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Vulva (C51)

	Males			Females			
	Cases	ASR (W)	CUM%	Cases	ASR (W)		CUM%	
Africa, central								
Congo, Brazzaville (2009–2013)				6	**0.3**	*0.15*	0.05	*0.03*
Africa, eastern								
Ethiopia, Addis Ababa (2012–2013)				28	**1.4**	*0.28*	0.16	*0.04*
France, Réunion (2011)				6	**1.1**	*0.45*	0.14	*0.07*
Kenya, Eldoret (2008–2011)				4	**0.4**	*0.22*	0.04	*0.03*
Kenya, Nairobi (2007–2011)				31	**1.2**	*0.27*	0.14	*0.04*
Malawi, Blantyre (2009–2010)				2	**0.4**	*0.28*	0.03	*0.02*
Mauritius (2010–2012)				23	**0.8**	*0.18*	0.07	*0.02*
Mozambique, Beira (2009–2013)				21	**2.9**	*0.72*	0.32	*0.10*
Seychelles (2009–2012)				2	**0.8**	*0.59*	0.07	*0.07*
Uganda, Kampala (2008–2012)				28	**1.2**	*0.26*	0.13	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)				25	**3.2**	*0.67*	0.28	*0.08*
Zimbabwe, Harare: Black (2010–2012)				40	**3.3**	*0.58*	0.31	*0.07*
Africa, southern								
Botswana (2005–2008)				47	**1.5**	*0.22*	0.14	*0.02*
Namibia (2009)				12	**1.5**	*0.46*	0.16	*0.06*
South Africa (2007)				194	**0.8**	*0.06*	0.08	*0.01*
South Africa, Eastern Cape (2008–2012)				22	**0.9**	*0.20*	0.09	*0.02*
Africa, western								
Benin, Cotonou (2013–2015)				1	**0.3**	*0.30*	0.03	*0.03*
Côte d´Ivoire, Abidjan (2012–2013)				14	**1.2**	*0.36*	0.16	*0.06*
The Gambia (2007–2011)				4	**0.2**	*0.10*	0.02	*0.01*
Guinea, Conakry (2001–2010)				11	**0.3**	*0.10*	0.03	*0.01*
Mali, Bamako (2010–2014)				19	**0.7**	*0.19*	0.11	*0.04*
Niger, Niamey (2006–2009)				6	**0.5**	*0.22*	0.07	*0.04*
Nigeria, Abuja (2013)				0	**-**	-	–	-
Nigeria, Calabar (2009–2013)				5	**1.4**	*0.68*	0.20	*0.11*
Nigeria, Ibadan (2006–2009)				5	**0.2**	*0.10*	0.02	*0.01*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Vagina (C52)

	Males			Females			
	Cases	ASR (W)	CUM%	Cases	ASR (W)	CUM%	
Africa, central							
Congo, Brazzaville (2009–2013)				4	**0.2** *0.11*	0.01	*0.01*
Africa, eastern							
Ethiopia, Addis Ababa (2012–2013)				13	**0.7** *0.20*	0.08	*0.03*
France, Réunion (2011)				0	**-** -	–	-
Kenya, Eldoret (2008–2011)				4	**0.4** *0.24*	0.04	*0.03*
Kenya, Nairobi (2007–2011)				13	**0.5** *0.19*	0.06	*0.03*
Malawi, Blantyre (2009–2010)				4	**0.8** *0.42*	0.12	*0.08*
Mauritius (2010–2012)				19	**0.7** *0.17*	0.06	*0.02*
Mozambique, Beira (2009–2013)				3	**0.5** *0.30*	0.02	*0.01*
Seychelles (2009–2012)				6	**3.1** *1.31*	0.43	*0.20*
Uganda, Kampala (2008–2012)				11	**0.5** *0.17*	0.05	*0.02*
Zimbabwe, Bulawayo: Black (2011–2013)				17	**2.3** *0.58*	0.18	*0.07*
Zimbabwe, Harare: Black (2010–2012)				7	**0.6** *0.25*	0.07	*0.03*
Africa, southern							
Botswana (2005–2008)				6	**0.2** *0.09*	0.03	*0.01*
Namibia (2009)				4	**0.6** *0.32*	0.09	*0.05*
South Africa (2007)				150	**0.7** *0.05*	0.07	*0.01*
South Africa, Eastern Cape (2008–2012)				5	**0.2** *0.08*	0.02	*0.01*
Africa, western							
Benin, Cotonou (2013–2015)				2	**0.4** *0.33*	0.04	*0.03*
Côte d´Ivoire, Abidjan (2012–2013)				8	**0.6** *0.24*	0.05	*0.03*
The Gambia (2007–2011)				8	**0.3** *0.12*	0.03	*0.01*
Guinea, Conakry (2001–2010)				12	**0.5** *0.16*	0.06	*0.02*
Mali, Bamako (2010–2014)				19	**0.6** *0.15*	0.06	*0.02*
Niger, Niamey (2006–2009)				9	**0.7** *0.27*	0.08	*0.03*
Nigeria, Abuja (2013)				0	**-** -	–	-
Nigeria, Calabar (2009–2013)				1	**0.1** *0.11*	0.01	*0.01*
Nigeria, Ibadan (2006–2009)				7	**0.5** *0.18*	0.06	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Cervix uteri (C53)

	Males			Females			
	Cases	ASR (W)	CUM%	Cases	ASR (W)		CUM%	
Africa, central								
Congo, Brazzaville (2009–2013)				331	**17.4**	*1.01*	2.05	*0.14*
Africa, eastern								
Ethiopia, Addis Ababa (2012–2013)				340	**18.2**	*1.03*	2.13	*0.14*
France, Réunion (2011)				60	**10.6**	*1.41*	1.10	*0.17*
Kenya, Eldoret (2008–2011)				237	**26.8**	*1.93*	2.92	*0.25*
Kenya, Nairobi (2007–2011)				1139	**43.3**	*1.59*	5.19	*0.24*
Malawi, Blantyre (2009–2010)				489	**89.3**	*4.56*	9.47	*0.57*
Mauritius (2010–2012)				262	**10.8**	*0.68*	1.27	*0.09*
Mozambique, Beira (2009–2013)				302	**46.7**	*3.00*	4.69	*0.37*
Seychelles (2009–2012)				28	**12.7**	*2.47*	1.29	*0.29*
Uganda, Kampala (2008–2012)				1057	**51.1**	*1.83*	5.67	*0.24*
Zimbabwe, Bulawayo: Black (2011–2013)				657	**102.4**	*4.22*	11.53	*0.59*
Zimbabwe, Harare: Black (2010–2012)				862	**85.9**	*3.24*	9.70	*0.46*
Africa, southern								
Botswana (2005–2008)				795	**27.1**	*1.01*	2.98	*0.13*
Namibia (2009)				162	**20.6**	*1.67*	2.16	*0.21*
South Africa (2007)				4889	**20.9**	*0.31*	2.27	*0.04*
South Africa, Eastern Cape (2008–2012)				734	**29.5**	*1.12*	3.36	*0.14*
Africa, western								
Benin, Cotonou (2013–2015)				63	**23.1**	*3.23*	2.74	*0.47*
Côte d´Ivoire, Abidjan (2012–2013)				276	**23.5**	*1.66*	3.02	*0.27*
The Gambia (2007–2011)				439	**19.5**	*1.18*	2.09	*0.16*
Guinea, Conakry (2001–2010)				1251	**43.7**	*1.52*	4.93	*0.21*
Mali, Bamako (2010–2014)				1140	**48.4**	*1.54*	5.73	*0.22*
Niger, Niamey (2006–2009)				88	**8.3**	*0.95*	0.97	*0.13*
Nigeria, Abuja (2013)				31	**41.3**	*8.80*	5.91	*1.47*
Nigeria, Calabar (2009–2013)				77	**21.0**	*2.72*	2.46	*0.37*
Nigeria, Ibadan (2006–2009)				455	**27.0**	*1.32*	3.33	*0.19*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Uterus (C54-55)

	Males			Females			
	Cases	ASR (W)	CUM%	Cases	ASR (W)		CUM%	
Africa, central								
Congo, Brazzaville (2009–2013)				40	**2.2**	*0.37*	0.24	*0.05*
Africa, eastern								
Ethiopia, Addis Ababa (2012–2013)				56	**2.7**	*0.39*	0.31	*0.05*
France, Réunion (2011)				34	**6.5**	*1.14*	0.93	*0.19*
Kenya, Eldoret (2008–2011)				36	**5.0**	*0.91*	0.68	*0.14*
Kenya, Nairobi (2007–2011)				154	**8.0**	*0.76*	1.07	*0.12*
Malawi, Blantyre (2009–2010)				19	**3.8**	*0.95*	0.42	*0.12*
Mauritius (2010–2012)				205	**8.6**	*0.62*	1.14	*0.09*
Mozambique, Beira (2009–2013)				10	**1.8**	*0.61*	0.17	*0.08*
Seychelles (2009–2012)				13	**6.1**	*1.83*	0.67	*0.25*
Uganda, Kampala (2008–2012)				87	**5.3**	*0.63*	0.69	*0.09*
Zimbabwe, Bulawayo: Black (2011–2013)				64	**12.1**	*1.57*	1.64	*0.26*
Zimbabwe, Harare: Black (2010–2012)				77	**10.4**	*1.24*	1.25	*0.19*
Africa, southern								
Botswana (2005–2008)				101	**3.8**	*0.40*	0.50	*0.06*
Namibia (2009)				32	**4.8**	*0.87*	0.63	*0.14*
South Africa (2007)				955	**4.4**	*0.14*	0.55	*0.02*
South Africa, Eastern Cape (2008–2012)				67	**2.6**	*0.33*	0.34	*0.05*
Africa, western								
Benin, Cotonou (2013–2015)				12	**5.7**	*1.78*	0.83	*0.28*
Côte d´Ivoire, Abidjan (2012–2013)				43	**4.8**	*0.81*	0.72	*0.14*
The Gambia (2007–2011)				29	**1.4**	*0.32*	0.16	*0.04*
Guinea, Conakry (2001–2010)				67	**2.9**	*0.41*	0.42	*0.07*
Mali, Bamako (2010–2014)				97	**4.4**	*0.49*	0.58	*0.08*
Niger, Niamey (2006–2009)				42	**4.0**	*0.66*	0.48	*0.10*
Nigeria, Abuja (2013)				7	**9.7**	*4.52*	1.12	*0.63*
Nigeria, Calabar (2009–2013)				9	**2.6**	*0.99*	0.32	*0.13*
Nigeria, Ibadan (2006–2009)				66	**4.0**	*0.51*	0.51	*0.08*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Ovary (C56)

	Males			Females			
	Cases	ASR (W)	CUM%	Cases	ASR (W)		CUM%	
Africa, central								
Congo, Brazzaville (2009–2013)				88	**4.1**	*0.47*	0.46	*0.06*
Africa, eastern								
Ethiopia, Addis Ababa (2012–2013)				166	**8.0**	*0.67*	0.87	*0.09*
France, Réunion (2011)				36	**7.3**	*1.23*	0.89	*0.17*
Kenya, Eldoret (2008–2011)				41	**3.8**	*0.66*	0.37	*0.08*
Kenya, Nairobi (2007–2011)				195	**8.8**	*0.76*	1.13	*0.13*
Malawi, Blantyre (2009–2010)				22	**3.2**	*0.80*	0.34	*0.11*
Mauritius (2010–2012)				157	**6.6**	*0.54*	0.72	*0.07*
Mozambique, Beira (2009–2013)				10	**1.2**	*0.47*	0.11	*0.05*
Seychelles (2009–2012)				9	**4.5**	*1.58*	0.46	*0.20*
Uganda, Kampala (2008–2012)				143	**7.2**	*0.71*	0.89	*0.10*
Zimbabwe, Bulawayo: Black (2011–2013)				49	**7.2**	*1.12*	0.81	*0.15*
Zimbabwe, Harare: Black (2010–2012)				72	**6.8**	*0.93*	0.79	*0.14*
Africa, southern								
Botswana (2005–2008)				76	**2.6**	*0.32*	0.28	*0.04*
Namibia (2009)				26	**3.6**	*0.73*	0.34	*0.08*
South Africa (2007)				406	**1.8**	*0.09*	0.20	*0.01*
South Africa, Eastern Cape (2008–2012)				58	**2.3**	*0.31*	0.23	*0.04*
Africa, western								
Benin, Cotonou (2013–2015)				12	**2.6**	*0.82*	0.28	*0.10*
Côte d´Ivoire, Abidjan (2012–2013)				68	**4.5**	*0.68*	0.53	*0.10*
The Gambia (2007–2011)				24	**1.0**	*0.26*	0.11	*0.04*
Guinea, Conakry (2001–2010)				91	**2.7**	*0.36*	0.31	*0.05*
Mali, Bamako (2010–2014)				126	**4.6**	*0.46*	0.54	*0.07*
Niger, Niamey (2006–2009)				91	**7.7**	*0.88*	0.83	*0.12*
Nigeria, Abuja (2013)				8	**12.1**	*4.90*	1.27	*0.65*
Nigeria, Calabar (2009–2013)				14	**2.9**	*0.87*	0.29	*0.09*
Nigeria, Ibadan (2006–2009)				96	**4.7**	*0.51*	0.53	*0.07*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Placenta (C58)

	Males			Females			
	Cases	ASR (W)	CUM%	Cases	ASR (W)		CUM%	
Africa, central								
Congo, Brazzaville (2009–2013)				7	**0.2**	*0.07*	0.01	*0.01*
Africa, eastern								
Ethiopia, Addis Ababa (2012–2013)				0	**-**	-	–	-
France, Réunion (2011)				0	**-**	-	–	-
Kenya, Eldoret (2008–2011)				4	**0.3**	*0.15*	0.02	*0.01*
Kenya, Nairobi (2007–2011)				6	**0.1**	*0.02*	0.00	*0.00*
Malawi, Blantyre (2009–2010)				0	**-**	-	–	-
Mauritius (2010–2012)				0	**-**	-	–	-
Mozambique, Beira (2009–2013)				6	**0.5**	*0.25*	0.04	*0.02*
Seychelles (2009–2012)				0	**-**	-	–	-
Uganda, Kampala (2008–2012)				27	**0.5**	*0.12*	0.04	*0.01*
Zimbabwe, Bulawayo: Black (2011–2013)				7	**0.8**	*0.33*	0.07	*0.04*
Zimbabwe, Harare: Black (2010–2012)				21	**0.9**	*0.25*	0.10	*0.05*
Africa, southern								
Botswana (2005–2008)				13	**0.3**	*0.09*	0.02	*0.01*
Namibia (2009)				5	**0.4**	*0.21*	0.03	*0.01*
South Africa (2007)				12	**0.0**	*0.01*	0.00	*0.00*
South Africa, Eastern Cape (2008–2012)				11	**0.5**	*0.14*	0.04	*0.01*
Africa, western								
Benin, Cotonou (2013–2015)				0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)				10	**0.3**	*0.13*	0.01	*0.01*
The Gambia (2007–2011)				0	**-**	-	–	-
Guinea, Conakry (2001–2010)				15	**0.2**	*0.06*	0.02	*0.00*
Mali, Bamako (2010–2014)				20	**0.4**	*0.10*	0.03	*0.01*
Niger, Niamey (2006–2009)				1	**0.0**	*0.05*	0.00	*0.00*
Nigeria, Abuja (2013)				0	**-**	-	–	-
Nigeria, Calabar (2009–2013)				0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)				12	**0.4**	*0.11*	0.03	*0.01*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Penis (C60)

	Males				Females		
	Cases	ASR (W)		CUM%		Cases	ASR (W)	CUM%
Africa, central								
Congo, Brazzaville (2009–2013)	2	**0.1**	*0.06*	0.01	*0.01*			
Africa, eastern								
Ethiopia, Addis Ababa (2012–2013)	1	**0.1**	*0.06*	0.01	*0.01*			
France, Réunion (2011)	0	**-**	-	–	-			
Kenya, Eldoret (2008–2011)	4	**0.5**	*0.28*	0.06	*0.03*			
Kenya, Nairobi (2007–2011)	11	**0.4**	*0.14*	0.01	*0.01*			
Malawi, Blantyre (2009–2010)	17	**3.5**	*0.95*	0.49	*0.17*			
Mauritius (2010–2012)	12	**0.5**	*0.16*	0.07	*0.02*			
Mozambique, Beira (2009–2013)	5	**1.0**	*0.52*	0.09	*0.06*			
Seychelles (2009–2012)	2	**1.3**	*0.96*	0.20	*0.15*			
Uganda, Kampala (2008–2012)	39	**2.3**	*0.45*	0.26	*0.07*			
Zimbabwe, Bulawayo: Black (2011–2013)	20	**3.9**	*0.94*	0.44	*0.13*			
Zimbabwe, Harare: Black (2010–2012)	23	**1.8**	*0.45*	0.17	*0.04*			
Africa, southern								
Botswana (2005–2008)	55	**2.2**	*0.32*	0.26	*0.05*			
Namibia (2009)	3	**0.5**	*0.27*	0.04	*0.03*			
South Africa (2007)	109	**0.6**	*0.06*	0.07	*0.01*			
South Africa, Eastern Cape (2008–2012)	15	**1.0**	*0.26*	0.11	*0.03*			
Africa, western								
Benin, Cotonou (2013–2015)	1	**0.9**	*0.86*	–	-			
Côte d´Ivoire, Abidjan (2012–2013)	3	**0.3**	*0.18*	0.05	*0.04*			
The Gambia (2007–2011)	5	**0.3**	*0.12*	0.04	*0.02*			
Guinea, Conakry (2001–2010)	5	**0.2**	*0.14*	0.01	*0.00*			
Mali, Bamako (2010–2014)	5	**0.1**	*0.07*	0.01	*0.01*			
Niger, Niamey (2006–2009)	1	**0.1**	*0.14*	0.02	*0.02*			
Nigeria, Abuja (2013)	0	**-**	-	–	-			
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-			
Nigeria, Ibadan (2006–2009)	0	**-**	-	–	-			

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Prostate (C61)

	Males				Females			
	Cases	ASR (W)		CUM%		Cases	ASR (W)	CUM%
Africa, central								
Congo, Brazzaville (2009–2013)	527	**42.6**	*1.88*	5.19	*0.29*			
Africa, eastern								
Ethiopia, Addis Ababa (2012–2013)	84	**5.7**	*0.63*	0.79	*0.11*			
France, Réunion (2011)	289	**65.3**	*3.88*	8.68	*0.62*			
Kenya, Eldoret (2008–2011)	114	**15.8**	*1.58*	2.05	*0.28*			
Kenya, Nairobi (2007–2011)	683	**43.9**	*1.78*	5.57	*0.31*			
Malawi, Blantyre (2009–2010)	41	**11.5**	*1.89*	1.75	*0.36*			
Mauritius (2010–2012)	297	**16.0**	*0.94*	1.77	*0.15*			
Mozambique, Beira (2009–2013)	8	**2.5**	*0.90*	0.42	*0.17*			
Seychelles (2009–2012)	103	**63.1**	*6.31*	7.39	*1.02*			
Uganda, Kampala (2008–2012)	515	**49.5**	*2.31*	6.87	*0.40*			
Zimbabwe, Bulawayo: Black (2011–2013)	204	**51.5**	*3.68*	5.00	*0.57*			
Zimbabwe, Harare: Black (2010–2012)	533	**86.0**	*3.82*	9.83	*0.62*			
Africa, southern								
Botswana (2005–2008)	210	**9.2**	*0.67*	1.12	*0.11*			
Namibia (2009)	222	**47.9**	*3.24*	5.49	*0.47*			
South Africa (2007)	4293	**30.6**	*0.48*	3.85	*0.07*			
South Africa, Eastern Cape (2008–2012)	182	**10.3**	*0.78*	1.21	*0.12*			
Africa, western								
Benin, Cotonou (2013–2015)	75	**55.6**	*6.67*	7.06	*1.14*			
Côte d´Ivoire, Abidjan (2012–2013)	251	**29.2**	*1.93*	3.84	*0.33*			
The Gambia (2007–2011)	103	**7.1**	*0.80*	0.90	*0.12*			
Guinea, Conakry (2001–2010)	357	**30.5**	*1.74*	3.26	*0.24*			
Mali, Bamako (2010–2014)	354	**19.8**	*1.07*	2.39	*0.17*			
Niger, Niamey (2006–2009)	23	**3.5**	*0.75*	0.51	*0.13*			
Nigeria, Abuja (2013)	53	**61.3**	*9.79*	9.04	*1.77*			
Nigeria, Calabar (2009–2013)	150	**50.8**	*4.33*	6.51	*0.69*			
Nigeria, Ibadan (2006–2009)	438	**27.7**	*1.35*	3.64	*0.22*			

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Testis (C62)

	Males					Females			
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%
Africa, central									
Congo, Brazzaville (2009–2013)	5	**0.1**	*0.04*	0.01	*0.00*				
Africa, eastern									
Ethiopia, Addis Ababa (2012–2013)	10	**0.3**	*0.10*	0.03	*0.01*				
France, Réunion (2011)	12	**3.0**	*0.89*	0.23	*0.07*				
Kenya, Eldoret (2008–2011)	4	**0.6**	*0.29*	0.06	*0.03*				
Kenya, Nairobi (2007–2011)	10	**0.2**	*0.08*	0.01	*0.00*				
Malawi, Blantyre (2009–2010)	4	**0.6**	*0.36*	0.10	*0.09*				
Mauritius (2010–2012)	28	**1.3**	*0.25*	0.10	*0.02*				
Mozambique, Beira (2009–2013)	0	**-**	-	–	-				
Seychelles (2009–2012)	2	**1.1**	*0.75*	0.10	*0.07*				
Uganda, Kampala (2008–2012)	12	**0.3**	*0.10*	0.02	*0.01*				
Zimbabwe, Bulawayo: Black (2011–2013)	0	**-**	-	–	-				
Zimbabwe, Harare: Black (2010–2012)	3	**0.4**	*0.28*	0.07	*0.05*				
Africa, southern									
Botswana (2005–2008)	12	**0.4**	*0.13*	0.04	*0.02*				
Namibia (2009)	7	**1.0**	*0.42*	0.13	*0.06*				
South Africa (2007)	151	**0.6**	*0.05*	0.05	*0.00*				
South Africa, Eastern Cape (2008–2012)	7	**0.4**	*0.16*	0.03	*0.01*				
Africa, western									
Benin, Cotonou (2013–2015)	2	**0.4**	*0.35*	0.04	*0.03*				
Côte d´Ivoire, Abidjan (2012–2013)	2	**0.0**	*0.02*	0.00	*0.00*				
The Gambia (2007–2011)	3	**0.2**	*0.12*	0.04	*0.02*				
Guinea, Conakry (2001–2010)	3	**0.0**	*0.02*	0.00	*0.00*				
Mali, Bamako (2010–2014)	21	**0.7**	*0.17*	0.06	*0.02*				
Niger, Niamey (2006–2009)	7	**0.8**	*0.33*	0.07	*0.03*				
Nigeria, Abuja (2013)	0	**-**	-	–	-				
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-				
Nigeria, Ibadan (2006–2009)	5	**0.2**	*0.07*	0.01	*0.00*				

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Kidney and renal pelvis (C64-65)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	29	**0.9**	*0.20*	0.10	*0.03*	10	**0.3**	*0.09*	0.02	*0.01*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	26	**1.5**	*0.30*	0.14	*0.04*	35	**1.8**	*0.32*	0.18	*0.04*
France, Réunion (2011)	34	**7.3**	*1.27*	0.90	*0.18*	20	**3.9**	*0.92*	0.44	*0.12*
Kenya, Eldoret (2008–2011)	16	**1.1**	*0.36*	0.10	*0.05*	13	**1.0**	*0.32*	0.07	*0.03*
Kenya, Nairobi (2007–2011)	43	**1.4**	*0.28*	0.21	*0.06*	58	**1.9**	*0.35*	0.24	*0.06*
Malawi, Blantyre (2009–2010)	8	**0.6**	*0.22*	0.03	*0.01*	13	**1.2**	*0.37*	0.07	*0.03*
Mauritius (2010–2012)	63	**3.0**	*0.38*	0.29	*0.05*	26	**1.2**	*0.26*	0.14	*0.03*
Mozambique, Beira (2009–2013)	2	**0.2**	*0.12*	0.01	*0.00*	1	**0.1**	*0.08*	0.00	*0.00*
Seychelles (2009–2012)	4	**2.6**	*1.34*	0.43	*0.24*	3	**1.3**	*0.76*	0.12	*0.08*
Uganda, Kampala (2008–2012)	48	**1.8**	*0.37*	0.17	*0.05*	46	**1.2**	*0.23*	0.08	*0.02*
Zimbabwe, Bulawayo: Black (2011–2013)	17	**3.3**	*0.90*	0.53	*0.18*	13	**1.7**	*0.51*	0.16	*0.07*
Zimbabwe, Harare: Black (2010–2012)	29	**3.0**	*0.65*	0.37	*0.11*	22	**1.5**	*0.35*	0.09	*0.03*
Africa, southern										
Botswana (2005–2008)	25	**1.0**	*0.20*	0.11	*0.03*	21	**0.7**	*0.15*	0.08	*0.02*
Namibia (2009)	12	**2.2**	*0.66*	0.16	*0.06*	8	**1.1**	*0.41*	0.11	*0.04*
South Africa (2007)	239	**1.4**	*0.09*	0.17	*0.01*	158	**0.7**	*0.06*	0.07	*0.01*
South Africa, Eastern Cape (2008–2012)	8	**0.2**	*0.09*	0.01	*0.00*	10	**0.4**	*0.11*	0.03	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	12	**4.0**	*1.43*	0.59	*0.28*	11	**3.5**	*1.23*	0.33	*0.14*
Côte d´Ivoire, Abidjan (2012–2013)	15	**0.6**	*0.21*	0.07	*0.03*	13	**0.6**	*0.23*	0.07	*0.03*
The Gambia (2007–2011)	5	**0.2**	*0.12*	0.02	*0.01*	1	**-**	-	–	-
Guinea, Conakry (2001–2010)	17	**0.4**	*0.13*	0.05	*0.03*	17	**0.3**	*0.09*	0.02	*0.01*
Mali, Bamako (2010–2014)	92	**2.3**	*0.29*	0.20	*0.03*	77	**1.8**	*0.24*	0.15	*0.03*
Niger, Niamey (2006–2009)	17	**1.6**	*0.43*	0.15	*0.05*	7	**0.6**	*0.24*	0.07	*0.04*
Nigeria, Abuja (2013)	3	**1.3**	*0.84*	0.16	*0.10*	4	**3.2**	*2.65*	0.47	*0.44*
Nigeria, Calabar (2009–2013)	5	**0.6**	*0.28*	0.05	*0.02*	3	**0.2**	*0.14*	0.01	*0.01*
Nigeria, Ibadan (2006–2009)	14	**0.6**	*0.18*	0.06	*0.02*	19	**0.9**	*0.21*	0.09	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Ureter and other urinary (C66, C68)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	0	**-**	-	–	-	2	**0.1**	*0.09*	0.01	*0.01*
France, Réunion (2011)	1	**0.2**	*0.19*	–	-	1	**0.1**	*0.11*	–	-
Kenya, Eldoret (2008–2011)	1	**0.0**	*0.05*	0.00	*0.00*	1	**0.2**	*0.20*	0.03	*0.03*
Kenya, Nairobi (2007–2011)	0	**-**	-	–	-	1	**0.1**	*0.05*	0.01	*0.01*
Malawi, Blantyre (2009–2010)	0	**-**	-	–	-	0	**-**	-	–	-
Mauritius (2010–2012)	0	**-**	-	–	-	2	**0.1**	*0.05*	0.01	*0.01*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Seychelles (2009–2012)	0	**-**	-	–	-	1	**0.4**	*0.41*	0.03	*0.03*
Uganda, Kampala (2008–2012)	4	**0.2**	*0.12*	0.01	*0.01*	2	**0.2**	*0.17*	0.04	*0.03*
Zimbabwe, Bulawayo: Black (2011–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Zimbabwe, Harare: Black (2010–2012)	1	**0.1**	*0.15*	–	-	1	**0.1**	*0.06*	0.01	*0.01*
Africa, southern										
Botswana (2005–2008)	0	**-**	-	–	-	2	**0.1**	*0.07*	0.01	*0.01*
Namibia (2009)	0	**-**	-	–	-	0	**-**	-	–	-
South Africa (2007)	32	**0.2**	*0.04*	0.03	*0.01*	26	**0.1**	*0.02*	0.01	*0.00*
South Africa, Eastern Cape (2008–2012)	1	**0.1**	*0.07*	0.01	*0.01*	0	**-**	-	–	-
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)	0	**-**	-	–	-	0	**-**	-	–	-
The Gambia (2007–2011)	0	**-**	-	–	-	0	**-**	-	–	-
Guinea, Conakry (2001–2010)	0	**-**	-	–	-	1	**0.0**	*0.01*	0.00	*0.00*
Mali, Bamako (2010–2014)	2	**0.1**	*0.07*	0.01	*0.01*	2	**0.1**	*0.05*	0.01	*0.01*
Niger, Niamey (2006–2009)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Abuja (2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	1	**0.1**	*0.07*	0.02	*0.02*	0	**-**	-	–	-

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Bladder (C67)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	12	**0.8**	*0.25*	0.08	*0.03*	21	**1.1**	*0.26*	0.14	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	57	**3.5**	*0.47*	0.41	*0.07*	23	**1.5**	*0.31*	0.21	*0.05*
France, Réunion (2011)	42	**9.1**	*1.41*	1.13	*0.24*	16	**2.9**	*0.75*	0.34	*0.11*
Kenya, Eldoret (2008–2011)	16	**1.8**	*0.49*	0.22	*0.08*	11	**1.4**	*0.48*	0.23	*0.09*
Kenya, Nairobi (2007–2011)	70	**4.0**	*0.53*	0.60	*0.10*	35	**1.8**	*0.34*	0.22	*0.05*
Malawi, Blantyre (2009–2010)	35	**7.5**	*1.41*	0.94	*0.23*	37	**6.8**	*1.32*	0.77	*0.19*
Mauritius (2010–2012)	105	**5.4**	*0.54*	0.63	*0.09*	31	**1.3**	*0.23*	0.15	*0.03*
Mozambique, Beira (2009–2013)	15	**2.8**	*0.82*	0.40	*0.14*	14	**2.3**	*0.66*	0.24	*0.09*
Seychelles (2009–2012)	9	**5.2**	*1.78*	0.48	*0.24*	4	**1.5**	*0.78*	0.18	*0.13*
Uganda, Kampala (2008–2012)	32	**2.2**	*0.44*	0.22	*0.06*	27	**1.6**	*0.35*	0.17	*0.05*
Zimbabwe, Bulawayo: Black (2011–2013)	10	**2.3**	*0.76*	0.15	*0.08*	6	**1.2**	*0.48*	0.16	*0.09*
Zimbabwe, Harare: Black (2010–2012)	40	**5.7**	*0.93*	0.57	*0.14*	44	**4.9**	*0.79*	0.53	*0.11*
Africa, southern										
Botswana (2005–2008)	18	**0.9**	*0.22*	0.12	*0.03*	15	**0.5**	*0.14*	0.07	*0.02*
Namibia (2009)	31	**6.4**	*1.17*	0.68	*0.17*	14	**2.1**	*0.57*	0.19	*0.08*
South Africa (2007)	666	**4.5**	*0.18*	0.50	*0.03*	227	**1.0**	*0.07*	0.10	*0.01*
South Africa, Eastern Cape (2008–2012)	9	**0.6**	*0.21*	0.06	*0.02*	7	**0.2**	*0.10*	0.03	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	7	**2.0**	*0.85*	0.23	*0.12*	2	**0.5**	*0.36*	0.05	*0.03*
Côte d´Ivoire, Abidjan (2012–2013)	16	**1.2**	*0.36*	0.16	*0.06*	9	**0.8**	*0.30*	0.06	*0.03*
The Gambia (2007–2011)	21	**1.2**	*0.28*	0.14	*0.04*	9	**0.7**	*0.26*	0.05	*0.02*
Guinea, Conakry (2001–2010)	23	**1.0**	*0.27*	0.12	*0.04*	10	**0.4**	*0.16*	0.03	*0.01*
Mali, Bamako (2010–2014)	260	**10.5**	*0.71*	1.27	*0.11*	169	**6.9**	*0.58*	0.85	*0.08*
Niger, Niamey (2006–2009)	22	**2.6**	*0.61*	0.19	*0.05*	9	**1.2**	*0.40*	0.15	*0.06*
Nigeria, Abuja (2013)	4	**0.9**	*0.47*	0.08	*0.04*	1	**1.5**	*1.49*	0.19	*0.19*
Nigeria, Calabar (2009–2013)	2	**0.3**	*0.28*	0.00	*0.00*	2	**0.7**	*0.57*	0.10	*0.09*
Nigeria, Ibadan (2006–2009)	31	**1.8**	*0.33*	0.23	*0.05*	13	**0.7**	*0.21*	0.08	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Conjunctiva: squamous cell carcinoma*

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	3	**0.1**	*0.07*	0.01	*0.01*	3	**0.1**	*0.05*	0.01	*0.00*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	11	**0.4**	*0.14*	0.03	*0.01*	7	**0.3**	*0.11*	0.03	*0.01*
France, Réunion (2011)	0	**-**	-	–	-	0	**-**	-	–	-
Kenya, Eldoret (2008–2011)	18	**1.5**	*0.40*	0.15	*0.04*	13	**1.0**	*0.33*	0.09	*0.04*
Kenya, Nairobi (2007–2011)	58	**1.2**	*0.23*	0.14	*0.04*	102	**2.3**	*0.29*	0.21	*0.04*
Malawi, Blantyre (2009–2010)	14	**1.6**	*0.48*	0.13	*0.04*	22	**3.0**	*0.71*	0.26	*0.07*
Mauritius (2010–2012)	1	**0.1**	*0.05*	0.01	*0.01*	1	**0.0**	*0.04*	0.00	*0.00*
Mozambique, Beira (2009–2013)	5	**0.6**	*0.28*	0.06	*0.03*	12	**1.1**	*0.33*	0.08	*0.03*
Seychelles (2009–2012)	0	**-**	-	–	-	1	**0.4**	*0.45*	0.04	*0.04*
Uganda, Kampala (2008–2012)	76	**2.5**	*0.38*	0.23	*0.05*	77	**2.2**	*0.32*	0.20	*0.03*
Zimbabwe, Bulawayo: Black (2011–2013)	30	**4.5**	*0.89*	0.47	*0.10*	33	**4.1**	*0.76*	0.36	*0.08*
Zimbabwe, Harare: Black (2010–2012)	44	**3.1**	*0.55*	0.33	*0.08*	52	**3.5**	*0.56*	0.32	*0.06*
Africa, southern										
Botswana (2005–2008)	109	**3.7**	*0.37*	0.33	*0.04*	153	**4.4**	*0.38*	0.44	*0.04*
Namibia (2009)	25	**3.0**	*0.62*	0.24	*0.05*	23	**2.4**	*0.52*	0.23	*0.05*
South Africa (2007)	111	**0.5**	*0.05*	0.05	*0.01*	161	**0.6**	*0.05*	0.05	*0.00*
South Africa, Eastern Cape (2008–2012)	3	**0.2**	*0.13*	0.02	*0.01*	10	**0.4**	*0.14*	0.04	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)	7	**0.3**	*0.13*	0.03	*0.01*	11	**0.7**	*0.27*	0.08	*0.04*
The Gambia (2007–2011)	3	**0.2**	*0.12*	0.02	*0.02*	2	**0.0**	*0.04*	0.00	*0.00*
Guinea, Conakry (2001–2010)	8	**0.1**	*0.06*	0.01	*0.01*	6	**0.1**	*0.07*	0.01	*0.01*
Mali, Bamako (2010–2014)	16	**0.6**	*0.17*	0.07	*0.03*	25	**0.7**	*0.15*	0.06	*0.01*
Niger, Niamey (2006–2009)	3	**0.1**	*0.08*	0.01	*0.01*	1	**0.1**	*0.15*	0.02	*0.02*
Nigeria, Abuja (2013)	0	**-**	-	–	-	2	**1.1**	*0.92*	0.10	*0.09*
Nigeria, Calabar (2009–2013)	6	**0.6**	*0.27*	0.05	*0.02*	4	**0.3**	*0.14*	0.02	*0.01*
Nigeria, Ibadan (2006–2009)	2	**0.1**	*0.09*	0.01	*0.01*	5	**0.2**	*0.10*	0.03	*0.02*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

*Includes malignant neoplasm of conjunctiva (C69.0) with unspecified histology or carcinoma NOS (M8000-8034) and squamous cell carcinoma (M8070) of eye NOS (C69.9).

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Brain and nervous system (C70-72)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	7	**0.2**	*0.09*	0.02	*0.01*	10	**0.5**	*0.16*	0.04	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	29	**1.3**	*0.27*	0.14	*0.04*	20	**0.8**	*0.20*	0.10	*0.03*
France, Réunion (2011)	11	**2.6**	*0.80*	0.33	*0.11*	9	**1.8**	*0.63*	0.18	*0.07*
Kenya, Eldoret (2008–2011)	28	**2.8**	*0.64*	0.34	*0.10*	18	**1.6**	*0.47*	0.23	*0.08*
Kenya, Nairobi (2007–2011)	94	**3.0**	*0.41*	0.35	*0.06*	110	**3.4**	*0.44*	0.39	*0.07*
Malawi, Blantyre (2009–2010)	2	**0.1**	*0.10*	0.01	*0.00*	3	**0.4**	*0.25*	0.03	*0.02*
Mauritius (2010–2012)	54	**2.7**	*0.38*	0.29	*0.05*	52	**2.5**	*0.36*	0.21	*0.03*
Mozambique, Beira (2009–2013)	2	**0.1**	*0.09*	0.01	*0.00*	1	**0.3**	*0.29*	0.04	*0.04*
Seychelles (2009–2012)	1	**0.7**	*0.67*	0.17	*0.17*	2	**1.3**	*0.94*	0.14	*0.12*
Uganda, Kampala (2008–2012)	55	**2.4**	*0.42*	0.25	*0.06*	54	**1.9**	*0.34*	0.19	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	2	**0.4**	*0.30*	0.04	*0.03*	6	**0.8**	*0.34*	0.09	*0.06*
Zimbabwe, Harare: Black (2010–2012)	40	**2.7**	*0.53*	0.29	*0.08*	45	**3.2**	*0.54*	0.26	*0.05*
Africa, southern										
Botswana (2005–2008)	22	**0.7**	*0.16*	0.06	*0.02*	21	**0.6**	*0.13*	0.04	*0.01*
Namibia (2009)	14	**2.0**	*0.58*	0.22	*0.07*	11	**1.1**	*0.34*	0.10	*0.03*
South Africa (2007)	158	**0.8**	*0.06*	0.08	*0.01*	129	**0.5**	*0.05*	0.05	*0.01*
South Africa, Eastern Cape (2008–2012)	4	**0.2**	*0.10*	0.01	*0.01*	9	**0.3**	*0.12*	0.03	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	2	**1.1**	*0.95*	0.25	*0.24*	1	**0.6**	*0.56*	0.14	*0.14*
Côte d´Ivoire, Abidjan (2012–2013)	8	**0.4**	*0.17*	0.03	*0.01*	7	**0.3**	*0.16*	0.03	*0.02*
The Gambia (2007–2011)	8	**0.3**	*0.27*	0.05	*0.04*	5	**0.2**	*0.14*	0.03	*0.02*
Guinea, Conakry (2001–2010)	0	**-**	-	–	-	0	**-**	-	–	-
Mali, Bamako (2010–2014)	22	**0.5**	*0.12*	0.03	*0.01*	24	**0.8**	*0.18*	0.07	*0.02*
Niger, Niamey (2006–2009)	16	**1.0**	*0.29*	0.10	*0.03*	6	**0.3**	*0.11*	0.02	*0.01*
Nigeria, Abuja (2013)	1	**1.8**	*1.80*	0.30	*0.30*	2	**1.3**	*0.99*	0.12	*0.10*
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	39	**1.7**	*0.28*	0.14	*0.03*	35	**1.5**	*0.26*	0.12	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Thyroid (C73)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	2	**0.1**	*0.10*	0.02	*0.02*	10	**0.4**	*0.16*	0.05	*0.02*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	37	**1.8**	*0.31*	0.20	*0.04*	92	**4.1**	*0.48*	0.44	*0.06*
France, Réunion (2011)	7	**1.6**	*0.61*	0.18	*0.08*	9	**1.6**	*0.54*	0.11	*0.04*
Kenya, Eldoret (2008–2011)	8	**1.0**	*0.37*	0.11	*0.06*	19	**1.9**	*0.50*	0.22	*0.07*
Kenya, Nairobi (2007–2011)	20	**0.7**	*0.20*	0.10	*0.04*	84	**3.2**	*0.44*	0.39	*0.07*
Malawi, Blantyre (2009–2010)	1	**0.1**	*0.07*	0.00	*0.00*	8	**2.1**	*0.79*	0.21	*0.08*
Mauritius (2010–2012)	21	**0.9**	*0.21*	0.08	*0.02*	36	**1.5**	*0.26*	0.15	*0.03*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	7	**1.1**	*0.45*	0.15	*0.08*
Seychelles (2009–2012)	0	**-**	-	–	-	7	**3.8**	*1.44*	0.33	*0.13*
Uganda, Kampala (2008–2012)	16	**1.0**	*0.31*	0.14	*0.05*	44	**2.0**	*0.36*	0.21	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	4	**1.0**	*0.53*	0.17	*0.10*	23	**4.2**	*0.90*	0.45	*0.12*
Zimbabwe, Harare: Black (2010–2012)	5	**0.5**	*0.24*	0.01	*0.01*	43	**5.1**	*0.84*	0.73	*0.15*
Africa, southern										
Botswana (2005–2008)	9	**0.4**	*0.14*	0.04	*0.02*	23	**0.8**	*0.18*	0.09	*0.02*
Namibia (2009)	2	**0.4**	*0.26*	0.07	*0.06*	13	**1.5**	*0.42*	0.13	*0.04*
South Africa (2007)	79	**0.4**	*0.05*	0.04	*0.01*	225	**0.9**	*0.06*	0.10	*0.01*
South Africa, Eastern Cape (2008–2012)	3	**0.2**	*0.12*	0.02	*0.01*	15	**0.6**	*0.17*	0.07	*0.02*
Africa, western										
Benin, Cotonou (2013–2015)	2	**0.7**	*0.60*	0.10	*0.10*	3	**0.7**	*0.46*	0.02	*0.02*
Côte d´Ivoire, Abidjan (2012–2013)	2	**0.2**	*0.15*	0.03	*0.02*	19	**1.5**	*0.41*	0.20	*0.07*
The Gambia (2007–2011)	8	**0.4**	*0.17*	0.05	*0.02*	13	**0.4**	*0.18*	0.02	*0.01*
Guinea, Conakry (2001–2010)	11	**0.4**	*0.17*	0.03	*0.01*	18	**0.5**	*0.15*	0.07	*0.02*
Mali, Bamako (2010–2014)	35	**1.4**	*0.27*	0.18	*0.04*	76	**3.1**	*0.39*	0.35	*0.05*
Niger, Niamey (2006–2009)	8	**0.6**	*0.21*	0.06	*0.02*	13	**0.8**	*0.25*	0.07	*0.02*
Nigeria, Abuja (2013)	1	**0.2**	*0.23*	0.02	*0.02*	1	**1.5**	*1.49*	0.19	*0.19*
Nigeria, Calabar (2009–2013)	0	**-**	-	–	-	1	**0.1**	*0.11*	0.01	*0.01*
Nigeria, Ibadan (2006–2009)	12	**0.6**	*0.17*	0.05	*0.02*	46	**2.3**	*0.36*	0.25	*0.05*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Hodgkin lymphoma (C81)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	1	**0.0**	*0.02*	0.00	*0.00*	1	**0.0**	*0.02*	0.00	*0.00*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	26	**0.9**	*0.19*	0.06	*0.02*	20	**0.6**	*0.16*	0.05	*0.01*
France, Réunion (2011)	8	**1.9**	*0.69*	0.15	*0.05*	13	**2.9**	*0.84*	0.24	*0.08*
Kenya, Eldoret (2008–2011)	27	**1.7**	*0.41*	0.16	*0.06*	11	**1.0**	*0.34*	0.09	*0.04*
Kenya, Nairobi (2007–2011)	56	**0.9**	*0.17*	0.07	*0.02*	49	**0.7**	*0.14*	0.07	*0.03*
Malawi, Blantyre (2009–2010)	8	**0.6**	*0.22*	0.04	*0.01*	9	**1.0**	*0.38*	0.08	*0.03*
Mauritius (2010–2012)	20	**1.0**	*0.24*	0.09	*0.02*	13	**0.6**	*0.17*	0.06	*0.02*
Mozambique, Beira (2009–2013)	16	**1.5**	*0.44*	0.12	*0.06*	6	**0.5**	*0.22*	0.04	*0.02*
Seychelles (2009–2012)	1	**0.4**	*0.45*	0.04	*0.04*	0	**-**	-	–	-
Uganda, Kampala (2008–2012)	67	**2.0**	*0.37*	0.23	*0.06*	53	**1.4**	*0.29*	0.14	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	16	**2.1**	*0.61*	0.17	*0.07*	9	**0.9**	*0.31*	0.07	*0.03*
Zimbabwe, Harare: Black (2010–2012)	15	**0.6**	*0.16*	0.04	*0.01*	9	**0.7**	*0.30*	0.07	*0.04*
Africa, southern										
Botswana (2005–2008)	34	**0.9**	*0.17*	0.08	*0.02*	37	**1.0**	*0.17*	0.08	*0.01*
Namibia (2009)	10	**0.9**	*0.31*	0.07	*0.03*	2	**0.1**	*0.10*	0.01	*0.01*
South Africa (2007)	190	**0.8**	*0.06*	0.07	*0.01*	133	**0.5**	*0.04*	0.04	*0.00*
South Africa, Eastern Cape (2008–2012)	3	**0.2**	*0.13*	0.02	*0.01*	1	**0.0**	*0.05*	0.00	*0.00*
Africa, western										
Benin, Cotonou (2013–2015)	4	**0.5**	*0.28*	0.04	*0.02*	2	**0.2**	*0.17*	0.02	*0.01*
Côte d´Ivoire, Abidjan (2012–2013)	8	**0.2**	*0.07*	0.01	*0.01*	6	**0.3**	*0.13*	0.03	*0.01*
The Gambia (2007–2011)	6	**0.2**	*0.10*	0.02	*0.01*	5	**0.2**	*0.14*	0.01	*0.01*
Guinea, Conakry (2001–2010)	22	**0.4**	*0.08*	0.03	*0.01*	13	**0.3**	*0.09*	0.02	*0.01*
Mali, Bamako (2010–2014)	52	**1.0**	*0.16*	0.09	*0.02*	28	**0.8**	*0.17*	0.08	*0.02*
Niger, Niamey (2006–2009)	9	**0.5**	*0.21*	0.06	*0.03*	2	**0.1**	*0.10*	0.01	*0.01*
Nigeria, Abuja (2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	15	**2.3**	*0.73*	0.17	*0.09*	15	**3.0**	*0.96*	0.34	*0.13*
Nigeria, Ibadan (2006–2009)	15	**0.7**	*0.18*	0.06	*0.02*	9	**0.4**	*0.15*	0.04	*0.02*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Non-Hodgkin lymphoma (C82-85, C96)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	31	**1.4**	*0.28*	0.17	*0.04*	35	**1.5**	*0.28*	0.18	*0.04*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	121	**5.9**	*0.57*	0.59	*0.07*	80	**3.6**	*0.44*	0.37	*0.05*
France, Réunion (2011)	30	**6.5**	*1.20*	0.78	*0.17*	28	**5.4**	*1.06*	0.68	*0.16*
Kenya, Eldoret (2008–2011)	100	**7.7**	*0.92*	0.76	*0.12*	68	**5.2**	*0.76*	0.52	*0.10*
Kenya, Nairobi (2007–2011)	208	**5.3**	*0.50*	0.63	*0.08*	158	**4.8**	*0.52*	0.61	*0.09*
Malawi, Blantyre (2009–2010)	93	**9.3**	*1.15*	0.69	*0.11*	68	**7.4**	*1.04*	0.59	*0.11*
Mauritius (2010–2012)	70	**3.4**	*0.42*	0.34	*0.05*	52	**2.1**	*0.30*	0.23	*0.04*
Mozambique, Beira (2009–2013)	63	**7.0**	*1.03*	0.63	*0.13*	40	**3.5**	*0.60*	0.22	*0.04*
Seychelles (2009–2012)	13	**7.6**	*2.16*	1.03	*0.33*	14	**7.4**	*2.06*	0.94	*0.29*
Uganda, Kampala (2008–2012)	255	**7.3**	*0.66*	0.73	*0.09*	201	**5.6**	*0.54*	0.51	*0.07*
Zimbabwe, Bulawayo: Black (2011–2013)	120	**20.2**	*2.01*	2.28	*0.28*	137	**18.1**	*1.67*	1.88	*0.22*
Zimbabwe, Harare: Black (2010–2012)	201	**16.7**	*1.39*	1.92	*0.21*	197	**13.0**	*1.09*	1.20	*0.13*
Africa, southern										
Botswana (2005–2008)	179	**6.3**	*0.50*	0.60	*0.06*	172	**5.1**	*0.41*	0.48	*0.05*
Namibia (2009)	24	**3.6**	*0.78*	0.32	*0.08*	25	**3.2**	*0.68*	0.34	*0.09*
South Africa (2007)	815	**4.2**	*0.15*	0.43	*0.02*	734	**3.0**	*0.11*	0.28	*0.01*
South Africa, Eastern Cape (2008–2012)	23	**1.5**	*0.33*	0.15	*0.04*	30	**1.2**	*0.22*	0.12	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	5	**1.5**	*0.84*	0.15	*0.10*	6	**1.8**	*0.92*	0.26	*0.16*
Côte d´Ivoire, Abidjan (2012–2013)	63	**2.2**	*0.36*	0.18	*0.04*	36	**1.5**	*0.36*	0.18	*0.07*
The Gambia (2007–2011)	71	**1.9**	*0.32*	0.15	*0.03*	40	**1.1**	*0.23*	0.10	*0.02*
Guinea, Conakry (2001–2010)	112	**2.7**	*0.36*	0.21	*0.04*	72	**1.8**	*0.29*	0.20	*0.04*
Mali, Bamako (2010–2014)	132	**3.6**	*0.37*	0.39	*0.05*	67	**1.8**	*0.28*	0.21	*0.04*
Niger, Niamey (2006–2009)	30	**2.0**	*0.45*	0.20	*0.07*	22	**1.3**	*0.30*	0.11	*0.03*
Nigeria, Abuja (2013)	2	**0.3**	*0.26*	0.02	*0.02*	4	**0.7**	*0.38*	0.05	*0.02*
Nigeria, Calabar (2009–2013)	12	**1.3**	*0.46*	0.10	*0.05*	10	**1.5**	*0.54*	0.12	*0.06*
Nigeria, Ibadan (2006–2009)	130	**6.2**	*0.58*	0.66	*0.08*	80	**3.5**	*0.42*	0.35	*0.05*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Burkitt lymphoma, patient age 0-14 years (C83.7)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	2	**0.1**	*0.10*	0.00	*0.00*	0	**-**	-	–	-
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	0	**-**	-	–	-	0	**-**	-	–	-
France, Réunion (2011)	0	**-**	-	–	-	0	**-**	-	–	-
Kenya, Eldoret (2008–2011)	7	**0.9**	*0.35*	0.01	*0.01*	3	**0.4**	*0.24*	0.01	*0.00*
Kenya, Nairobi (2007–2011)	14	**0.6**	*0.17*	0.01	*0.00*	4	**0.2**	*0.09*	0.00	*0.00*
Malawi, Blantyre (2009–2010)	43	**10.3**	*1.57*	0.16	*0.02*	28	**6.4**	*1.21*	0.10	*0.02*
Mauritius (2010–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Mozambique, Beira (2009–2013)	5	**1.1**	*0.50*	0.02	*0.01*	4	**0.8**	*0.42*	0.01	*0.01*
Seychelles (2009–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Uganda, Kampala (2008–2012)	53	**2.4**	*0.33*	0.04	*0.01*	38	**1.6**	*0.26*	0.02	*0.00*
Zimbabwe, Bulawayo: Black (2011–2013)	0	**-**	-	–	-	1	**0.3**	*0.27*	0.00	*0.00*
Zimbabwe, Harare: Black (2010–2012)	2	**0.3**	*0.20*	0.00	*0.00*	1	**0.1**	*0.13*	0.00	*0.00*
Africa, southern										
Botswana (2005–2008)	2	**0.2**	*0.12*	0.00	*0.00*	0	**-**	-	–	-
Namibia (2009)	0	**-**	-	–	-	0	**-**	-	–	-
South Africa (2007)	19	**0.3**	*0.06*	0.00	*0.00*	5	**0.1**	*0.03*	0.00	*0.00*
South Africa, Eastern Cape (2008–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Africa, western										
Benin, Cotonou (2013–2015)	0	**-**	-	–	-	0	**-**	-	–	-
Côte d´Ivoire, Abidjan (2012–2013)	25	**1.6**	*0.33*	0.03	*0.01*	16	**1.0**	*0.25*	0.01	*0.00*
The Gambia (2007–2011)	4	**0.2**	*0.11*	0.00	*0.00*	2	**0.1**	*0.08*	0.00	*0.00*
Guinea, Conakry (2001–2010)	11	**0.4**	*0.12*	0.01	*0.00*	7	**0.3**	*0.10*	0.00	*0.00*
Mali, Bamako (2010–2014)	9	**0.4**	*0.15*	0.01	*0.00*	7	**0.3**	*0.13*	0.00	*0.00*
Niger, Niamey (2006–2009)	8	**0.9**	*0.32*	0.01	*0.01*	1	**0.1**	*0.11*	0.00	*0.00*
Nigeria, Abuja (2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	5	**1.6**	*0.70*	0.02	*0.01*	4	**1.3**	*0.63*	0.02	*0.01*
Nigeria, Ibadan (2006–2009)	17	**1.7**	*0.41*	0.03	*0.01*	12	**1.2**	*0.35*	0.02	*0.01*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 14 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Multiple myeloma (C90)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	24	**1.5**	*0.33*	0.24	*0.06*	21	**1.3**	*0.28*	0.18	*0.04*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	16	**1.0**	*0.26*	0.14	*0.04*	6	**0.4**	*0.15*	0.05	*0.02*
France, Réunion (2011)	15	**3.0**	*0.79*	0.24	*0.08*	14	**2.2**	*0.62*	0.30	*0.11*
Kenya, Eldoret (2008–2011)	20	**2.4**	*0.58*	0.31	*0.10*	16	**2.2**	*0.59*	0.26	*0.08*
Kenya, Nairobi (2007–2011)	54	**2.1**	*0.34*	0.28	*0.06*	41	**2.4**	*0.41*	0.34	*0.07*
Malawi, Blantyre (2009–2010)	1	**-**	-	–	-	1	**0.2**	*0.25*	0.03	*0.03*
Mauritius (2010–2012)	21	**1.1**	*0.24*	0.13	*0.04*	27	**1.2**	*0.23*	0.17	*0.04*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Seychelles (2009–2012)	2	**1.5**	*1.09*	0.23	*0.16*	2	**1.2**	*0.84*	0.13	*0.10*
Uganda, Kampala (2008–2012)	22	**1.9**	*0.44*	0.26	*0.07*	21	**1.3**	*0.32*	0.15	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	15	**3.7**	*0.99*	0.53	*0.17*	36	**6.8**	*1.17*	0.83	*0.18*
Zimbabwe, Harare: Black (2010–2012)	28	**3.4**	*0.70*	0.33	*0.10*	30	**3.9**	*0.74*	0.61	*0.13*
Africa, southern										
Botswana (2005–2008)	17	**0.8**	*0.20*	0.10	*0.03*	21	**0.8**	*0.19*	0.10	*0.03*
Namibia (2009)	9	**1.6**	*0.55*	0.16	*0.06*	1	**0.1**	*0.09*	0.01	*0.01*
South Africa (2007)	141	**0.9**	*0.07*	0.11	*0.01*	123	**0.6**	*0.05*	0.07	*0.01*
South Africa, Eastern Cape (2008–2012)	7	**0.4**	*0.16*	0.06	*0.03*	6	**0.2**	*0.09*	0.03	*0.01*
Africa, western										
Benin, Cotonou (2013–2015)	9	**2.3**	*0.82*	0.22	*0.08*	6	**1.7**	*0.71*	0.21	*0.10*
Côte d´Ivoire, Abidjan (2012–2013)	2	**0.1**	*0.06*	0.01	*0.01*	1	**0.0**	*0.02*	0.00	*0.00*
The Gambia (2007–2011)	0	**-**	-	–	-	0	**-**	-	–	-
Guinea, Conakry (2001–2010)	0	**-**	-	–	-	1	**0.0**	*0.03*	0.00	*0.00*
Mali, Bamako (2010–2014)	8	**0.2**	*0.08*	0.03	*0.02*	6	**0.1**	*0.06*	0.01	*0.00*
Niger, Niamey (2006–2009)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Abuja (2013)	0	**-**	-	–	-	2	**1.8**	*1.80*	0.18	*0.18*
Nigeria, Calabar (2009–2013)	1	**0.1**	*0.07*	0.00	*0.00*	3	**1.0**	*0.68*	0.14	*0.11*
Nigeria, Ibadan (2006–2009)	14	**0.9**	*0.25*	0.12	*0.04*	14	**0.9**	*0.26*	0.13	*0.04*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Leukaemia (C91-95)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	73	**2.2**	*0.30*	0.20	*0.04*	57	**2.1**	*0.32*	0.23	*0.05*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	127	**5.7**	*0.55*	0.53	*0.07*	126	**5.6**	*0.56*	0.61	*0.08*
France, Réunion (2011)	45	**10.5**	*1.59*	1.06	*0.20*	28	**5.3**	*1.04*	0.53	*0.12*
Kenya, Eldoret (2008–2011)	88	**6.4**	*0.81*	0.64	*0.12*	68	**5.6**	*0.81*	0.64	*0.12*
Kenya, Nairobi (2007–2011)	137	**3.2**	*0.37*	0.32	*0.06*	105	**3.0**	*0.40*	0.28	*0.05*
Malawi, Blantyre (2009–2010)	5	**1.0**	*0.59*	0.11	*0.07*	4	**0.5**	*0.28*	0.04	*0.03*
Mauritius (2010–2012)	63	**3.5**	*0.47*	0.33	*0.05*	51	**2.4**	*0.37*	0.25	*0.04*
Mozambique, Beira (2009–2013)	1	**0.1**	*0.08*	0.00	*0.00*	1	**0.1**	*0.06*	0.00	*0.00*
Seychelles (2009–2012)	11	**6.7**	*2.07*	0.63	*0.25*	7	**4.1**	*1.60*	0.40	*0.17*
Uganda, Kampala (2008–2012)	113	**3.2**	*0.47*	0.35	*0.07*	92	**3.4**	*0.47*	0.40	*0.07*
Zimbabwe, Bulawayo: Black (2011–2013)	24	**3.0**	*0.69*	0.25	*0.09*	18	**2.0**	*0.52*	0.17	*0.06*
Zimbabwe, Harare: Black (2010–2012)	47	**3.4**	*0.61*	0.31	*0.08*	39	**2.8**	*0.53*	0.30	*0.08*
Africa, southern										
Botswana (2005–2008)	55	**1.9**	*0.28*	0.19	*0.04*	61	**1.9**	*0.26*	0.20	*0.03*
Namibia (2009)	13	**1.9**	*0.57*	0.15	*0.06*	11	**1.3**	*0.41*	0.10	*0.04*
South Africa (2007)	358	**1.8**	*0.10*	0.19	*0.01*	288	**1.2**	*0.07*	0.11	*0.01*
South Africa, Eastern Cape (2008–2012)	11	**0.6**	*0.18*	0.05	*0.02*	6	**0.2**	*0.07*	0.01	*0.00*
Africa, western										
Benin, Cotonou (2013–2015)	16	**6.2**	*2.08*	0.61	*0.34*	15	**5.4**	*1.64*	0.67	*0.22*
Côte d´Ivoire, Abidjan (2012–2013)	13	**0.8**	*0.30*	0.13	*0.06*	10	**0.5**	*0.22*	0.05	*0.02*
The Gambia (2007–2011)	6	**0.2**	*0.10*	0.02	*0.01*	4	**0.1**	*0.09*	0.02	*0.01*
Guinea, Conakry (2001–2010)	15	**0.3**	*0.08*	0.02	*0.01*	5	**0.1**	*0.07*	0.01	*0.01*
Mali, Bamako (2010–2014)	38	**0.7**	*0.13*	0.04	*0.01*	24	**0.4**	*0.09*	0.02	*0.01*
Niger, Niamey (2006–2009)	25	**1.6**	*0.39*	0.14	*0.04*	12	**0.9**	*0.27*	0.09	*0.03*
Nigeria, Abuja (2013)	3	**0.5**	*0.30*	0.04	*0.02*	1	**0.4**	*0.42*	0.03	*0.03*
Nigeria, Calabar (2009–2013)	8	**1.1**	*0.49*	0.15	*0.10*	3	**0.7**	*0.57*	0.11	*0.09*
Nigeria, Ibadan (2006–2009)	48	**2.6**	*0.39*	0.32	*0.06*	34	**1.7**	*0.31*	0.18	*0.04*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Lymphoid leukaemia (C91)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	32	**1.0**	*0.20*	0.10	*0.03*	22	**1.0**	*0.24*	0.10	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	67	**3.4**	*0.44*	0.32	*0.05*	53	**2.6**	*0.39*	0.28	*0.05*
France, Réunion (2011)	19	**4.6**	*1.08*	0.38	*0.11*	6	**1.1**	*0.48*	0.11	*0.05*
Kenya, Eldoret (2008–2011)	46	**3.4**	*0.61*	0.36	*0.10*	24	**2.2**	*0.53*	0.26	*0.08*
Kenya, Nairobi (2007–2011)	65	**1.4**	*0.24*	0.15	*0.04*	41	**1.1**	*0.24*	0.11	*0.03*
Malawi, Blantyre (2009–2010)	0	**-**	-	–	-	1	**0.2**	*0.24*	0.02	*0.02*
Mauritius (2010–2012)	10	**0.6**	*0.19*	0.08	*0.03*	4	**0.1**	*0.07*	0.01	*0.01*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Seychelles (2009–2012)	7	**4.2**	*1.62*	0.44	*0.21*	1	**0.4**	*0.44*	0.11	*0.11*
Uganda, Kampala (2008–2012)	31	**0.9**	*0.23*	0.10	*0.04*	24	**0.9**	*0.26*	0.12	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	11	**1.6**	*0.55*	0.17	*0.09*	2	**0.2**	*0.13*	0.01	*0.01*
Zimbabwe, Harare: Black (2010–2012)	10	**0.7**	*0.27*	0.04	*0.02*	16	**1.2**	*0.36*	0.14	*0.06*
Africa, southern										
Botswana (2005–2008)	25	**0.8**	*0.16*	0.06	*0.02*	22	**0.6**	*0.15*	0.06	*0.02*
Namibia (2009)	3	**0.5**	*0.34*	0.07	*0.05*	3	**0.5**	*0.27*	0.03	*0.03*
South Africa (2007)	136	**0.7**	*0.06*	0.07	*0.01*	91	**0.4**	*0.04*	0.03	*0.00*
South Africa, Eastern Cape (2008–2012)	6	**0.4**	*0.16*	0.04	*0.02*	0	**-**	-	–	-
Africa, western										
Benin, Cotonou (2013–2015)	11	**4.5**	*1.80*	0.30	*0.24*	8	**3.6**	*1.41*	0.50	*0.20*
Côte d´Ivoire, Abidjan (2012–2013)	3	**0.3**	*0.20*	0.06	*0.04*	1	**0.1**	*0.08*	0.01	*0.01*
The Gambia (2007–2011)	0	**-**	-	–	-	0	**-**	-	–	-
Guinea, Conakry (2001–2010)	0	**-**	-	–	-	1	**0.1**	*0.06*	0.01	*0.01*
Mali, Bamako (2010–2014)	26	**0.5**	*0.11*	0.03	*0.01*	15	**0.2**	*0.06*	0.01	*0.00*
Niger, Niamey (2006–2009)	6	**0.5**	*0.27*	0.03	*0.02*	2	**0.2**	*0.15*	0.02	*0.02*
Nigeria, Abuja (2013)	0	**-**	-	–	-	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	2	**0.5**	*0.42*	0.11	*0.10*	2	**0.6**	*0.57*	0.10	*0.09*
Nigeria, Ibadan (2006–2009)	19	**1.2**	*0.27*	0.17	*0.05*	16	**0.8**	*0.20*	0.08	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Myeloid leukaemia (C92-94)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	20	**0.7**	*0.17*	0.05	*0.01*	24	**0.8**	*0.19*	0.10	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	59	**2.3**	*0.33*	0.20	*0.04*	72	**3.0**	*0.40*	0.32	*0.05*
France, Réunion (2011)	26	**5.9**	*1.16*	0.68	*0.17*	22	**4.2**	*0.92*	0.43	*0.11*
Kenya, Eldoret (2008–2011)	38	**2.8**	*0.53*	0.26	*0.07*	37	**3.0**	*0.59*	0.36	*0.09*
Kenya, Nairobi (2007–2011)	43	**1.0**	*0.21*	0.11	*0.04*	41	**1.1**	*0.24*	0.11	*0.03*
Malawi, Blantyre (2009–2010)	0	**-**	-	–	-	0	**-**	-	–	-
Mauritius (2010–2012)	30	**1.6**	*0.30*	0.15	*0.03*	30	**1.5**	*0.29*	0.16	*0.04*
Mozambique, Beira (2009–2013)	0	**-**	-	–	-	0	**-**	-	–	-
Seychelles (2009–2012)	2	**1.3**	*0.91*	0.09	*0.09*	5	**3.0**	*1.38*	0.21	*0.09*
Uganda, Kampala (2008–2012)	33	**1.2**	*0.32*	0.15	*0.05*	32	**1.1**	*0.25*	0.11	*0.03*
Zimbabwe, Bulawayo: Black (2011–2013)	11	**1.2**	*0.40*	0.08	*0.03*	13	**1.5**	*0.47*	0.14	*0.06*
Zimbabwe, Harare: Black (2010–2012)	16	**1.5**	*0.44*	0.17	*0.07*	14	**1.0**	*0.32*	0.10	*0.04*
Africa, southern										
Botswana (2005–2008)	24	**0.9**	*0.19*	0.09	*0.03*	32	**1.1**	*0.20*	0.12	*0.03*
Namibia (2009)	10	**1.3**	*0.45*	0.08	*0.04*	7	**0.8**	*0.30*	0.06	*0.03*
South Africa (2007)	154	**0.8**	*0.06*	0.08	*0.01*	139	**0.6**	*0.05*	0.05	*0.01*
South Africa, Eastern Cape (2008–2012)	0	**-**	-	–	-	0	**-**	-	–	-
Africa, western										
Benin, Cotonou (2013–2015)	4	**1.4**	*0.98*	0.27	*0.24*	6	**1.6**	*0.81*	0.17	*0.09*
Côte d´Ivoire, Abidjan (2012–2013)	1	**0.0**	*0.02*	0.00	*0.00*	1	**0.0**	*0.02*	0.00	*0.00*
The Gambia (2007–2011)	0	**-**	-	–	-	1	**0.0**	*0.02*	0.00	*0.00*
Guinea, Conakry (2001–2010)	8	**0.1**	*0.04*	0.01	*0.00*	3	**0.1**	*0.04*	0.00	*0.00*
Mali, Bamako (2010–2014)	4	**0.1**	*0.04*	0.01	*0.00*	3	**0.0**	*0.03*	0.00	*0.00*
Niger, Niamey (2006–2009)	12	**0.7**	*0.22*	0.06	*0.02*	7	**0.5**	*0.20*	0.05	*0.02*
Nigeria, Abuja (2013)	3	**0.5**	*0.30*	0.04	*0.02*	0	**-**	-	–	-
Nigeria, Calabar (2009–2013)	1	**0.1**	*0.09*	0.01	*0.01*	1	**0.1**	*0.09*	0.01	*0.01*
Nigeria, Ibadan (2006–2009)	25	**1.2**	*0.26*	0.13	*0.03*	14	**0.8**	*0.22*	0.08	*0.03*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Leukaemia, unspecified (C95)

	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	21	**0.6**	*0.14*	0.05	*0.02*	11	**0.3**	*0.11*	0.03	*0.01*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	1	**0.0**	*0.02*	0.00	*0.00*	1	**0.0**	*0.05*	0.00	*0.00*
France, Réunion (2011)	0	**-**	-	–	-	0	**-**	-	–	-
Kenya, Eldoret (2008–2011)	4	**0.2**	*0.13*	0.02	*0.01*	7	**0.3**	*0.13*	0.02	*0.01*
Kenya, Nairobi (2007–2011)	29	**0.8**	*0.19*	0.07	*0.03*	23	**0.8**	*0.21*	0.06	*0.03*
Malawi, Blantyre (2009–2010)	5	**1.0**	*0.59*	0.11	*0.07*	3	**0.2**	*0.14*	0.02	*0.01*
Mauritius (2010–2012)	23	**1.4**	*0.31*	0.10	*0.02*	17	**0.8**	*0.22*	0.07	*0.02*
Mozambique, Beira (2009–2013)	1	**0.1**	*0.08*	0.00	*0.00*	1	**0.1**	*0.06*	0.00	*0.00*
Seychelles (2009–2012)	2	**1.3**	*0.91*	0.09	*0.09*	1	**0.7**	*0.68*	0.09	*0.09*
Uganda, Kampala (2008–2012)	49	**1.2**	*0.24*	0.10	*0.03*	36	**1.4**	*0.30*	0.16	*0.04*
Zimbabwe, Bulawayo: Black (2011–2013)	2	**0.2**	*0.13*	0.01	*0.01*	3	**0.3**	*0.18*	0.02	*0.01*
Zimbabwe, Harare: Black (2010–2012)	21	**1.2**	*0.32*	0.10	*0.03*	9	**0.6**	*0.23*	0.06	*0.03*
Africa, southern										
Botswana (2005–2008)	6	**0.3**	*0.11*	0.04	*0.02*	7	**0.2**	*0.07*	0.01	*0.01*
Namibia (2009)	0	**-**	-	–	-	1	**0.1**	*0.09*	0.01	*0.01*
South Africa (2007)	68	**0.4**	*0.05*	0.04	*0.01*	58	**0.2**	*0.03*	0.02	*0.00*
South Africa, Eastern Cape (2008–2012)	5	**0.2**	*0.09*	0.01	*0.01*	6	**0.2**	*0.07*	0.01	*0.00*
Africa, western										
Benin, Cotonou (2013–2015)	1	**0.3**	*0.30*	0.04	*0.04*	1	**0.1**	*0.14*	0.01	*0.01*
Côte d´Ivoire, Abidjan (2012–2013)	9	**0.5**	*0.22*	0.07	*0.05*	8	**0.4**	*0.20*	0.04	*0.02*
The Gambia (2007–2011)	6	**0.2**	*0.10*	0.02	*0.01*	3	**0.1**	*0.09*	0.01	*0.01*
Guinea, Conakry (2001–2010)	7	**0.2**	*0.07*	0.02	*0.01*	1	**0.0**	*0.01*	0.00	*0.00*
Mali, Bamako (2010–2014)	8	**0.1**	*0.05*	0.01	*0.00*	6	**0.1**	*0.06*	0.01	*0.00*
Niger, Niamey (2006–2009)	7	**0.4**	*0.18*	0.04	*0.02*	3	**0.2**	*0.12*	0.02	*0.01*
Nigeria, Abuja (2013)	0	**-**	-	–	-	1	**0.4**	*0.42*	0.03	*0.03*
Nigeria, Calabar (2009–2013)	5	**0.5**	*0.24*	0.03	*0.02*	0	**-**	-	–	-
Nigeria, Ibadan (2006–2009)	4	**0.2**	*0.10*	0.02	*0.01*	4	**0.2**	*0.08*	0.01	*0.01*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

Number of cases, world age-standardized incidence rate (and standard error), and cumulative incidence rate (and standard error), by registry population and sex

Other and unspecified (O&U)

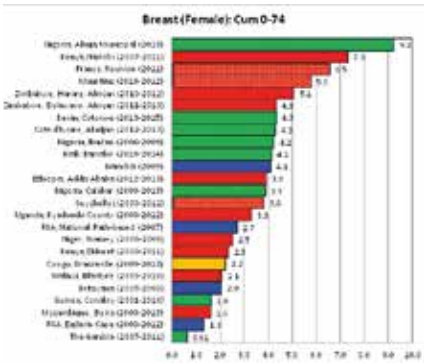
	Males					Females				
	Cases	ASR (W)		CUM%		Cases	ASR (W)		CUM%	
Africa, central										
Congo, Brazzaville (2009–2013)	22	**1.1**	*0.25*	0.13	*0.04*	14	**0.6**	*0.17*	0.07	*0.03*
Africa, eastern										
Ethiopia, Addis Ababa (2012–2013)	106	**5.7**	*0.59*	0.66	*0.08*	133	**6.7**	*0.63*	0.75	*0.08*
France, Réunion (2011)	36	**8.0**	*1.34*	0.84	*0.18*	35	**5.9**	*1.06*	0.60	*0.14*
Kenya, Eldoret (2008–2011)	207	**25.2**	*1.93*	2.91	*0.30*	210	**24.2**	*1.89*	2.91	*0.29*
Kenya, Nairobi (2007–2011)	144	**5.3**	*0.56*	0.66	*0.09*	135	**5.7**	*0.61*	0.72	*0.10*
Malawi, Blantyre (2009–2010)	42	**6.8**	*1.24*	0.65	*0.15*	67	**12.2**	*1.76*	1.52	*0.27*
Mauritius (2010–2012)	269	**13.8**	*0.88*	1.47	*0.12*	340	**14.3**	*0.81*	1.61	*0.11*
Mozambique, Beira (2009–2013)	42	**6.2**	*1.10*	0.66	*0.15*	32	**5.4**	*1.09*	0.63	*0.15*
Seychelles (2009–2012)	17	**9.7**	*2.40*	1.09	*0.30*	15	**6.6**	*1.80*	0.79	*0.26*
Uganda, Kampala (2008–2012)	180	**9.1**	*0.87*	1.08	*0.13*	165	**9.0**	*0.85*	1.14	*0.13*
Zimbabwe, Bulawayo: Black (2011–2013)	91	**21.0**	*2.34*	2.83	*0.41*	62	**10.4**	*1.38*	1.30	*0.22*
Zimbabwe, Harare: Black (2010–2012)	124	**14.1**	*1.42*	1.63	*0.22*	110	**11.8**	*1.23*	1.26	*0.18*
Africa, southern										
Botswana (2005–2008)	118	**5.3**	*0.51*	0.66	*0.08*	92	**3.0**	*0.33*	0.34	*0.05*
Namibia (2009)	36	**6.9**	*1.19*	0.58	*0.14*	15	**2.2**	*0.57*	0.28	*0.09*
South Africa (2007)	1932	**11.8**	*0.28*	1.38	*0.04*	1791	**7.9**	*0.19*	0.93	*0.03*
South Africa, Eastern Cape (2008–2012)	73	**4.8**	*0.57*	0.59	*0.08*	58	**2.3**	*0.31*	0.21	*0.03*
Africa, western										
Benin, Cotonou (2013–2015)	19	**5.7**	*1.63*	0.55	*0.18*	16	**4.9**	*1.49*	0.57	*0.21*
Côte d´Ivoire, Abidjan (2012–2013)	49	**3.5**	*0.62*	0.44	*0.10*	57	**3.8**	*0.62*	0.40	*0.09*
The Gambia (2007–2011)	46	**1.7**	*0.33*	0.15	*0.03*	37	**1.3**	*0.32*	0.13	*0.04*
Guinea, Conakry (2001–2010)	120	**4.8**	*0.56*	0.51	*0.07*	129	**5.4**	*0.58*	0.62	*0.08*
Mali, Bamako (2010–2014)	370	**13.1**	*0.78*	1.49	*0.11*	302	**12.0**	*0.77*	1.42	*0.11*
Niger, Niamey (2006–2009)	72	**5.0**	*0.68*	0.52	*0.09*	65	**5.0**	*0.70*	0.59	*0.11*
Nigeria, Abuja (2013)	10	**5.1**	*2.31*	0.63	*0.35*	9	**7.9**	*3.28*	1.15	*0.60*
Nigeria, Calabar (2009–2013)	17	**3.1**	*0.87*	0.32	*0.13*	17	**3.6**	*1.03*	0.46	*0.17*
Nigeria, Ibadan (2006–2009)	96	**4.7**	*0.50*	0.47	*0.06*	105	**5.3**	*0.56*	0.57	*0.07*

ASR(W), world age-standardized incidence rate, expressed as cases per 100 000 person-years; CUM%, cumulative incidence rate up to and including the age of 74 years, expressed as a percentage.

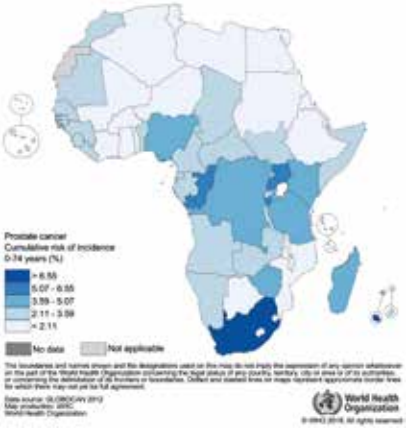
CHAPTER 7
Discussion of results by cancer

In this chapter, we review the results presented in Chapters 4–6 for the 15 cancers diagnosed most commonly in sub-Saharan Africa (Fig. 7.01). For each cancer type, we present the following:

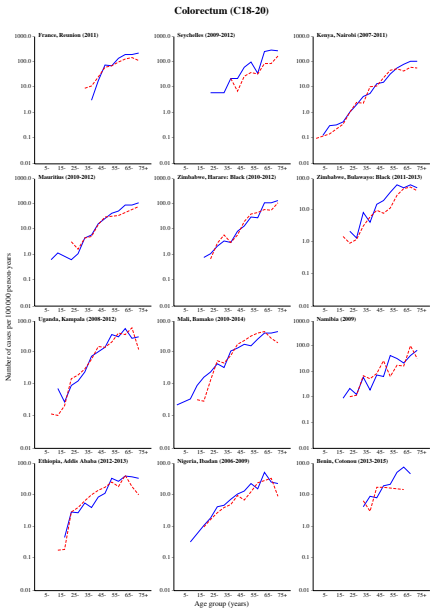
Cumulative incidence bar charts: These show the cumulative incidence rates up to and including the age of 74 years (expressed as percentages), by registry population, with separate charts for males and females. The bars are colour-coded by region: yellow for central Africa, red for eastern Africa (with hatching to differentiate the three Indian Ocean island populations: Mauritius, Réunion, and Seychelles), blue for southern Africa, and green for western Africa. For registries with so few cases of a given cancer that the 95% confidence interval for the cumulative incidence rate includes 0, the corresponding bars are omitted from the chart.



Cumulative risk maps: These show the cumulative risk of incidence up to and including the age of 74 years (expressed as a percentage) of the cancer, by country, for the whole of Africa. The rates shown are taken from the national estimates of incidence in GLOBOCAN 2012 (Ferlay et al., 2013).



Age-specific incidence graphs: These show the age-specific incidence rates (expressed as cases per 100 000 person-years) in males (solid blue lines) and females (dashed red lines), by registry population. The age-specific rates for Abuja (Nigeria) were not included, given that the sparse data meant that the curves were difficult to interpret.



For each cancer, there is also a brief discussion of the data presented in these three figures, including some pertinent references relating to the reasons for observed differences, some notes on the possible future evolution of the cancer in Africa, and relevant prevention strategies.

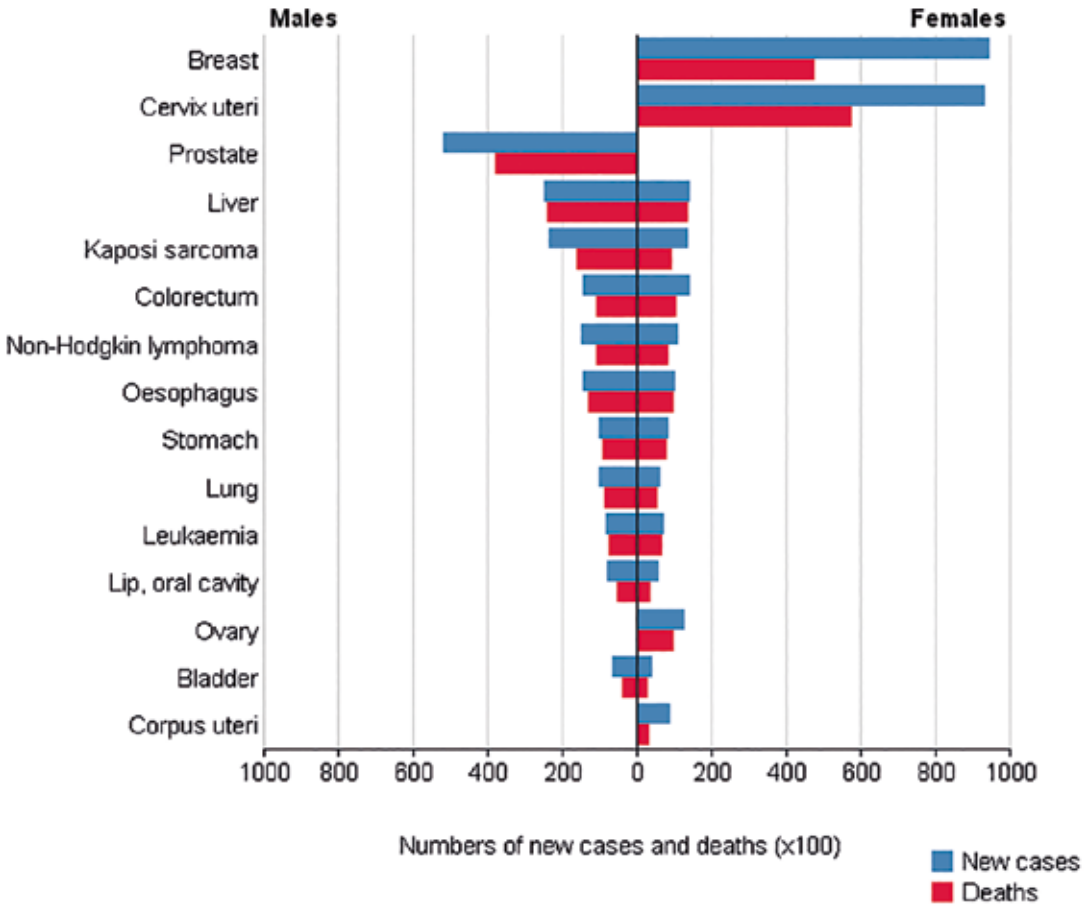


Fig. 7.01. The 15 cancers diagnosed most commonly in sub-Saharan Africa: numbers of new cases and deaths in 2012, by sex

Cancer of the breast

Fig. 7.02 shows the cumulative incidence rates of breast cancer (among females) observed in each of the registry populations of sub-Saharan Africa included in this volume.

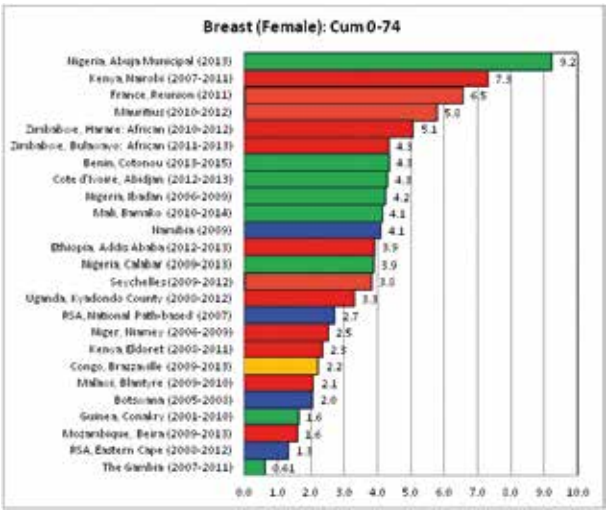


Fig. 7.02. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the breast among females in sub-Saharan Africa, by registry population

Breast cancer was the most commonly diagnosed cancer in females in sub-Saharan Africa in 2012 (with an estimated 94 000 new cases) and was also the leading cause of death from cancer that year. It is the most common cancer among women in 26 (about one half) of the 54 countries in Africa (Fig. 7.03).

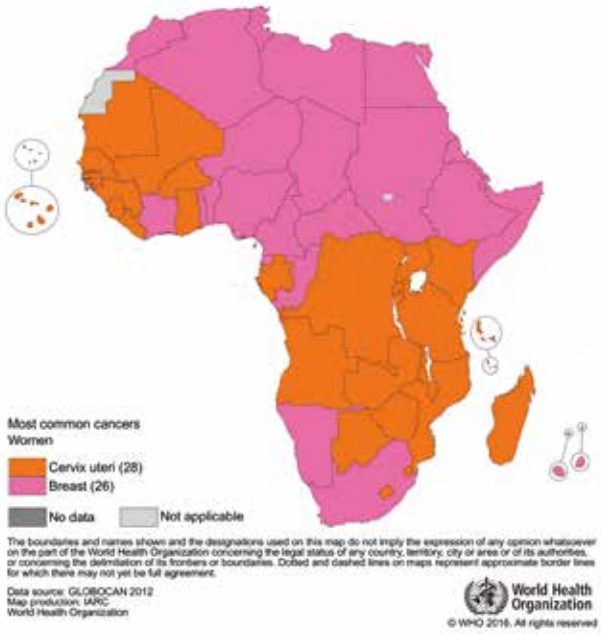


Fig. 7.03. The most common cancers in women in Africa, by country

The incidence of breast cancer in Africa is generally relatively low; most of the registries report a cumulative incidence rate of < 5% in females, compared with 9.6% in the Black population of the USA in 2003–2007 (Forman et al., 2014).

The geographical pattern of high- and low-incidence countries in sub-Saharan Africa does not closely follow the conventional regions. The highest incidence is that reported in Abuja (Nigeria). Then, apart from the island populations of Mauritius and Réunion (France), the highest rates are seen in Nairobi (Kenya) and in the Black population of Harare and Bulawayo (Zimbabwe).

The lowest recorded incidence rates are in the rural populations of Eastern Cape (South Africa) and The Gambia.

The map for the whole of Africa using GLOBOCAN 2012 data (Fig. 7.04) shows that breast cancer incidence rates vary substantially; apart from the island populations of Mauritius and Réunion (France), the highest rates are seen in Nigeria, Ethiopia, Egypt, Algeria, and South Africa.

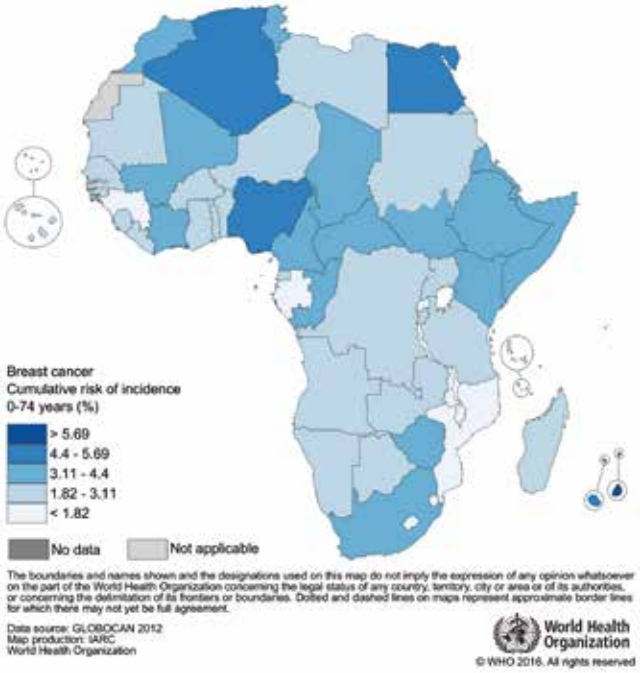


Fig. 7.04. Cumulative risk (up to and including the age of 74 years) of cancer of the breast among females in Africa, expressed as a percentage, by country

Fig. 7.05 shows the age-specific incidence rates of breast cancer in the contributing registries of sub-Saharan Africa. The rates in older age groups show little increase with age and, in some series, an apparent decrease with age. This almost certainly represents a cohort (or generational) effect that is the consequence of increasing risk of breast cancer in successive generations. There have been rapid increases in the incidence of breast cancer in sub-Saharan Africa;

rates of increase during the past 20 years were 3.6% per year in Kampala (Uganda) (Wabinga et al., 2014) and 4.9% per year in the Black population of Harare (Zimbabwe) (Chokunonga et al., 2013). A report from the rural registry of Eastern Cape (South Africa) showed an annual increase of 4.3% over the 15-year period since 1998 (Somdyala et al., 2015). These changes are most marked in postmenopausal women, and are most likely to be associated with declining fertility in successive generations of African women (Corbex et al., 2014), as well as changing lifestyles with respect to, for example, increasing prevalence of overweight or obesity, declining levels of physical activity, reduced prevalence and duration of breastfeeding, and, possibly, increasing alcohol consumption. The roles of these risk factors in sub-Saharan Africa are discussed in more detail below.

The young age structure of African populations, coupled with the relatively flat cross-sectional age-specific incidence curves in postmenopausal age groups (Fig. 7.05), means that the average age at diagnosis is lower in Africa than in populations in North America and Europe. This early age at diagnosis is often mentioned in clinical series from Africa, but has no etiological significance (Corbex et al., 2014). Nevertheless, Black females in the USA do have a slightly higher incidence of breast cancer at young ages (< 45 years) than White females in the USA (Howlader et al., 2014; Newman, 2014).

STAGE AND SURVIVAL

In Africa, tumour stage at presentation is generally advanced (Islami et al., 2015), and an association between tumour stage and distance to health services has been shown (Dickens et al., 2014). Most T3 tumours will already have developed metastasis at the time of diagnosis. Follow-up studies of unselected patients diagnosed with breast cancer in 1993–1997 have been completed in Harare (Zimbabwe) and Kampala (Uganda) (Gondos et al., 2004, 2005). In Harare, 5-year survival in Black (African) females was 38%, compared with 74% in White females in the same city, and 45% in Black (African) females in Kampala. In the USA, there are extensive data on breast cancer incidence, mortality, and survival by ethnicity. These data show that Black females are diagnosed with later-stage disease and have poorer survival, even within stage groups, than White females (Howlader et al., 2015).

BIOLOGY

Differences in the biology of breast carcinomas between Black and White females have been sought to explain these findings. There is little or no evidence for differences in histopathological type (Middleton et al., 2003). However, tumours in Black females in the USA are more likely to be estrogen receptor (ER)–negative and of a higher grade than those in White females in the USA (Chu & Anderson, 2002; Jemal & Fedewa, 2012). The same is true in the Black population of the United Kingdom (Bowen et al., 2008). Aggressive clinical features such as triple-negative and inflammatory disease have frequently been documented in clinical series from Africa. A probable reason that the relative proportions are high is because of the lower incidence of other forms of breast cancer (Corbex et al., 2014). Case series from several centres in Africa have reported that hormone receptor–negative cases are predominant. In a recent meta-analysis, Eng et al. (2014) found that, in prospectively collected specimens, the pooled proportions were 0.59 (95% confidence interval: 0.56–0.62) for ER-positive tumours and 0.21 (95% confidence interval: 0.17–0.25) for triple-negative tumours. However, they noted the low methodological quality of many studies in terms of the representativeness of the case series and the quality of the procedures for collection, fixation, and receptor testing, which undoubtedly influenced many of the results.

RISK FACTORS

The incidence in White females living in Africa is much higher than in Black females; the difference for histologically diagnosed cancers in South Africa in 1998–1999 was about 4-fold (Norman et al., 2006). Very high incidence rates were recorded in the White population of Harare in 1990–1992 (an age-standardized incidence rate of 127.7 per 100 000) (Bassett et al., 1995), but the risk differential in Harare is decreasing, reflecting the rising incidence rates in the Black population (Chokunonga et al., 2016).

Family history has been shown to be a marker of breast cancer risk in the African setting (Okobia et al., 2006; Rosenberg et al., 2002). Part of this risk is mediated by the major susceptibility genes *BRCA1* and *BRCA2* (about 2% of breast cancer cases in Europe), but although several distinct mutations in these genes have been identified in Black people in the USA, very little is known about the prevalence of these mutations in African populations (Oluwagbemiga et al., 2012). Because of the great genetic diversity throughout Africa (Gomez et al., 2014), evidence will remain limited until genetic testing is easily accessible. A genome-wide association study in women of African ancestry in the USA has suggested the possibility of some distinctive common variants associated with breast cancer, compared with European populations (Chen et al., 2013).

Breast cancer risk is also related to menstrual and reproductive factors, high body mass index (BMI), high alcohol consumption, low levels of physical activity, and exposure to exogenous hormones either as contraceptives or as postmenopausal hormone replacement therapy. A recent review by Brinton et al. (2014) provided a useful summary of knowledge about the role of these risk factors in breast cancer risk in sub-Saharan Africa.

With respect to reproductive and hormonal factors, increases in risk are reported with advanced age at first pregnancy or delivery, low parity, and late age at menarche (Adebamowo & Adekunle, 1999; Huo et al., 2008; Rosenberg et al., 2002). As in developed countries, body size (including height, body mass, and waist–hip ratio) has been shown to relate to breast cancer risk in sub-Saharan Africa (Ogundiran et al., 2010; Okobia et al., 2006). Physical activity levels vary greatly across African countries and population subgroups; this is mostly related to work (including housework) and transportation, whereas physical activity during leisure time appears to be rare (Guthold et al., 2011). Breast cancer risk (in both premenopausal and postmenopausal women) was significantly associated with reduced physical activity

in a case–control study in three countries: Cameroon, Nigeria, and Uganda (Hou et al., 2014).

Although most African women are lifetime abstainers, the prevalence of alcohol consumption varies widely and is, in general, increasing (Martinez et al., 2011). In the three-country study mentioned above, Qian et al. (2014) found a positive relationship between alcohol consumption and breast cancer risk, with a dose–response relationship observed for duration of alcohol consumption.

Breastfeeding is now thought to protect against breast cancer, and two thirds of the difference in breast cancer incidence between developed and developing countries has been estimated to be attributable to breastfeeding (Collaborative Group on Hormonal Factors in Breast Cancer, 2002). Although some studies in Africa have found no association (Coogan et al., 1999), a study in Nigerian women found that breast cancer risk decreased by 7% for every 12 months of breastfeeding (Huo et al., 2008).

As with most cancers, attempts have been made to link risk to HIV status. A hospital-based study in South Africa found similar rates of HIV-positive cases among breast cancer patients and among the general population (Cubasch et al., 2013).

Brinton et al. (2014) also speculated about the possible role of microbiomes, compromised immune status (due to infections or exposure to chemicals such as insecticides), environmental estrogens, and the widespread use of skin lighteners and hair relaxers by African women.

EARLY DETECTION

Mammography screening can reduce mortality from breast cancer (IARC, 2002). In Africa, resources are lacking and mammography is not useful for a predominantly premenopausal population. Because hospital case series have shown markedly better outcomes in early-stage disease, earlier detection through improved awareness is a logical approach to reducing mortality (Kantelhardt et al., 2014). Physical examination by health care workers has been advocated as a screening modality. To date, there are no randomized trials of the effectiveness of physical examination in reducing mortality. In Sudan, trained volunteers screened 70% of a target population of 15 000 women. They found 138 breast masses with 4 early-stage and 5 advanced breast cancers, compared with 1 early-stage and 3 advanced cases self-reported by women in the control villages (Abuidris et al., 2013). In the United Republic of Tanzania, a similar intervention led to an increase in the number of early-stage breast cancers, over a 3-year period, from 9% to 67% (Ngoma et al., 2015). The feasibility and costs of such programmes need further investigation.

TREATMENT

To the clinician, breast cancer presents as a different disease in Africa compared with in developed countries, with predominantly young patients and advanced-stage tumours typical of low-resource settings. Open questions exist about how to decentralize palliative care (Cardoso et al., 2013), how to optimize neoadjuvant treatment, how to scale up the use of endocrine treatment, and how best to use scarce radiotherapy facilities (Abdel-Wahab et al., 2013). Several organizations, such as the Breast Health Global Initiative and the National Comprehensive Cancer Network, have developed and published resource-stratified guidelines to take this situation into account (Anderson, 2014; National Comprehensive Cancer Network, 2015).

CONCLUSION

The rapid growth and ageing of the African population, and changes in reproductive habits and lifestyles, will mean that breast cancer becomes an even more important problem than at present. Prospects for preventing this increase seem slim, and undoubtedly the challenge will be how to achieve earlier diagnosis and provide adequate treatment, already a major challenge for resource-poor health services.

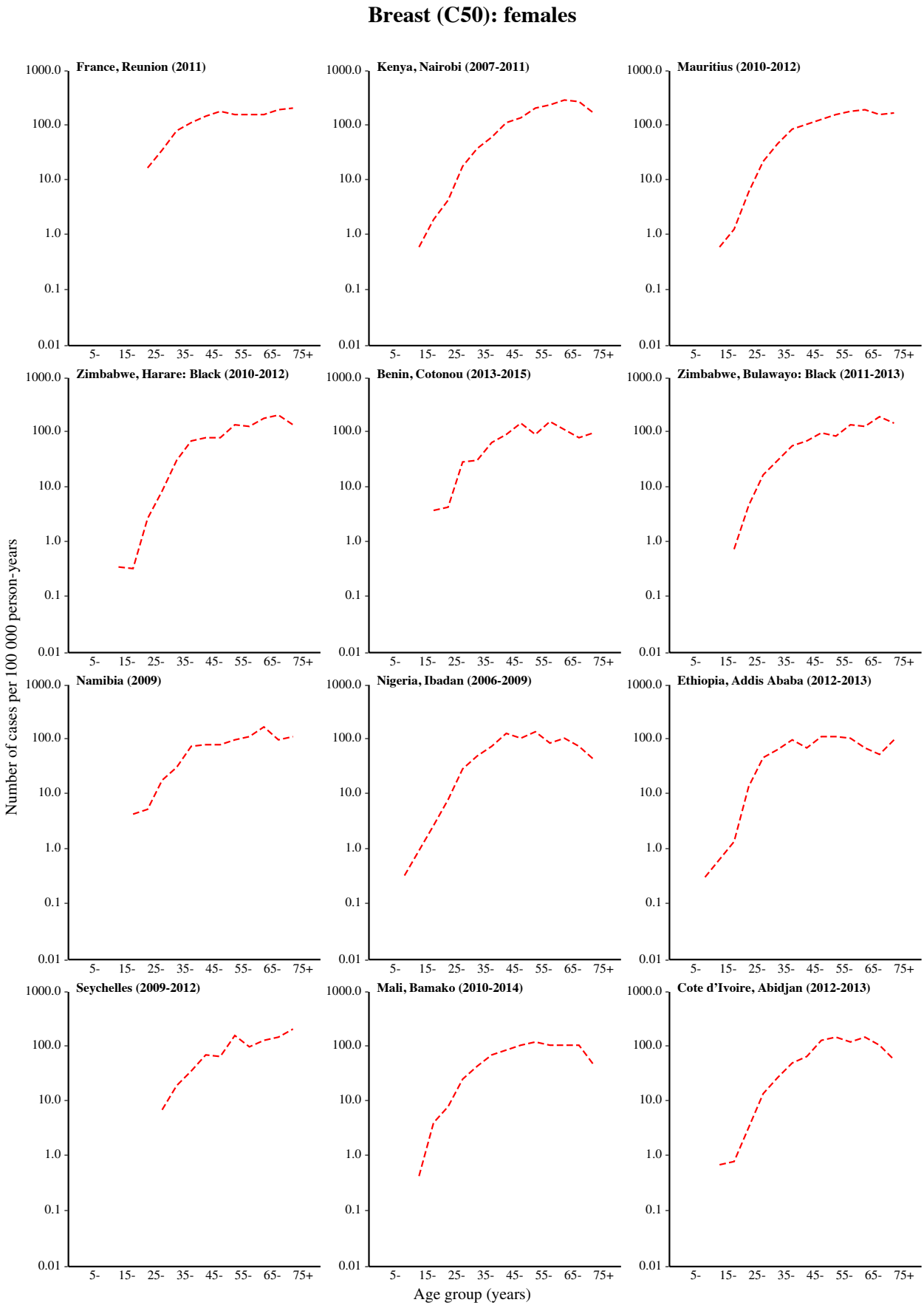


Fig. 7.05. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the breast among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

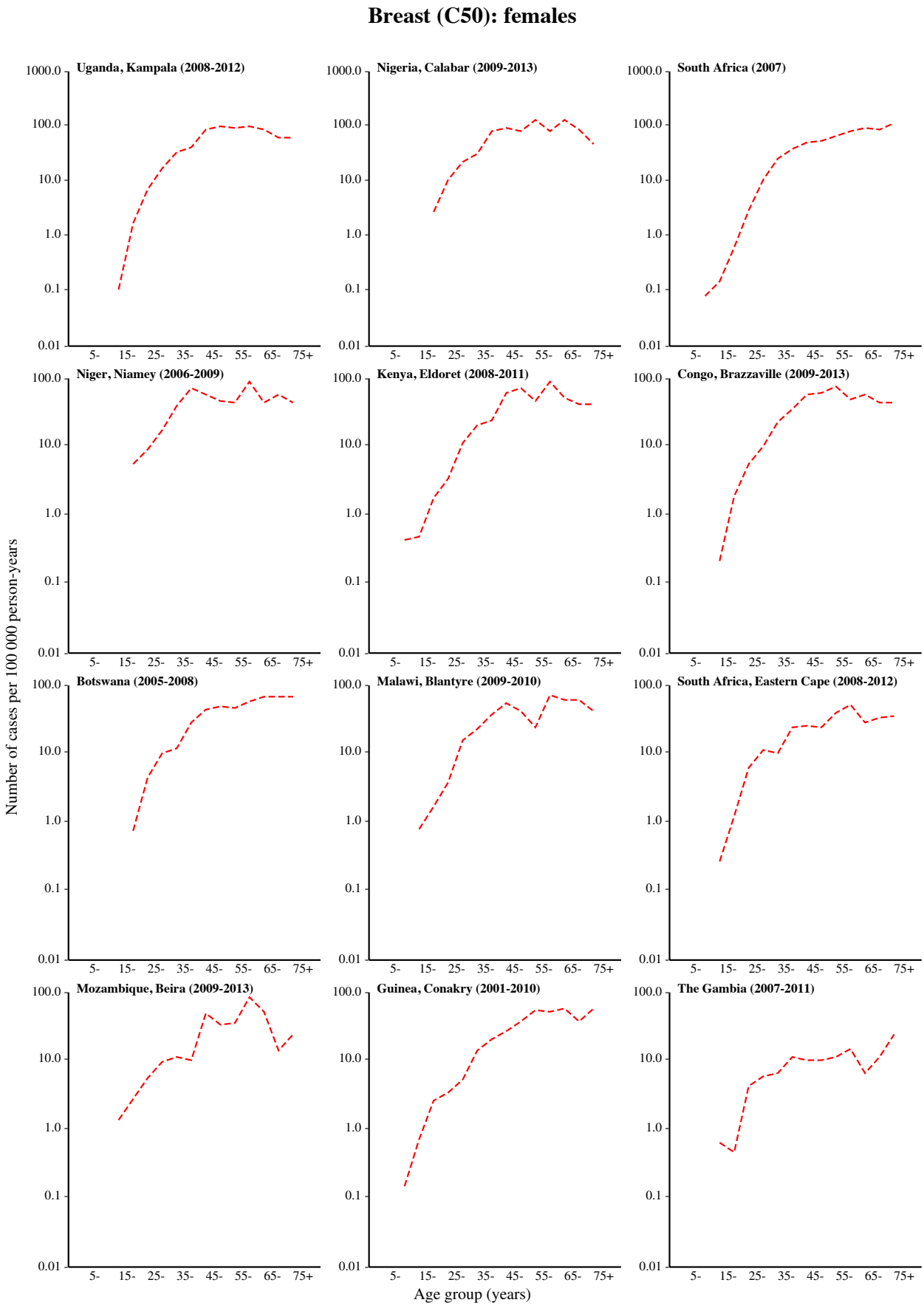


Fig. 7.05 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the breast among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the cervix uteri

Fig. 7.06 shows the cumulative incidence rates of cervical cancer observed in each of the registry populations of sub-Saharan Africa included in this volume.

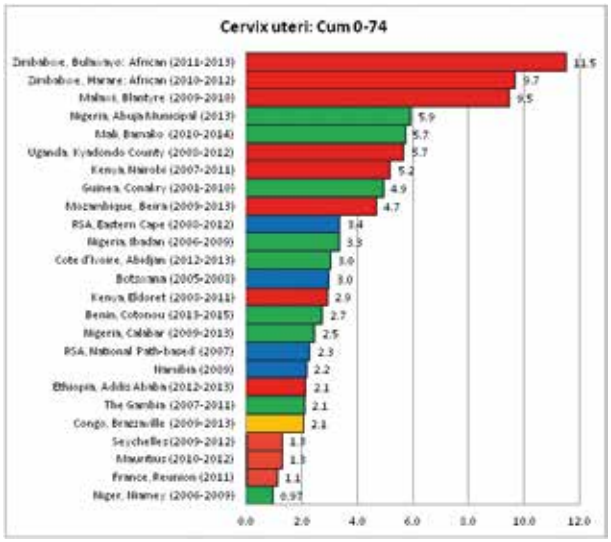


Fig. 7.06. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the cervix uteri among females in sub-Saharan Africa, by registry population

About 99 000 newly diagnosed cervical cancer cases and 60 000 deaths from cervical cancer were estimated to have occurred in 2012 in Africa (Ferlay et al., 2013). Cervical cancer is the most frequently diagnosed cancer in 28 of the 54 countries in Africa (Fig. 7.07) and the leading cause of death in 30 countries, accounting for about 30% of total cancer cases and deaths in the region.

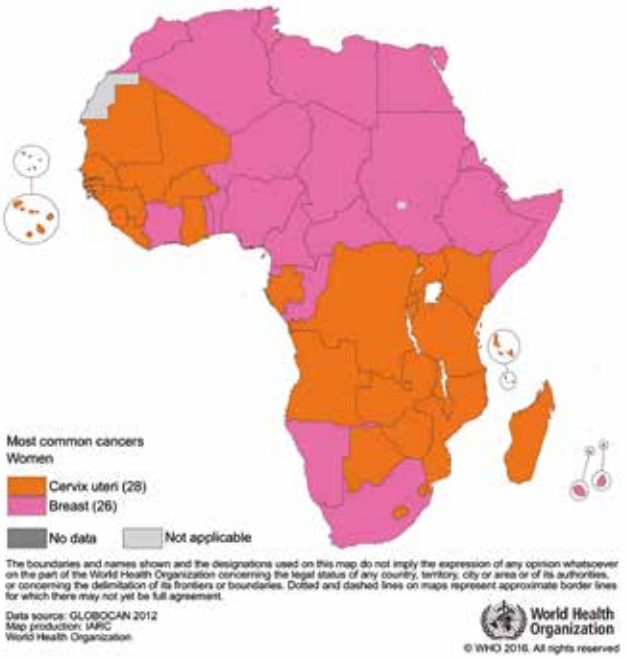


Fig. 7.07. The most common cancers in women in Africa, by country

The cumulative incidence rates of cervical cancer up to and including the age of 74 years, expressed as percentages, vary substantially, from < 1% in Egypt and Niamey (Niger) to almost 12% in the Black population of Bulawayo (Zimbabwe) (Fig. 7.06). This variation reflects, in part, differences in the prevalence of chronic human papillomavirus (HPV) infection, the major risk factor for cervical cancer; the availability and use of early detection services; and coinfections with HIV, which increases the likelihood of chronic HPV infection and progression of precancerous lesions to cancer (Denny et al., 2012).

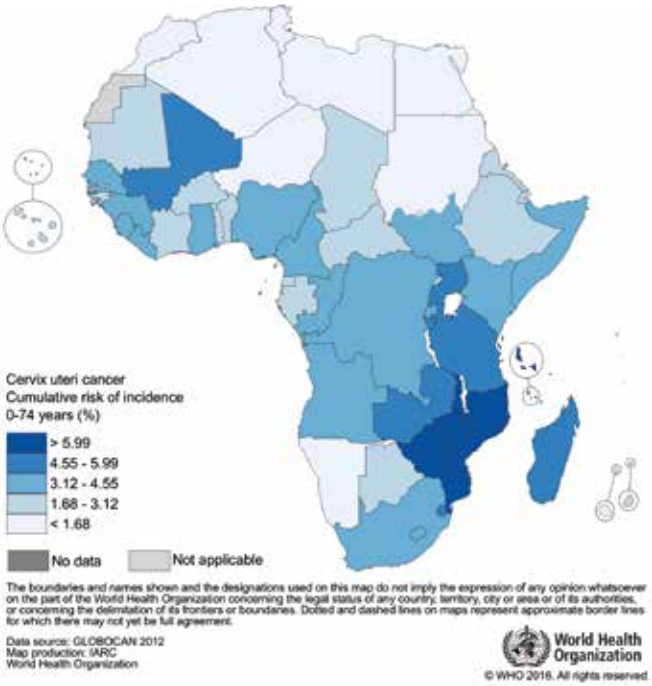


Fig. 7.08. Cumulative risk (up to and including the age of 74 years) of cancer of the cervix uteri among females in Africa, expressed as a percentage, by country

Fig. 7.09 shows age-specific incidence rates. In general, rates increase with age. This contrasts with the pattern commonly seen in developed countries (e.g. the USA), where rates peak at ages in the early 40s, probably due to the removal of precancerous lesions in middle age through screening (Howlader et al., 2013). However, it is noteworthy that before the introduction and increasing use of Pap testing after the middle of the 20th century, cervical cancer incidence rates in the USA were as high as those found in eastern Africa today (Dorn & Cutler, 1959). In addition to the high incidence rates, most cervical cancer patients in sub-Saharan Africa are diagnosed at late stages of the

disease, when the treatment options are limited and survival is poor, largely because of the lack of screening services (Lim & Ojo, 2017). Five-year survival in sub-Saharan Africa for patients diagnosed and treated in the 1990s ranged from 18% in Uganda to 31% in the Black population of Zimbabwe (Gondos et al., 2004, 2005), compared with > 80% in developed countries (Allemani et al., 2015).

Furthermore, the burden of cervical cancer in sub-Saharan Africa, as measured by the age-standardized incidence rate, appears to be increasing rather than decreasing, based on data from three recent studies in Harare (Zimbabwe) (Chokunonga et al., 2016), Kampala (Uganda) (Wabinga et al., 2014), and rural Eastern Cape (South Africa) (Somdyala et al., 2015). The reasons for this increase are unknown, but the increase may, in part, reflect improved survival of people with HIV as a result of better access to highly active antiretroviral therapy (HAART), and greater opportunity for precancerous cervical lesions to progress to cancer. In the USA, recent increases in the risk of HIV-defined cancers (anal cancers) and non-defined cancers (cancers of the colorectum and liver) among people with HIV, in part due to decreased mortality from HIV, have been noted (Silverberg et al., 2015).

Major preventive measures for cervical cancer include HPV vaccination and screening. Vaccines that protect against HPV 16 and HPV 18 infections, which cause 70% of cervical cancers, have been commercially available since 2006. An improved vaccine that protects against nine types of oncogenic HPV, which cause 90% of cervical cancers, was approved for commercial use in 2014. In 2014, WHO recommended vaccination of girls aged 9–13 years (before the onset of sexual activity) with two doses of the vaccine administered 6 months apart (WHO, 2014). Major barriers to the introduction of the vaccine in sub-Saharan Africa include cost and accessibility (Cunningham et al., 2014; Perlman et al., 2014; Sankaranarayanan et al., 2013). In 2011, GAVI negotiated a lower price ($5 per dose) with the vaccine manufacturers to facilitate the introduction of the vaccine in low- and middle-income countries, where the disease burden is highest and the vaccine is most needed. As of August 2015, the vaccine had been introduced in six countries in sub-Saharan Africa (Botswana, Lesotho, Rwanda, Seychelles, South Africa, and Uganda) as part of national immunization programmes to vaccinate pre-adolescent girls in schools. The vaccine was also introduced in several other countries as demonstration projects. Reported three-dose coverage ranged from 73% in Uganda to 93% in Rwanda (Binagwaho et al., 2012; Mugisha et al., 2015; Raesima et al., 2015), rates that are high enough to provide herd immunity (Drolet et al., 2015).

Cytology screening has been credited with the dramatic decrease in cervical cancer rates in developed countries, with rates decreasing by > 70% in several Scandinavian countries (Vaccarella et al., 2014). However, population screening by cytology testing in Africa has been impeded by weak health care infrastructure and lack of trained personnel, as well as by the need for multiple health facility visits (Lim & Ojo, 2017; Sankaranarayanan et al., 2013). According to a recent review, the coverage of cervical cancer screening in sub-Saharan Africa ranged from 2% to 20% in urban areas, and from < 1% to 14% in rural areas (Louie et al., 2009). However, in the past two decades, alternative screening approaches that have proven to be effective for use in low-resource settings have been developed (Denny et al., 2005; Sankaranarayanan et al., 2016). These approaches include visual inspection with acetic acid (VIA) or visual inspection with Lugol's iodine (VILI) and HPV DNA testing for detecting lesions, followed by cryotherapy on the same day, in what is known as the "single visit" or "screen and treat" approach. Several countries in sub-Saharan Africa have introduced cervical cancer screening programmes using these approaches at the national level (e.g. Rwanda); others have introduced them at the subnational level (Binagwaho et al., 2013). Other innovative strategies that have been explored to improve women's participation in screening include screening of women attending HIV clinics (Kahesa et al., 2008) and inviting mothers of daughters receiving HPV vaccinations at school to participate in self-screening using HPV testing by taking a self-screening kit home (Snyman et al., 2015). In addition to increasing coverage of HPV vaccination and screening of women, the burden of cervical cancer in sub-Saharan Africa could be reduced by comprehensive control of HIV infections.

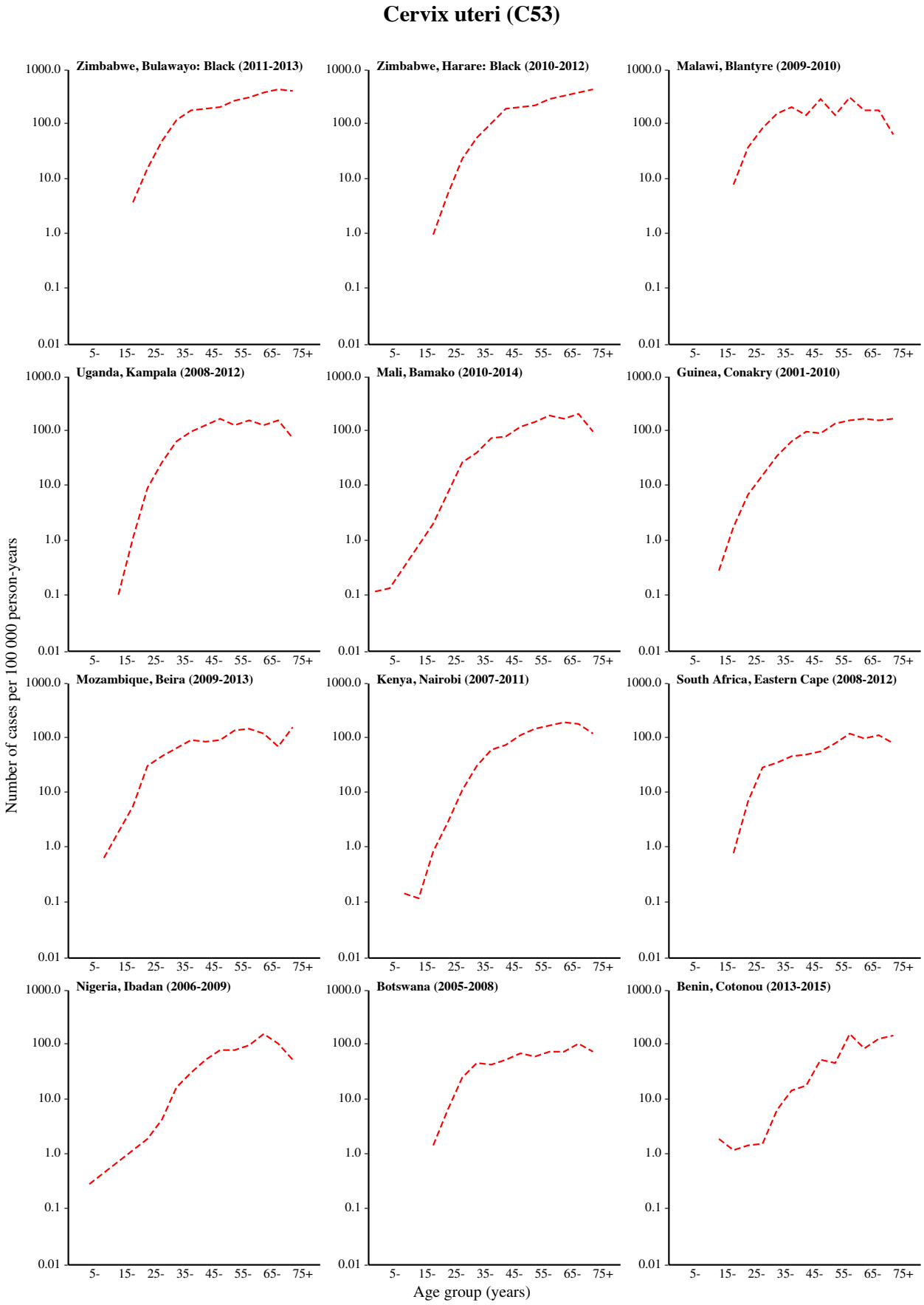


Fig. 7.09. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the cervix uteri among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

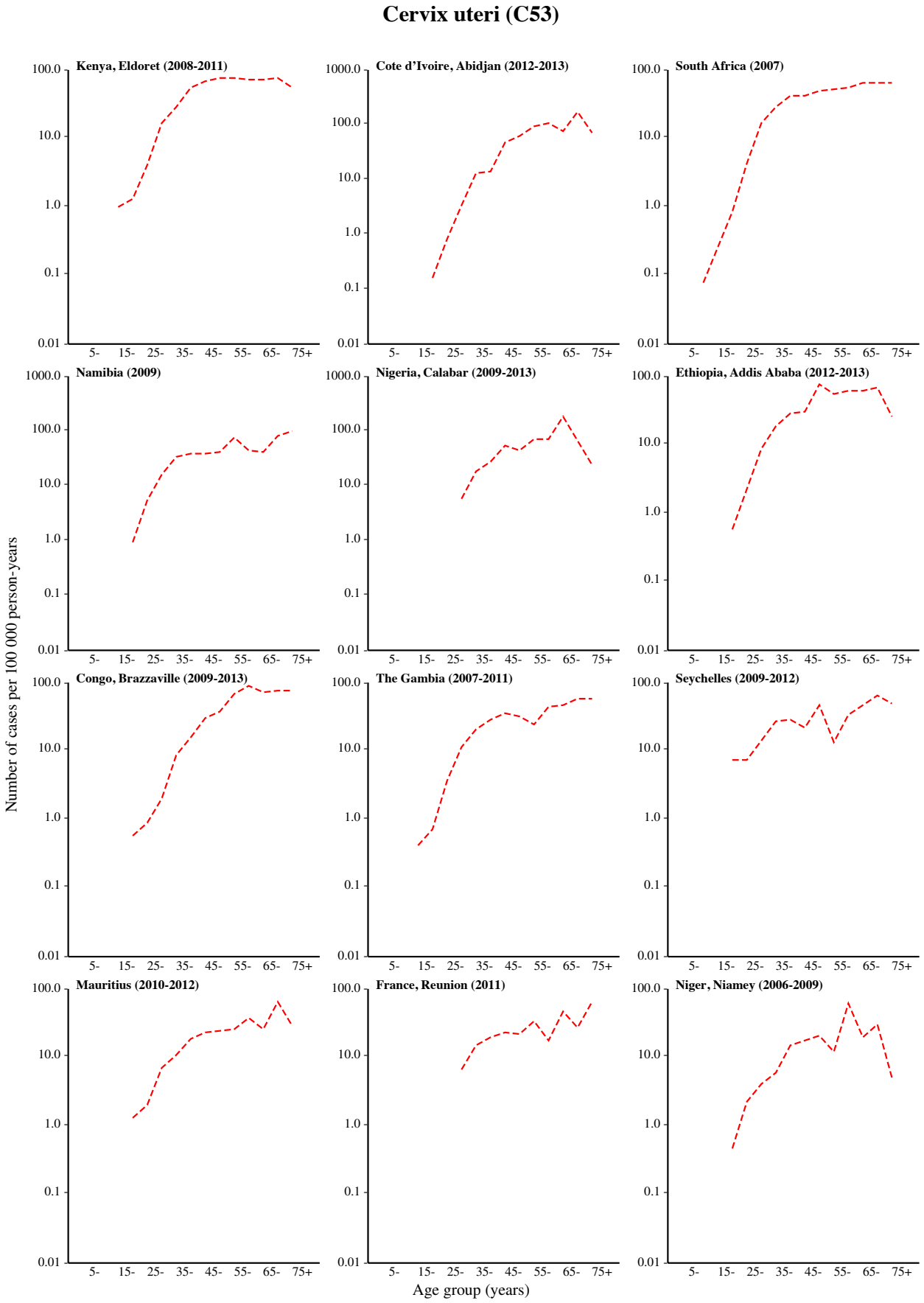


Fig. 7.09 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the cervix uteri among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the prostate

Prostate cancer is the most frequently diagnosed cancer in men in sub-Saharan Africa, and the third most common neoplasm overall (after breast cancer and cervical cancer), with almost 52 000 new cases and 38 000 deaths estimated to have occurred in 2012 (Fig. 7.01). The average risk that a man in sub-Saharan Africa will develop prostate cancer before the age of 75 years is 3.4%, meaning that it affects almost 1 in 30 men. This rate is similar to the equivalent risks for breast cancer (3.5%) and cervical cancer (3.8%) in women.

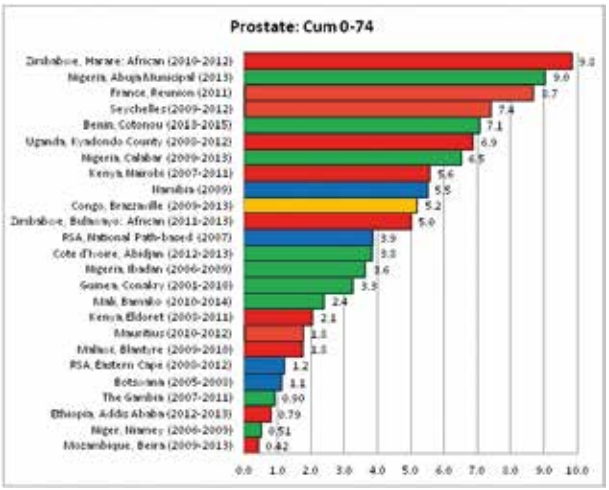


Fig. 7.10. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the prostate among males in sub-Saharan Africa, by registry population

Prostate cancer is the leading cause of cancer among men in 23 of the 54 countries in Africa (Fig. 7.11).

The cumulative incidence rates reported by the registries in this volume vary widely, from almost 10% in the Black population of Harare (Zimbabwe) to < 1% in The Gambia and Addis Ababa (Ethiopia) (Fig. 7.10). There are no clear geographical differences between the regions of Africa. The estimated incidence rates in GLOBOCAN 2012 show a 10-fold variation in cumulative incidence of prostate cancer in countries in sub-Saharan Africa (Fig. 7.12), with risk ranging from 0.8% in Ethiopia to > 8% in South Africa in 2012.

Fig. 7.13 shows age-specific incidence rates in 24 registry populations. The risk increases very steeply with age, and, as has been noted for many years, this rate of increase is considerably greater than for other epithelial cancers (Cook et al., 1969). The young age of African populations means that the average age at diagnosis is lower in Africa than in populations in Europe and North America. This is often noted in clinical series from Africa, although the curves of incidence versus age are very similar to those observed elsewhere.

In South Africa, the incidence rates of histologically diagnosed prostate cancer in White men have been much higher than the rates in Black men (Norman et al., 2006), in part due to the lack of access to

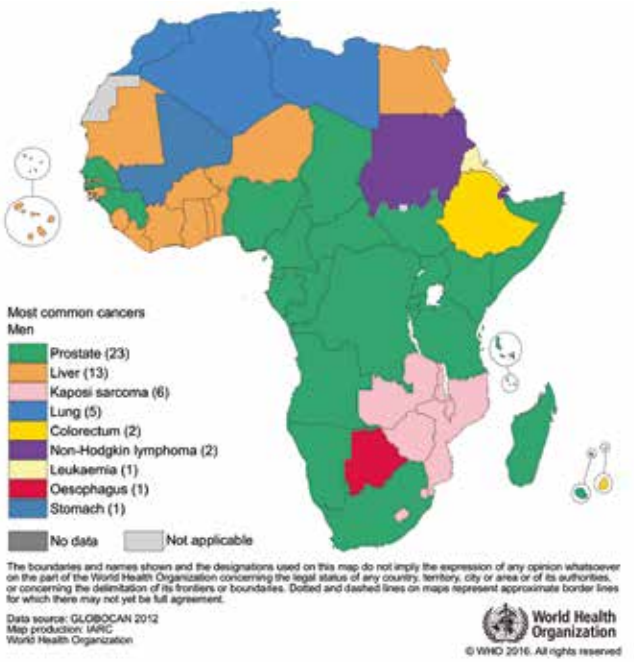


Fig. 7.11. The most common cancers in men in Africa, by country

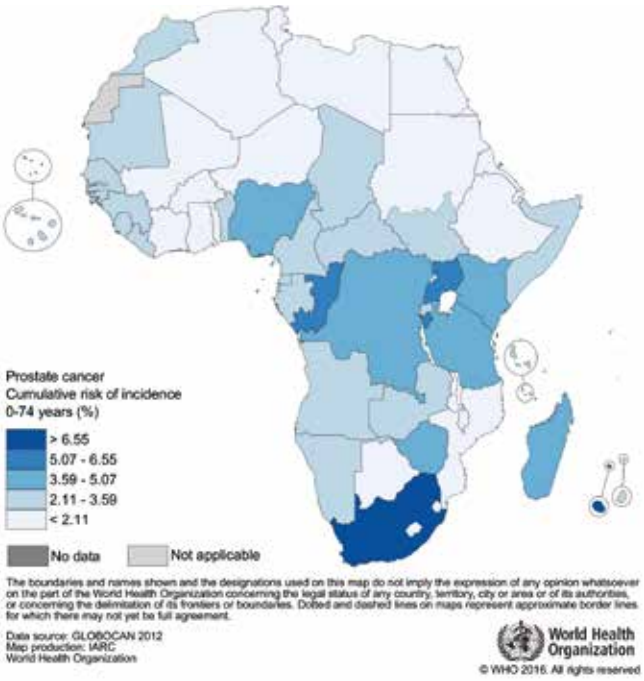


Fig. 7.12. Cumulative risk (up to and including the age of 74 years) of cancer of the prostate among males in Africa, expressed as a percentage, by country

diagnostic and screening facilities for Black men. However, the incidence of prostate cancer in Black men in Harare has been rising rapidly, at a rate of 6.4% per year during the period 1991–2010 (Chokunonga et al., 2013), and the risk is now higher in Black men in

Harare than in the White population (Chokunonga et al., 2016). Incidence rates are increasing significantly in Kampala (Uganda), at 3.7% per year (Wabinga et al., 2014), and in the rural population of Eastern Cape (South Africa) (Somdyala et al., 2015). These increases are certainly not due to screening, although it is likely that increased awareness, a greater readiness to perform prostatectomy for urinary symptoms in elderly men, and histological examinations of operative biopsies have played a role. Most cancer registries are located in major cities or urban populations in Africa, and therefore it remains difficult to ascribe such geographical and temporal differences to risk factors linked to increasing affluence (a transition to a lifestyle typical of industrialized countries) or to inherent and well-known artefacts (enhanced diagnostic capabilities, notably via the increasing availability and affordability of prostate-specific antigen [PSA] testing).

The relatively high incidence and mortality recorded in African populations is reflected in populations of African descent elsewhere in the world. Thus, within the USA, incidence rates in the Black population have been higher those in the White population for several decades, despite more intensive PSA screening in the White population (Howlader et al., 2015). In the islands of the Caribbean, which are populated largely by descendants of people from western Africa, the mortality rates are some of the highest in the world (Rebbeck et al., 2013). In São Paulo, Brazil, the risk of prostate cancer in Black males was 1.8 (95% confidence interval: 1.4–2.3) times that in White males (Bouchardy et al., 1991), and in England the incidence among Black males was more than twice the incidence among White males (Maruthappu et al., 2015).

The reasons underlying this higher risk of prostate cancer in men of African origin have been the subject of intense research efforts. It seems unlikely that the higher risk is due to differences in environmental exposures (including lifestyle factors) (Mordukhovich et al., 2011). Possible variations in single-nucleotide polymorphism patterns of the genes of the enzymes involved in androgen biosynthesis and metabolism (e.g. CYP17 and CYP3A4), in vitamin D synthesis, and in regulating cell apoptosis (e.g. BCL2), and polymorphisms at 17q21, 11q13, and 8q24 may be involved. Epigenetic changes and variations in fusion-gene products among men of African origin may also be involved in the genetic differences underlying this disease (Hatcher et al., 2009; McGinley et al., 2016).

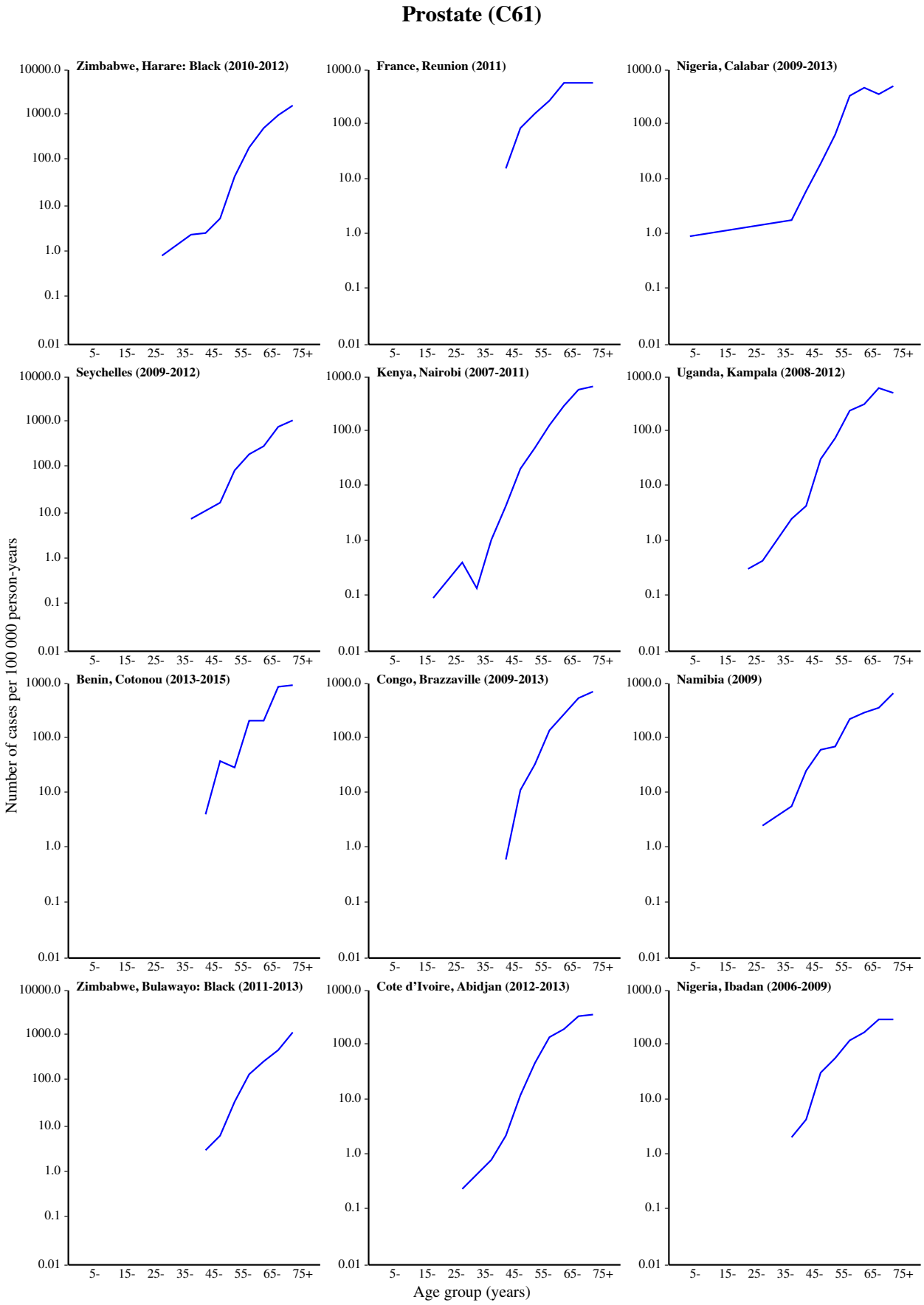


Fig. 7.13. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the prostate among males in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

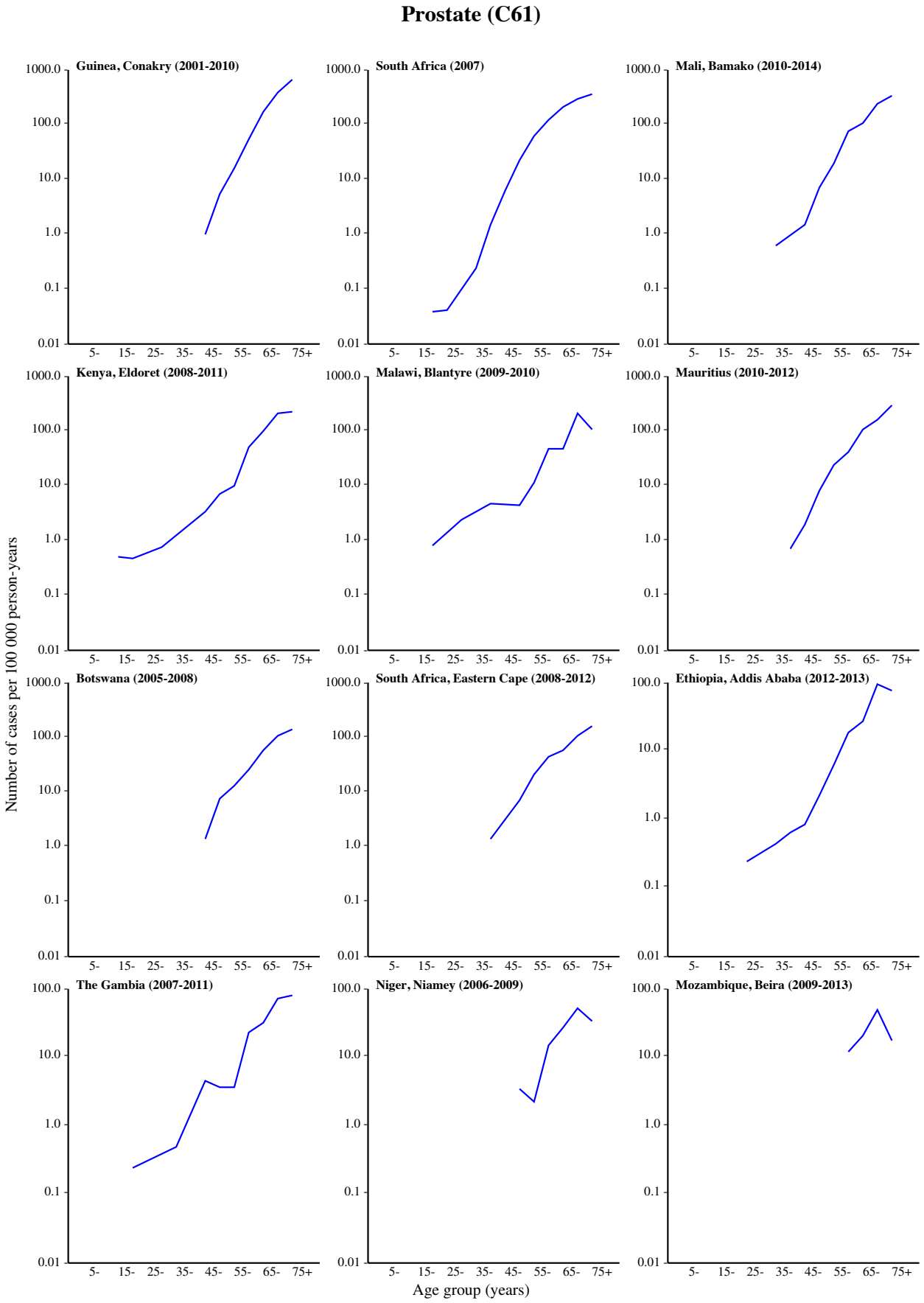


Fig. 7.13 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the prostate among males in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the liver

About 59 000 newly diagnosed liver cancer cases and 56 000 deaths from liver cancer (predominantly hepatocellular carcinoma) were estimated to have occurred in 2012 in Africa, and > 67% of these cases and deaths occurred in sub-Saharan Africa (Ferlay et al., 2013).

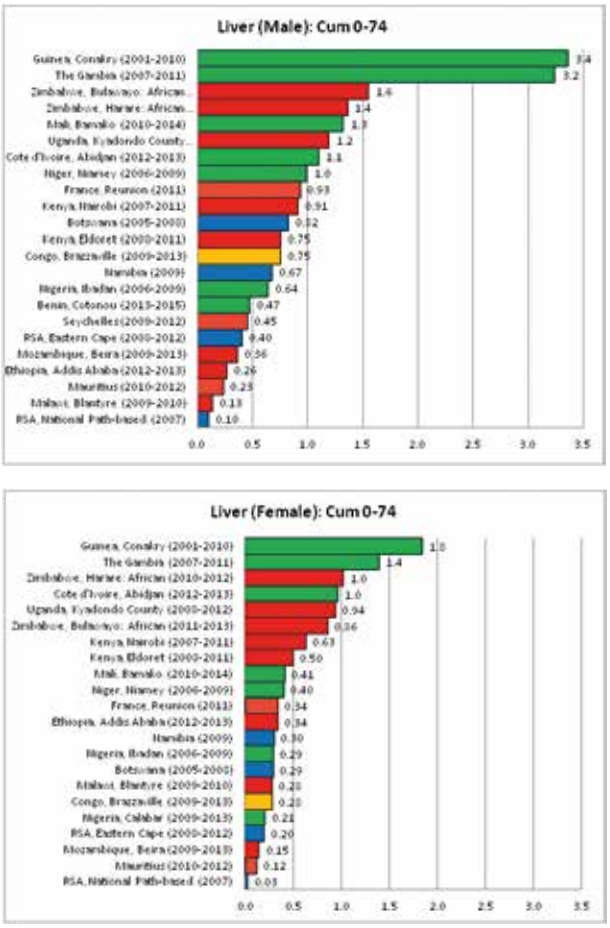


Fig. 7.14. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the liver among males and females in sub-Saharan Africa, by registry population

The highest cumulative incidence rates are found in parts of western and eastern Africa, with cumulative incidence in males younger than 75 years as high as 3.4% in Guinea (Conakry) and 3.2% in The Gambia, compared with < 1% in parts of central Africa (Fig. 7.14). In general, incidence rates continue to increase with age, and they are higher in males than in females (Fig. 7.16).

Major risk factors for liver cancer in Africa vary by region. Chronic infection with hepatitis B virus (HBV) is the dominant risk factor for liver cancer in sub-Saharan Africa, accounting for the majority of cases (Kew, 1992; Kew, 2013b; Parkin, 2006). In this region, most HBV infections occur during childhood (Whittle et al., 1983),

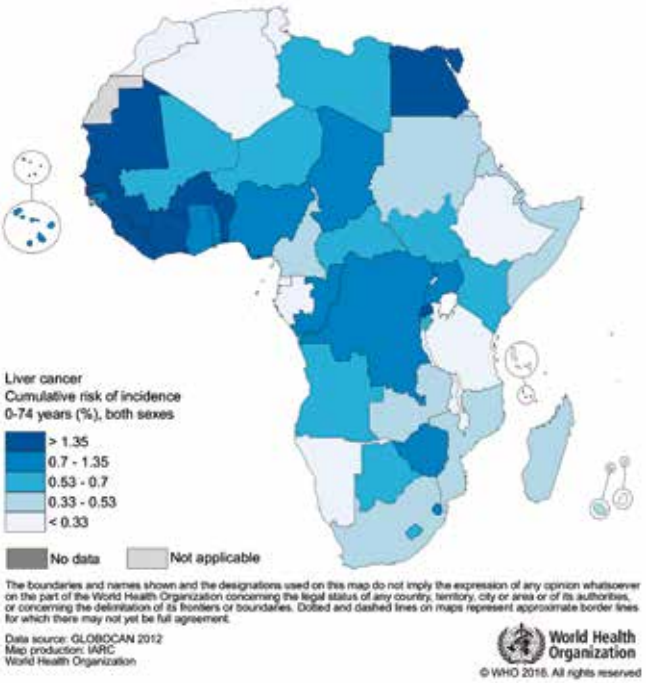


Fig. 7.15. Cumulative risk (up to and including the age of 74 years) of cancer of the liver among both sexes in Africa, expressed as a percentage, by country

in contrast to parts of Asia, where most infections occur during the perinatal period, and to economically developed countries, where most infections occur during adulthood (IARC, 2012). Western Africa and eastern Africa are the regions with the highest chronic HBV infection rates in the world; the prevalence in the general population in these two regions reaches as high as 20%. Aflatoxin (Ott et al., 2012; Schweitzer et al., 2015), a by-product of fungus, is another important risk factor for the occurrence of liver cancer in sub-Saharan Africa, and aflatoxin has a synergetic effect in the presence of chronic HBV infection (Kew, 2003; Kirk et al., 2006; Wild & Montesano, 2009). Exposure to the toxin often occurs through ingestion of contaminated staple foods, particularly maize and groundnuts (Egal et al., 2005; Kew et al., 2013a; Wild et al., 2015).

In contrast to sub-Saharan Africa, infection with hepatitis C virus (HCV) is the dominant risk factor for liver cancer in northern Africa, with a prevalence as high as 14% in Egypt (Guerra et al., 2012). The high prevalence of chronic HCV infection in Egypt is probably due to the parenteral anti-schistosomiasis therapy mass-treatment campaign that took place from the 1960s to the 1980s (Strickland, 2006). HCV infection, as well as HBV infection, can also be transmitted through contaminated blood products and unsafe sex (IARC, 2012). Other known risk factors for liver cancer include alcohol consumption, obesity, diabetes, smoking, and HIV infection (Nordenstedt et al., 2010).

A vaccine against HBV infection has been commercially available since 1982, and it has been demonstrated to reduce chronic infection in children in African settings, including in Côte d'Ivoire, The Gambia, and South Africa (Hino et al., 2001; Magoni et al., 2009; Peto et al., 2014; Viviani et al., 1999). Although evidence on the effect of the vaccine on the occurrence of liver cancer has yet to be documented in Africa, the vaccine was associated with a reduction of 80% in liver cancer incidence rates among adolescents and young adults in Taiwan, China, 30 years after the introduction of a national vaccination programme in 1984 (Chiang et al., 2013). Since 1992, WHO has recommended that the vaccine be included in routine national infant immunization programmes in endemic areas, such as sub-Saharan Africa. However, the introduction of the vaccine has been slow in this region because of its cost. According to the WHO vaccination database, as of 2014, all 48 countries in sub-Saharan Africa (except South Sudan, for which there are no data) have introduced the HBV vaccine into their national infant immunization schedules. However, the proportion of infants aged 1 year that had received three doses of the vaccine was < 80% in 19 countries and < 70% in 10 countries (WHO, 2018). Furthermore, recent studies in parts of sub-Saharan Africa found that a substantial proportion of pregnant women infected with HBV are at higher risk of transmitting the infection to their infants (Andersson et al., 2015; Chasela et al., 2014), and that chronic HBV infection is not uncommon in children who were vaccinated according to schedule during infancy (Ekra et al., 2008). These findings suggest that vaccination should start at birth (Andersson et al., 2015), which is not done in most countries because of a long-standing assumption about the rarity of mother-to-child transmission of HBV infection in the region.

Liver cancer rates in sub-Saharan Africa can also be reduced substantially through the implementation of proven post-harvest interventions that prevent aflatoxin contamination, including sorting and grain cleaning and drying (Wild et al., 2015). One such community intervention among groundnut farmers in western Africa reported significant reductions in both groundnut contamination (70%) and blood levels (Turner et al., 2005). Additional primary preventive measures for liver cancer include practising safer sex, sterilizing injection needles, and screening blood products to minimize horizontal transmission of HCV and HBV infections. Secondary preventive measures include treating patients who have chronic HBV and HCV infections and increasing awareness about the early-stage presentation and treatment of the disease. Egypt established a national network of 23 viral hepatitis facilities throughout the country in 2008 to treat patients who have chronic HBV and HCV infections at a reduced cost (Centers for Disease Control and Prevention, 2012). In The Gambia and Senegal, population-based demonstration projects to screen for chronic HBV infections and to treat positive patients with antiviral therapy (tenofovir) were launched in 2011 (Shimakawa et al., 2014).

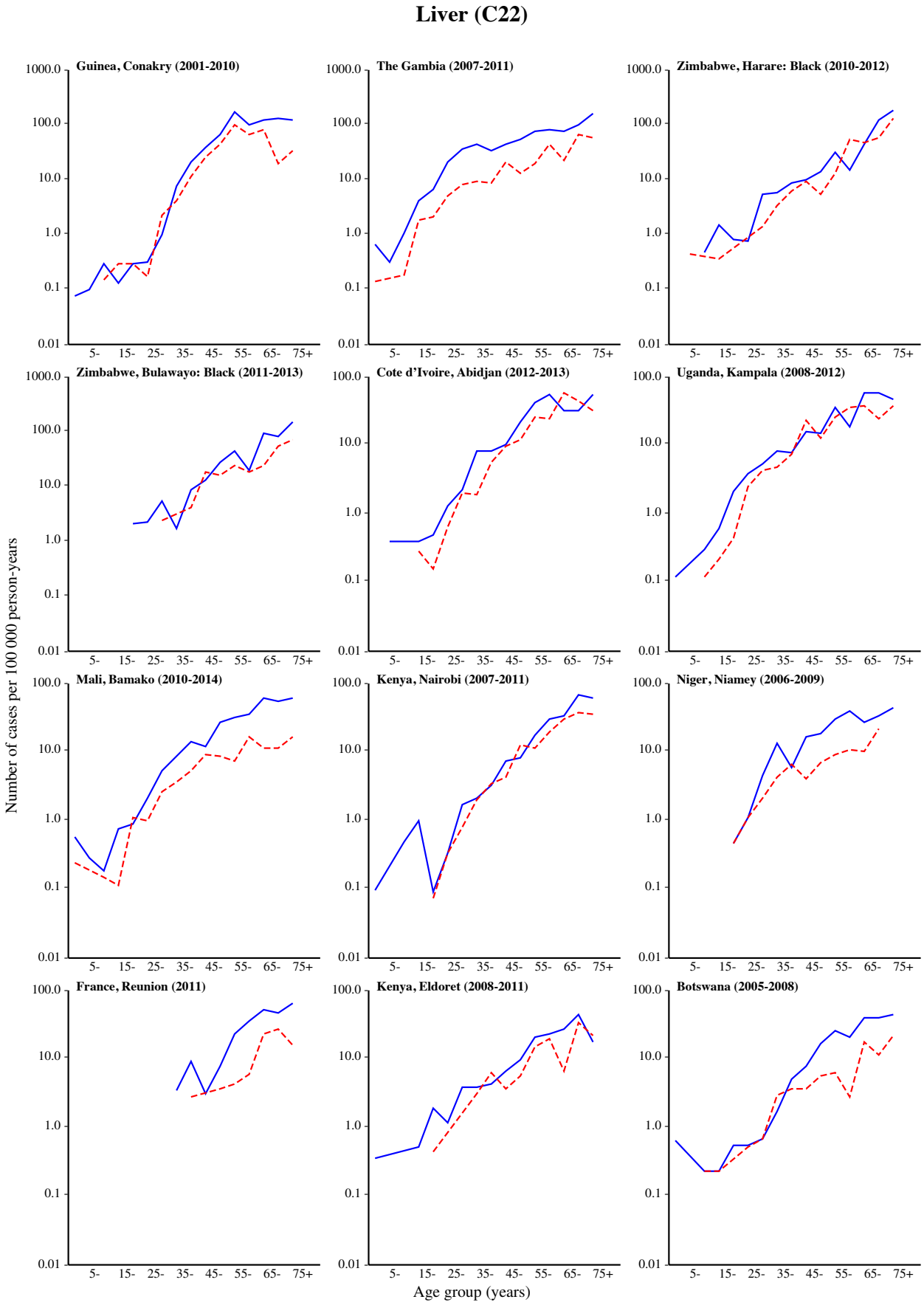


Fig. 7.16. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the liver among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

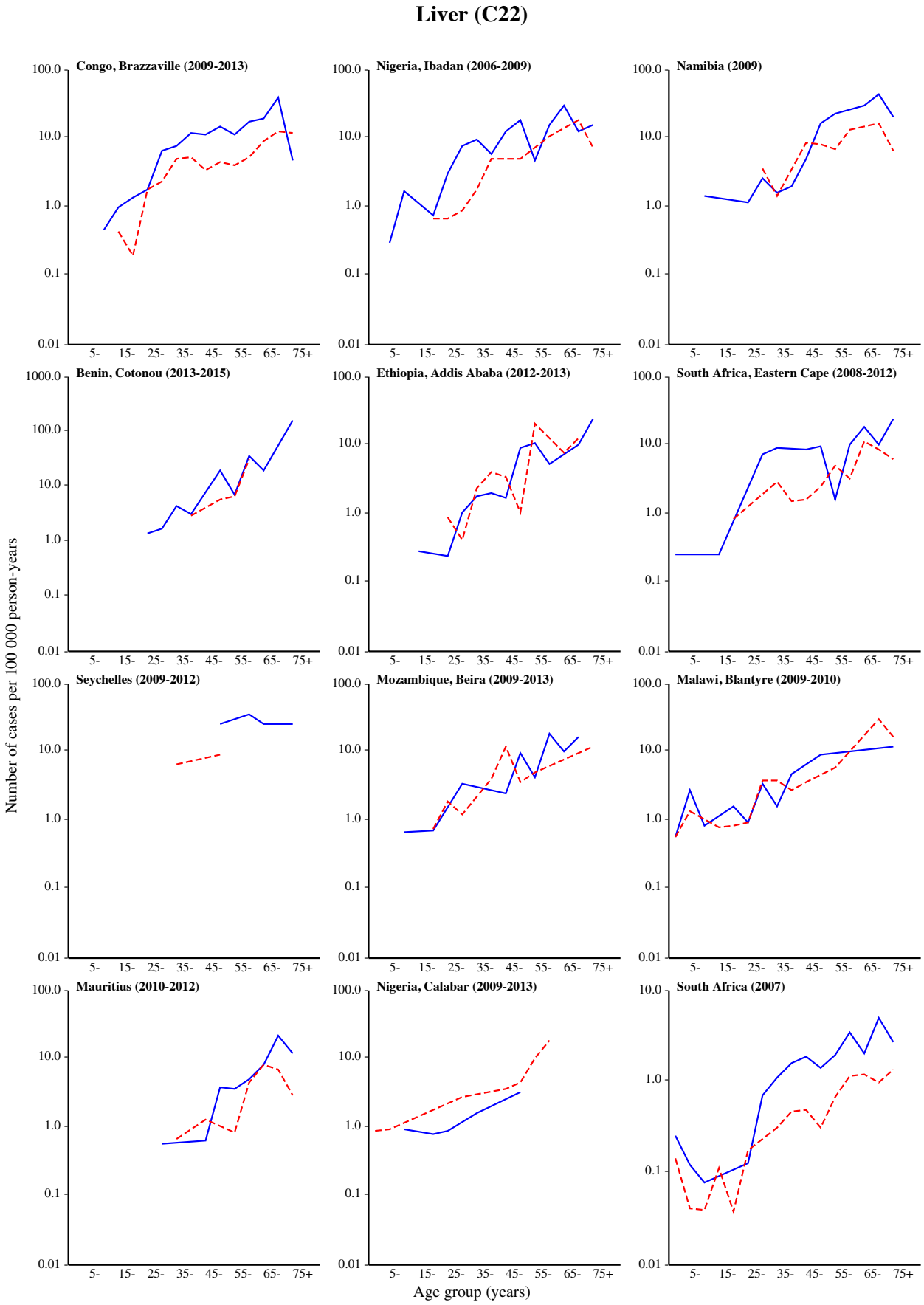


Fig. 7.16 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the liver among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Kaposi sarcoma

An estimated 37 500 cases of Kaposi sarcoma, 23 800 in males and 13 700 in females, were diagnosed in 2012 in Africa; all except about 300 of these cases were diagnosed in sub-Saharan Africa.

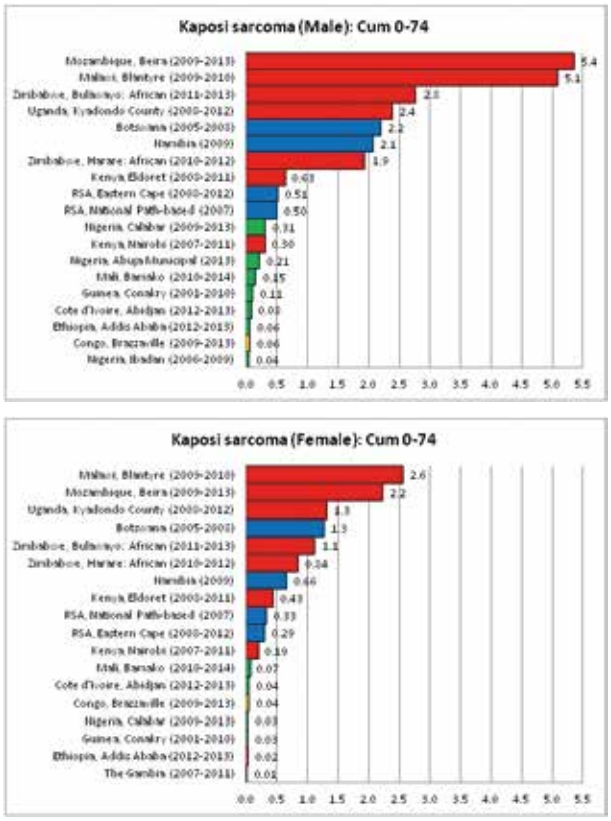


Fig. 7.17. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of Kaposi sarcoma among males and females in sub-Saharan Africa, by registry population

The bar charts (Fig. 7.17) and the GLOBOCAN 2012 map (Fig. 7.18) show that the region most affected is eastern Africa, with the highest incidence rates observed in Beira (Mozambique) and Blantyre (Malawi), followed by southern Africa, with lower rates in western Africa. This geographical pattern is consistent with the background prevalence of HIV infection in each of these regions.

Before the HIV/AIDS epidemic in Africa, the highest incidence of Kaposi sarcoma was in central Africa, with lower frequencies in northern and southern Africa (Cook-Mozaffari et al., 1998; IARC, 1996; Oettle 1962). Kaposi sarcoma-associated herpesvirus (KSHV)/ human herpesvirus-8 (HHV-8) is considered to be a necessary cause for the development of Kaposi sarcoma (IARC, 2012), although there is only a weak correlation between KSHV prevalence and the so-called endemic Kaposi sarcoma, which means that other cofactors are certainly involved (Dedicoat & Newton, 2003). Endemic Kaposi sarcoma was mainly a disease of the elderly, with its incidence increasing

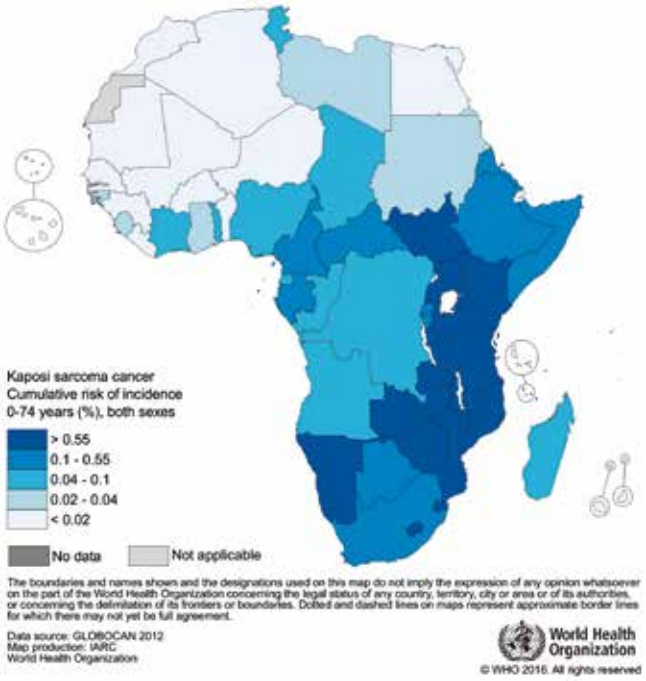


Fig. 7.18. Cumulative risk (up to and including the age of 74 years) of Kaposi sarcoma among both sexes in Africa, expressed as a percentage, by country

progressively after the age of 30–35 years. In older age groups, Kaposi sarcoma was about 10 times as common in males as in females (Hutt, 1981; Oettle, 1962).

In Europe and North America, risk of Kaposi sarcoma is increased with HIV-1-related immunosuppression by several orders of magnitude (in the thousands) (IARC, 2012). In Africa, the relative risks, although still elevated, are substantially lower than those reported in developed countries. The reasons for this are unclear but may reflect differences in background risk and competing mortality. The risk is much higher (an odds ratio of 1600) in HIV-positive individuals with high antibody titres of HHV-8 immunoglobulin G (Sitas et al., 1999).

The incidence rates of Kaposi sarcoma rose several-fold in eastern Africa and other parts of sub-Saharan Africa during the 1990s, consistent with the HIV/AIDS epidemic in these regions (Chokunonga et al., 1999; Parkin et al., 1999), and incidence rates still correlate, at least to some extent, with the prevalence of HIV/AIDS. As a result of the HIV/AIDS epidemic, the incidence of Kaposi sarcoma has also increased in countries where it was previously relatively rare but where KSHV was prevalent, such as in southern Africa. HIV-associated Kaposi sarcoma involves internal organs and lymph nodes, features that were typical of childhood Kaposi sarcoma in the pre-AIDS era. The age-specific incidence curves in those centres with high rates of HIV-related Kaposi sarcoma have also changed: epidemic Kaposi sarcoma shows a pattern reminiscent of the prevalence of HIV infection, with a modest peak in children up to the age of 4 years,

a decrease until the age of 15 years, and then a progressive increase to a peak in young adults, with younger ages in females than in males (Fig. 7.19).

Although Kaposi sarcoma continues to be a leading cause of cancer in most parts of eastern Africa, rates are declining because of the reduction in the prevalence of HIV and the wider availability of highly active antiretroviral therapy (HAART) (Chokunonga et al., 2013; Mills et al., 2011; Wabinga et al., 2014).

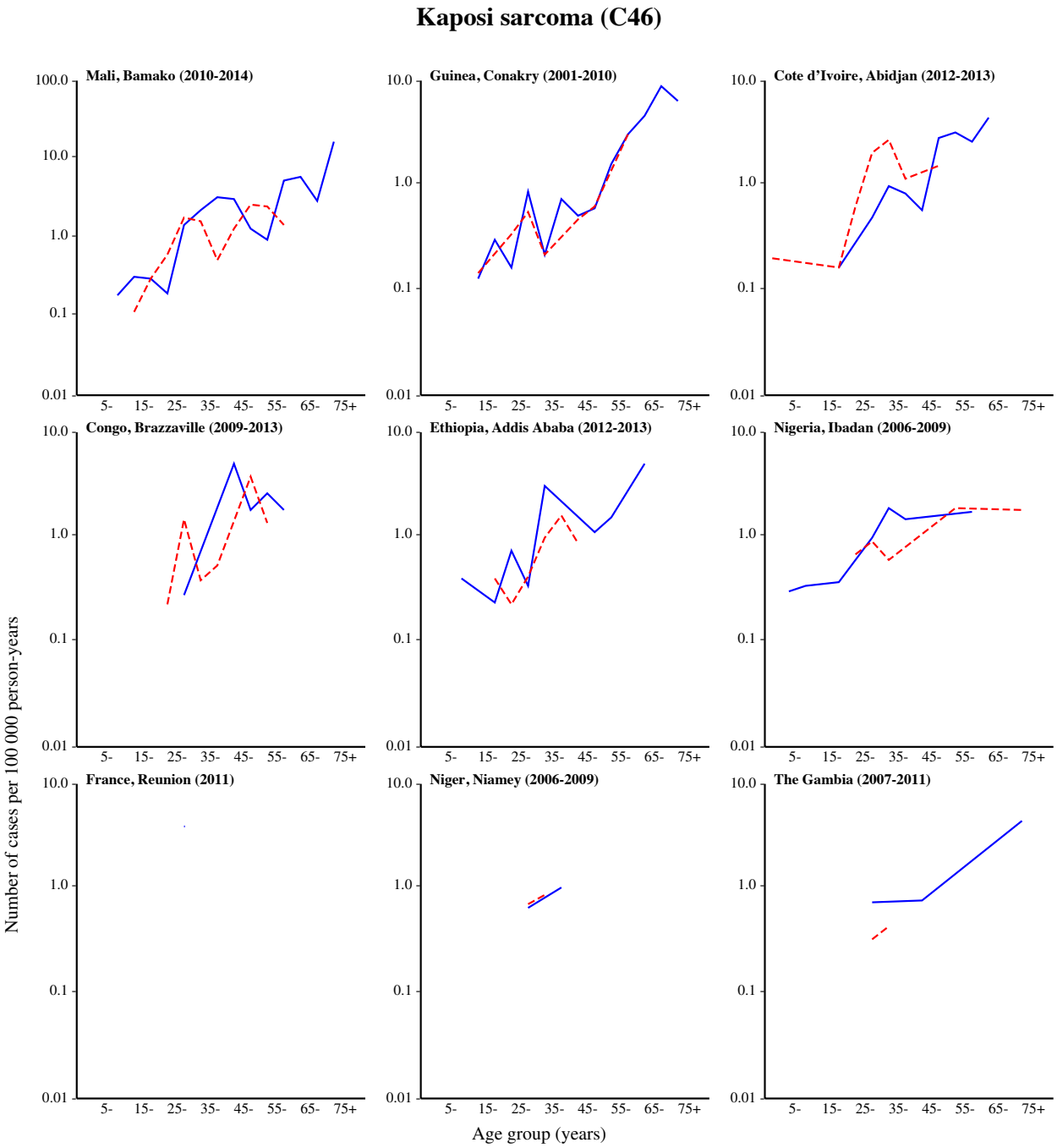


Fig. 7.19. Age-specific incidence rates (expressed as cases per 100 000 person-years) of Kaposi sarcoma among males (solid blue lines) and females (dashed red lines) in 21 of the 25 registry populations of sub-Saharan Africa included in this volume

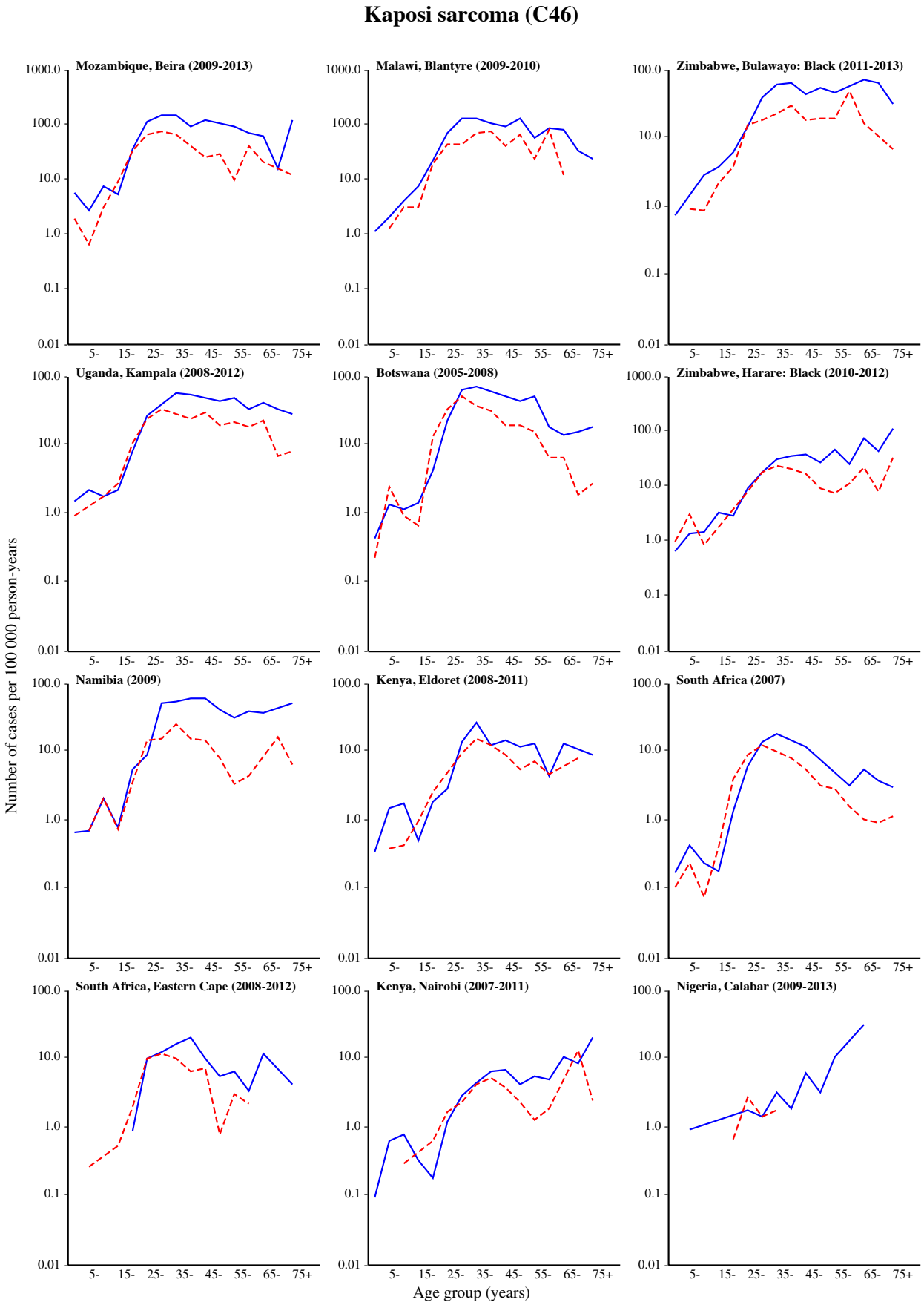


Fig. 7.19 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of Kaposi sarcoma among males (solid blue lines) and females (dashed red lines) in 21 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the colorectum

Colorectal cancer is the fifth most common malignancy in Africa, with 41 000 new cases and about 29 000 deaths estimated to have occurred in 2012 (Ferlay et al., 2015). The cumulative risk of colorectal cancer by cancer registry range from < 0.2% in Conakry (Guinea) and The Gambia to > 4% in Seychelles in males, and from < 0.1% in The Gambia to almost 3% in Réunion (France) in females. In general, the risk of the disease for both sexes combined is highest in parts of northern Africa, southern Africa, and eastern Africa, and lowest in parts of western Africa (Fig. 7.21).

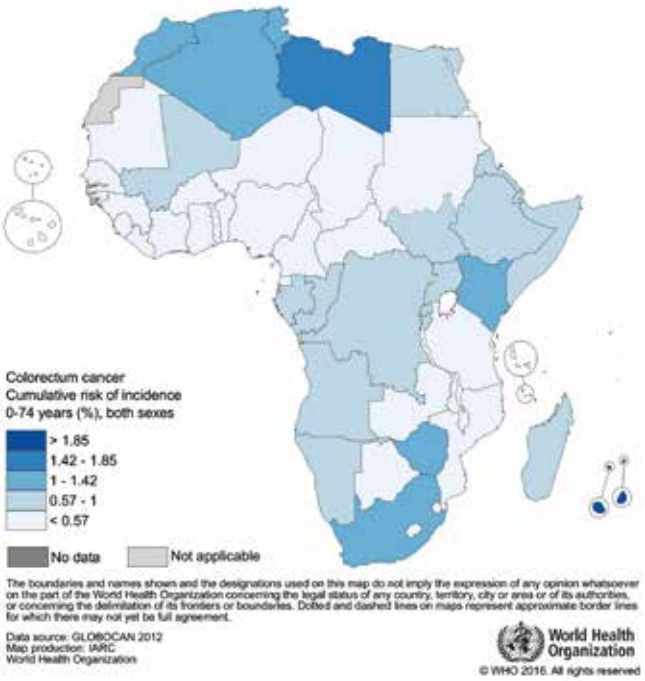


Fig. 7.21. Cumulative risk (up to and including the age of 74 years) of cancer of the colorectum among both sexes in Africa, expressed as a percentage, by country

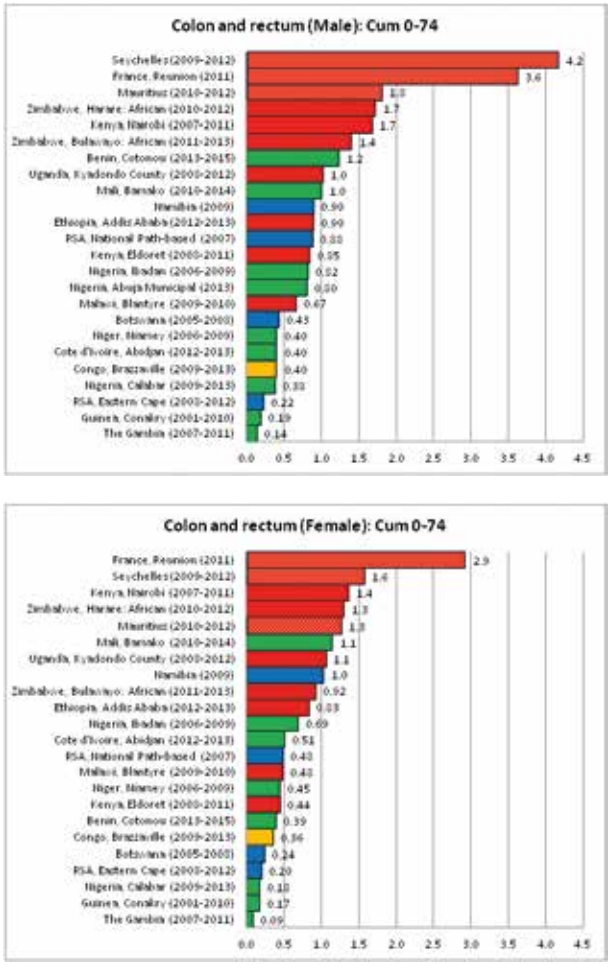


Fig. 7.20. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the colorectum among males and females in sub-Saharan Africa, by registry population

Colorectal cancer is the most frequently diagnosed cancer in men in Ethiopia, and the second most commonly diagnosed cancer (after breast cancer) in women in Algeria, Tunisia, and Libya. Incidence rates increase with age in all registries, and the rates are generally higher in males than in females (Fig. 7.22).

Previous studies documented increases in incidence rates of colorectal cancer in several African countries, including in Uganda (Kampala), South Africa (rural Eastern Cape), Zimbabwe (Harare, Black population), and Tunisia (Sousse region) (Chokunonga et al., 2013; Missaoui et al., 2010; Somdyala et al., 2015; Wabinga et al., 2014). For example, among the Black population of Zimbabwe, age-standardized incidence rates per 100 000 males and females increased by about 4% per year during the period 1991–2010 (Chokunonga et al., 2013). The increase in incidence in Africa is thought to reflect changes in dietary patterns from plant-based and fibre-rich food to animal-based and calorie-dense food, increases in sedentary lifestyles, and increases in the prevalence of obesity and smoking (Walker & Segal, 2002). The prevalence of obesity among women is more than one third in South Africa, Egypt, and Libya, as well as in urban areas in several countries (Kamadjeu et al., 2006; NCD Risk Factor Collaboration, 2016). However, despite the rising incidence rates in Blacks in sub-Saharan Africa and the decreasing incidence rates in Blacks in the USA (Siegel et al., 2014), rates in most parts of Africa are still less than one quarter of those in Blacks in the USA. A recent study suggested that differences in the preparation, cooking, and composition of diets between Blacks in Africa and Blacks in the USA may, in part, contribute to the marked difference in risk between those populations (O'Keefe et al., 2015).

The burden of colorectal cancer in Africa, as well as in other parts of the world, could be reduced substantially by promoting behaviours such as maintaining a healthy body weight, staying physically active, consuming a healthy (plant-based) diet, and avoiding

smoking. Colorectal cancer can also be prevented by use of screening, especially colonoscopy, which enables the detection and removal of premalignant lesions (adenomatous polyps) (Shaukat et al., 2013; Zauber et al., 2012). However, the relatively low risk of colorectal cancer and the currently inadequate health care infrastructure in most parts of Africa preclude the introduction of an organized colorectal cancer screening programme (Lambert et al., 2009).

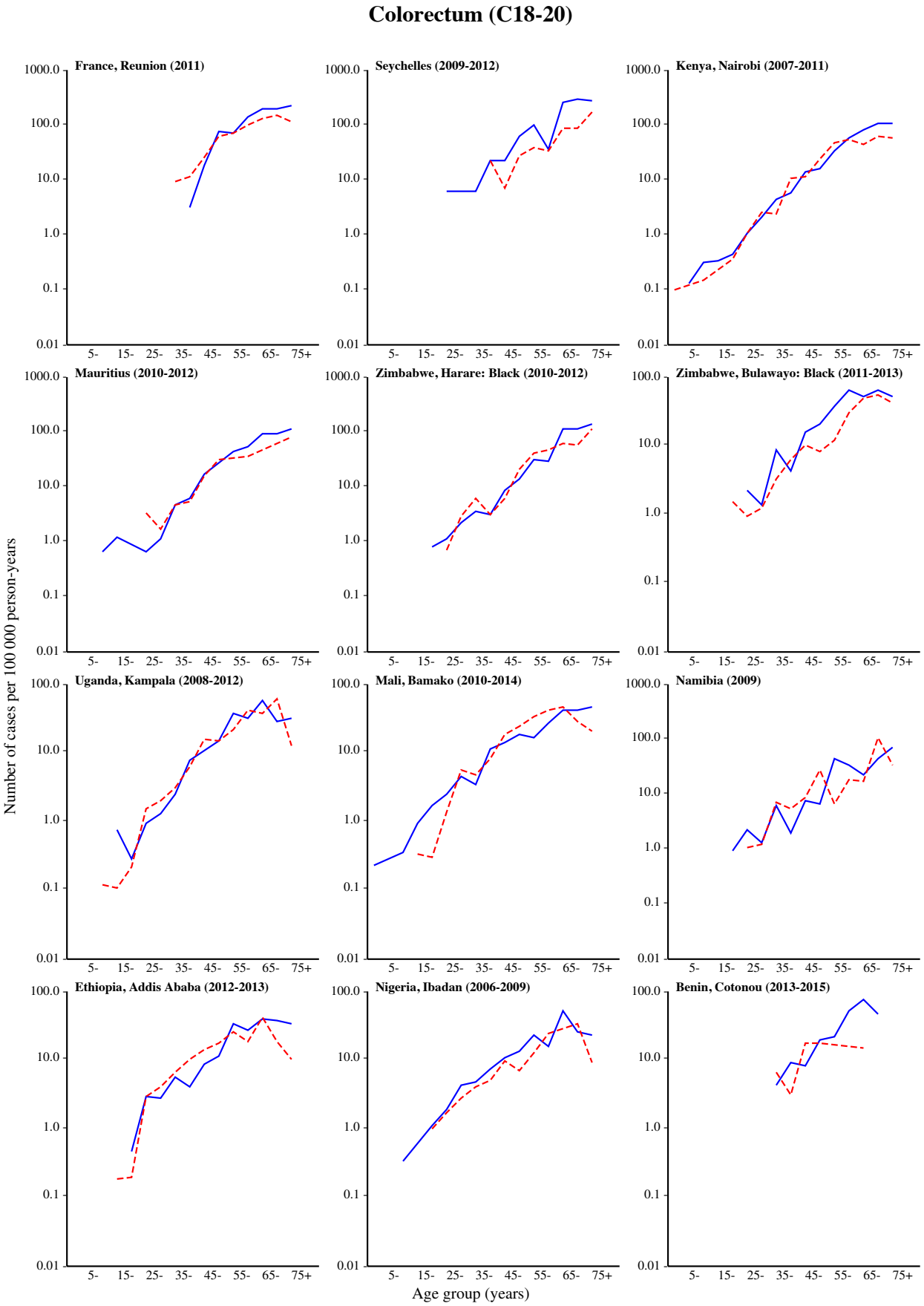


Fig. 7.22. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the colorectum among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

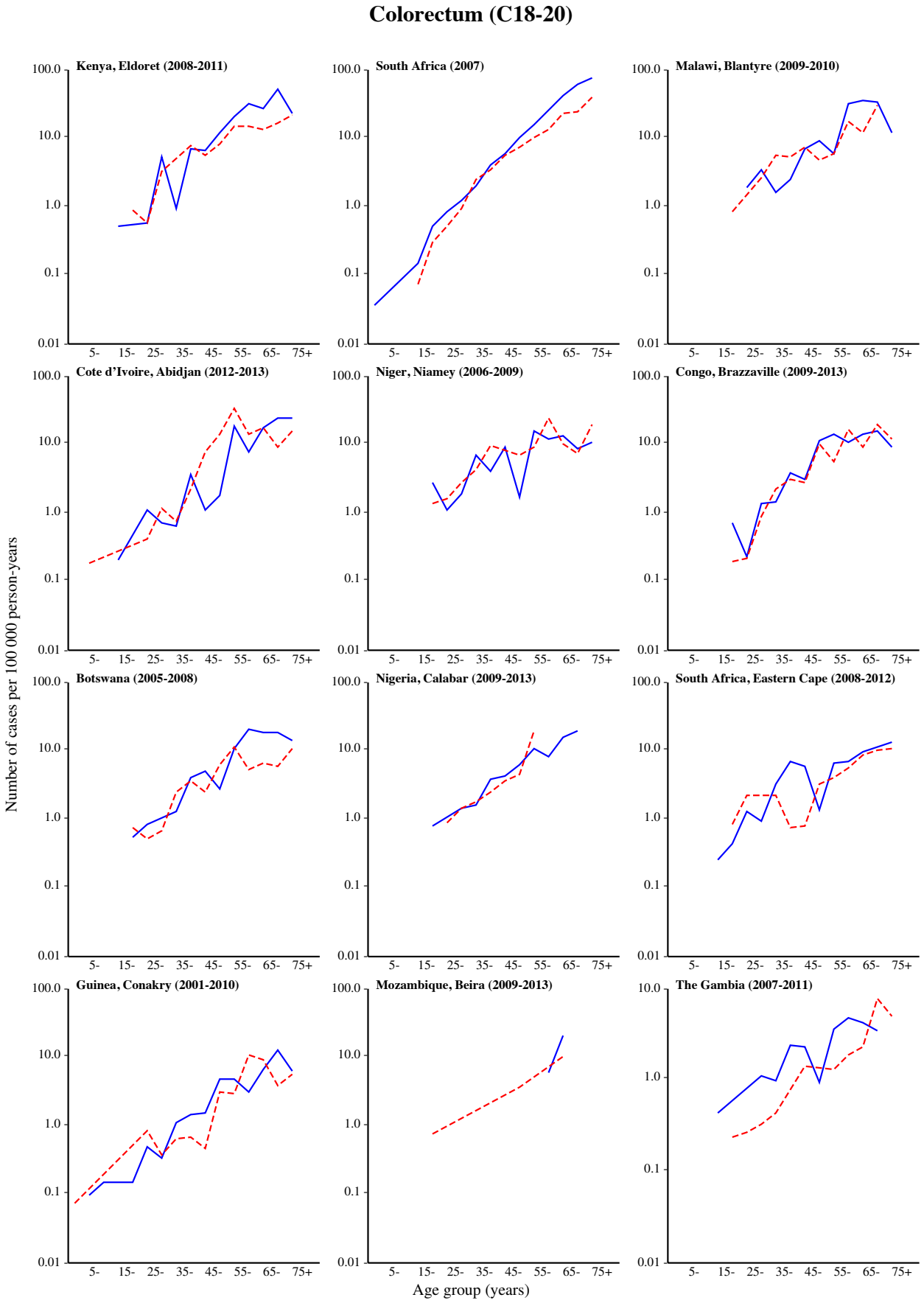


Fig. 7.22 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the colorectum among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Non-Hodgkin lymphoma

An estimated 36 700 new cases and 26 400 deaths from non-Hodgkin lymphoma (NHL) occurred in 2012 in Africa. Incidence rates in both sexes in sub-Saharan Africa are lower (cumulative risk, 0.37%) than the world average (common risk, 0.54%). NHL encompasses a variety of histologically distinct forms. The summary tables (see Chapter 6) provide results (as number of cases, age-standardized incidence rate, and cumulative incidence rate) for Burkitt lymphoma in children and NHL in adults. The results for NHL in adults (i.e. older than 15 years) are summarized in Fig. 7.23.

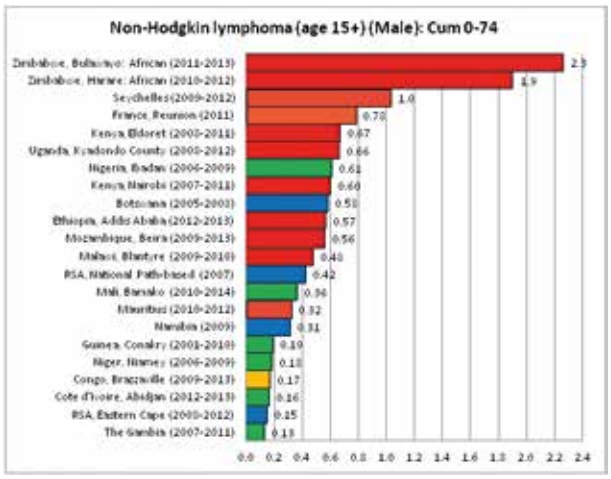


Fig. 7.23. Cumulative incidence rates for ages 15–74 years (expressed as percentages) of non-Hodgkin lymphoma among males and females in sub-Saharan Africa, by registry population

In adults, the highest incidence rates are observed in eastern Africa (Fig. 7.24). Most NHLs in Africa are of the B-cell type, and clinical series show an excess of high-grade lymphomas and a deficit of nodular lymphomas.

Burkitt lymphoma is a very common cancer in children in parts of tropical Africa, where it may

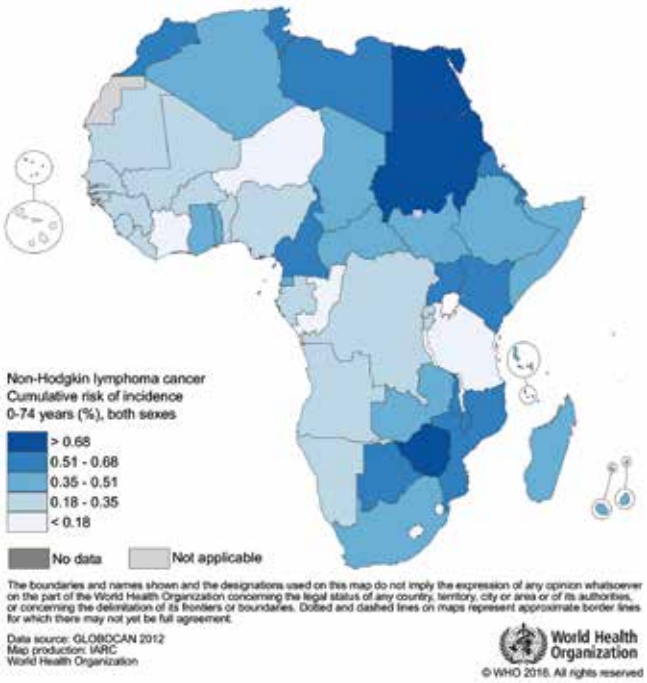


Fig. 7.24. Cumulative risk (for ages 15–74 years) of non-Hodgkin lymphoma among both sexes in Africa, expressed as a percentage, by country

account for up to three quarters of all childhood cancers. In many of the graphs of age-specific incidence rates (Fig. 7.25), a peak of incidence can be seen in the age group 5–9 years (higher in boys than in girls), representing cases of Burkitt lymphoma. High incidence rates are seen in Blantyre (Malawi) and Kampala (Uganda), with slightly lower rates in western Africa: Abidjan (Côte d'Ivoire) and Ibadan (Nigeria). In these zones of high incidence of childhood Burkitt lymphoma, almost all cases are associated with Epstein–Barr virus (EBV) infection, as demonstrated by the presence of either EBV nuclear antigen or EBV DNA in the tumour cells. Intense, holoendemic malaria infection is a cofactor: children with Burkitt lymphoma have evidence of more frequent or intense infection with malaria compared with control children (Molyneux et al., 2012).

Little is known about the causes of NHL. Human T-cell lymphotropic viruses (e.g. HTLV-I) are common in tropical Africa (IARC, 1996) and are a cause of T-cell lymphomas, but the incidence of these cancers in Africa is low. Although EBV DNA is present in a small proportion of lymphomas, its role in causing NHL in people who are not immunosuppressed is unclear (IARC, 2012). Infection with hepatitis C virus (HCV) is considered to be a cause of B-cell NHL (IARC, 2012), and this accounts for the high incidence of NHL in Egypt, where the prevalence of HCV infection is high (Alter, 2007).

The risk of NHL in adults is increased by HIV infection, although the relative risk in HIV-positive

people in Africa is lower than in Europe and North America. The association between endemic Burkitt lymphoma and HIV is even less clear (Mbulaiteye et al., 2011). It was estimated that in 2002 about one quarter of NHL cases in sub-Saharan Africa were associated with AIDS (Parkin, 2006). However, it is not clear that the incidence of NHL in areas where there is a high prevalence of HIV infection has been much affected by increasing use of antiretroviral therapy. For example, in the Western Cape of South Africa, cases of HIV-related lymphoma accounted for 37% of all lymphomas seen in 2009 (an increase from 5% in 2002), and Burkitt lymphoma is now the most common HIV-related lymphoma, followed by diffuse large B-cell lymphoma subtypes (Abayomi et al., 2011). In Harare (Zimbabwe), incidence rates of NHL have increased steadily since 1991 (by 6.7–6.9% per year), although rates in young adults (aged 15–39 years) have decreased since 2001 (Chokunonga et al., 2016). The rate of increase in Kampala (Uganda) in 1991–2010 was similar (5.2% per year in men, 6.9% per year in women), although there was a small decrease in rates in young adults (aged 15–49 years) since 2007–2008 (Wabinga et al., 2014). It is not clear why antiretroviral therapy appears to have been less successful in reducing the incidence of NHL compared with that of Kaposi sarcoma, although, as noted, the risk associated with HIV infection is much lower for NHL than for Kaposi sarcoma. Poor coverage, late initiation of antiretroviral therapy, and incomplete viral suppression may mask any effect at the population level.

There has not been much change in the incidence of Burkitt lymphoma in either Harare or Kampala, although a recent decline in incidence has been reported in the northern United Republic of Tanzania (Aka et al., 2012).

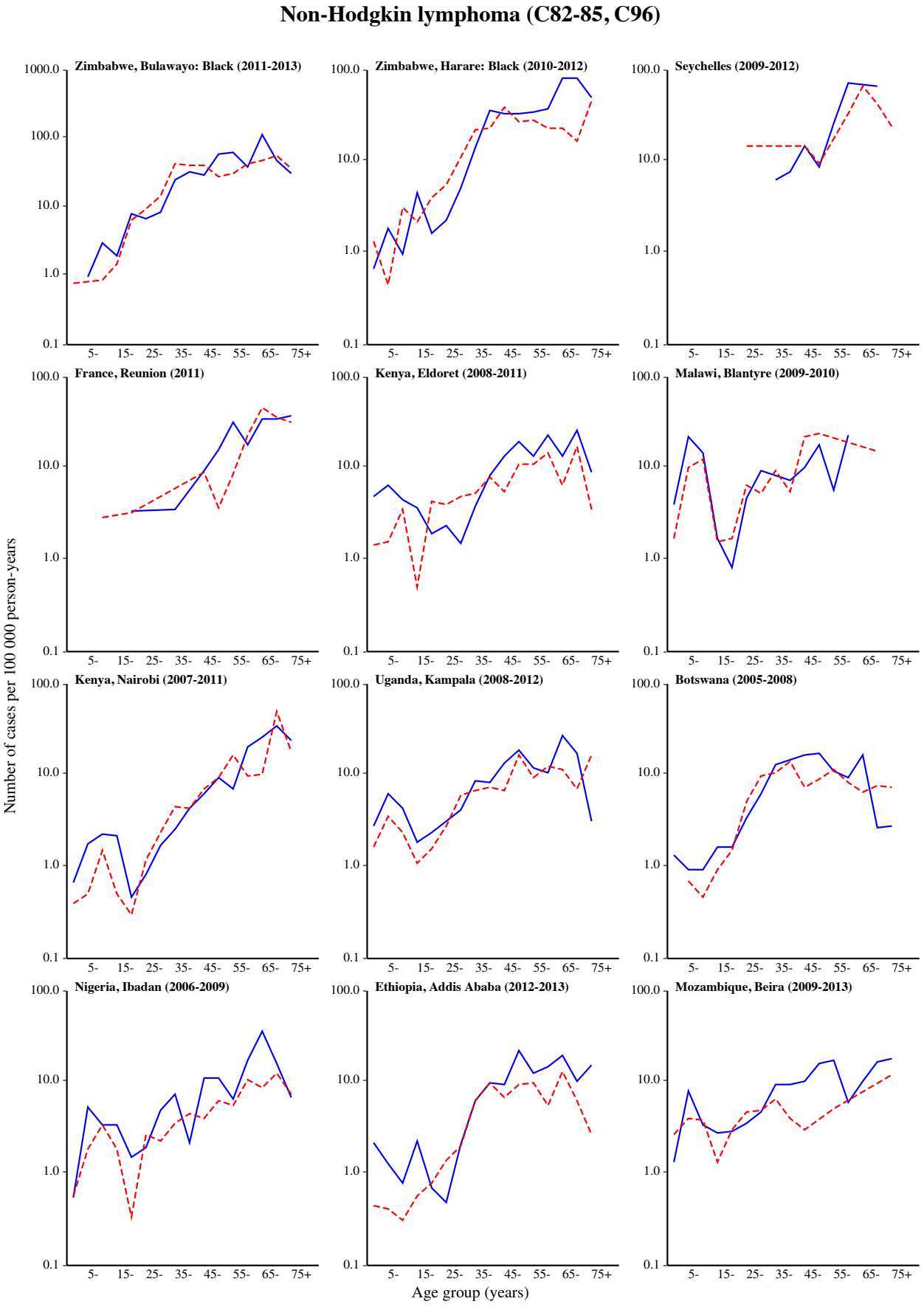


Fig. 7.25. Age-specific incidence rates (expressed as cases per 100 000 person-years) of non-Hodgkin lymphoma among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

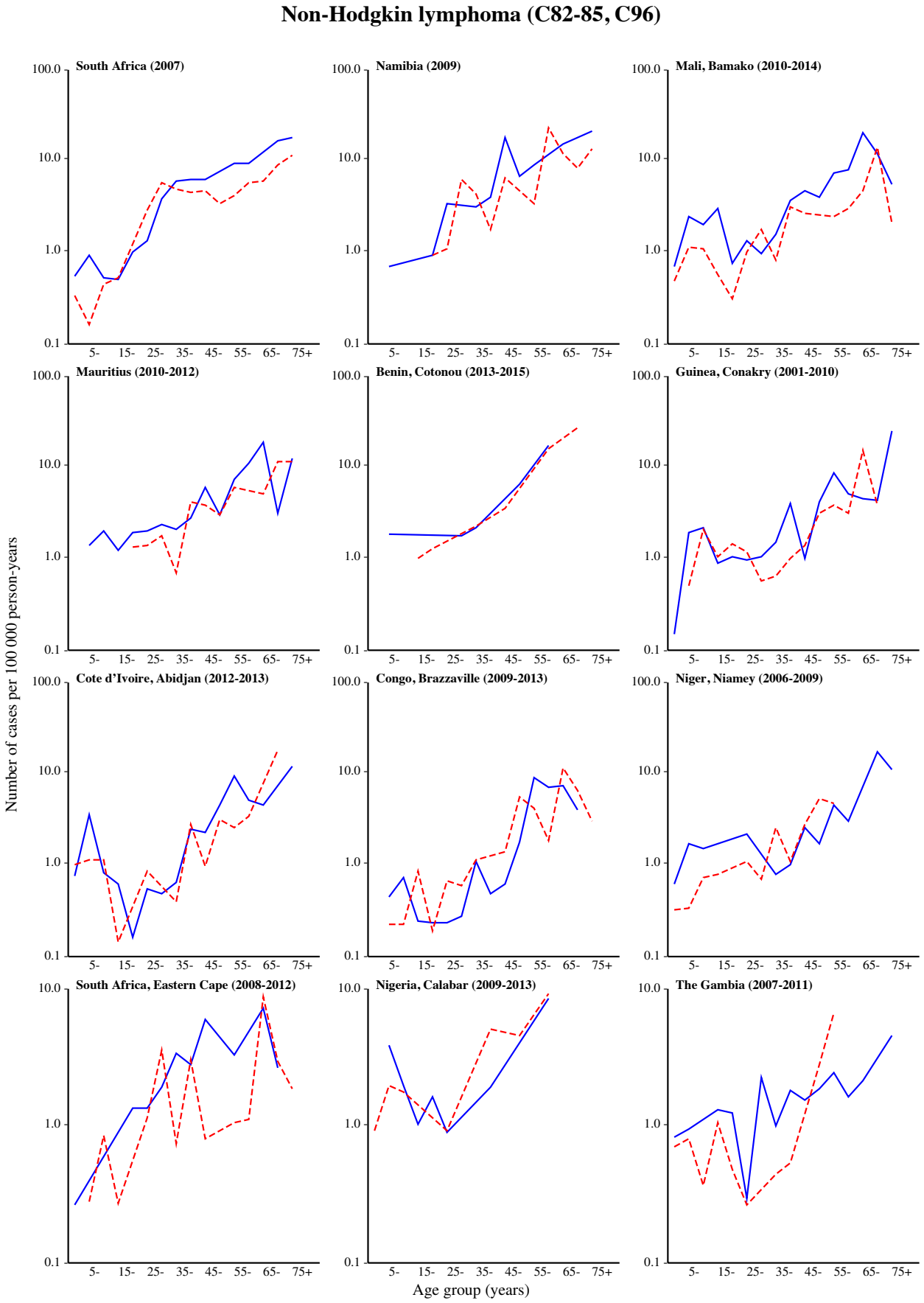


Fig. 7.25 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of non-Hodgkin lymphoma among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the oesophagus

About 27 500 new cases and 25 200 deaths from oesophageal cancer were estimated to have occurred in 2012 in Africa, and about 90% of these cases and deaths occurred in sub-Saharan Africa. Incidence rates vary substantially across the region. Cumulative incidence rates up to and including the age of 74 years range from < 0.1% in several northern and western African countries to > 2.5% in many eastern and southern African countries (Fig. 7.27). Several eastern and southern African countries are among the countries with the highest incidence rates of oesophageal cancer in the world (Arnold et al., 2015; Cheng et al., 2015).

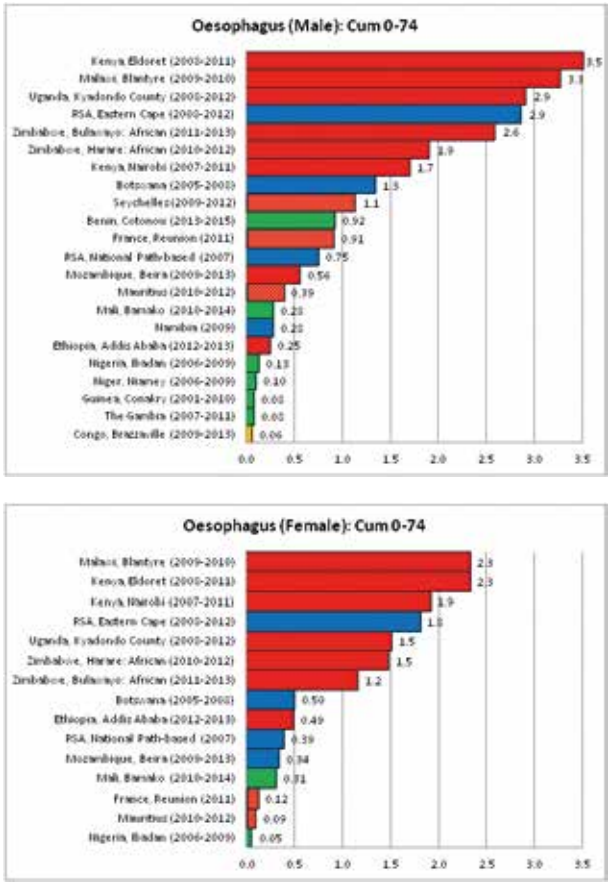


Fig. 7.26. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the oesophagus among males and females in sub-Saharan Africa, by registry population

Incidence rates increase with age. Rates are generally higher in men than in women, with a rate ratio of about 2. There are two major histological types of oesophageal cancer: squamous cell carcinoma (SCC) and adenocarcinoma. SCC is the dominant form of the disease in Africa, representing up to 90% of all cases (Cheng et al., 2015; Wabinga et al., 2004; White et al., 2002). Smoking and alcohol consumption are the two known risk factors for oesophageal cancer in high-incidence areas of southern Africa

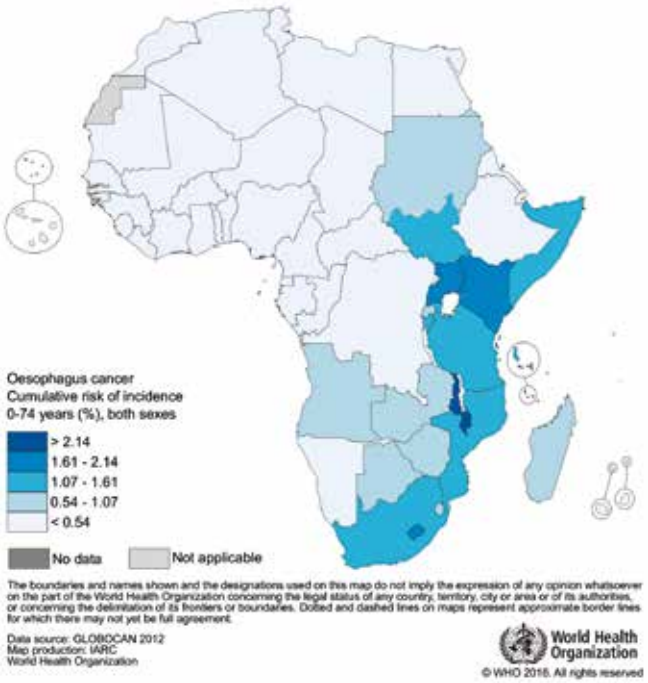


Fig. 7.27. Cumulative risk (up to and including the age of 74 years) of cancer of the oesophagus among both sexes in Africa, expressed as a percentage, by country

and eastern Africa (Kayamba et al., 2015; Pacella-Norman et al., 2002; Sewram et al., 2014). A recent study cited the consumption of fermented milk with a high concentration of alcohol and acetaldehyde as a risk factor in the high incidence of oesophageal cancer in western Kenya (Nieminen et al., 2013). Nevertheless, the prevalences of both smoking and alcohol consumption are too low to account for the exceptionally high incidence rates in these regions. Worldwide, sub-Saharan Africa is the region with the lowest per capita cigarette consumption, with very little increase observed over the past 30 years (Eriksen et al., 2015). Similar patterns of exceptionally high incidence rates of oesophageal cancer with low prevalences of smoking and alcohol consumption in both men and women have been reported in parts of the Islamic Republic of Iran, China, and South America (Blot et al., 2006).

Other risk factors that are thought to contribute to the high incidence rates of oesophageal cancer in parts of eastern and southern Africa include low consumption of fruit and vegetables (Sewram et al., 2014), deficiency of certain micronutrients (Schaafsma et al., 2015), maize as a staple food (Pink et al., 2011; Sammon & Iputo, 2006), contamination of maize with fumonisins (Marasas, 2001), domestic smoke exposure from cooking with charcoal or firewood (Kayamba et al., 2015; Pacella-Norman R et al., 2002), and human papillomavirus (HPV) infection (Petrick et al., 2014).

Among recent studies that examined temporal trends in oesophageal cancer incidence rates in

high-risk areas of eastern and southern Africa, one study reported a decline (Somdyala et al., 2015), whereas others reported no change (Chokunonga et al., 2016; Parkin et al., 2010). The burden of oesophageal cancer in these high-risk areas could be mitigated by promoting smoking cessation and improving dietary patterns (Walker et al., 2002). However, to substantially reduce the risk of the disease, the elucidation of major risk factors is required.

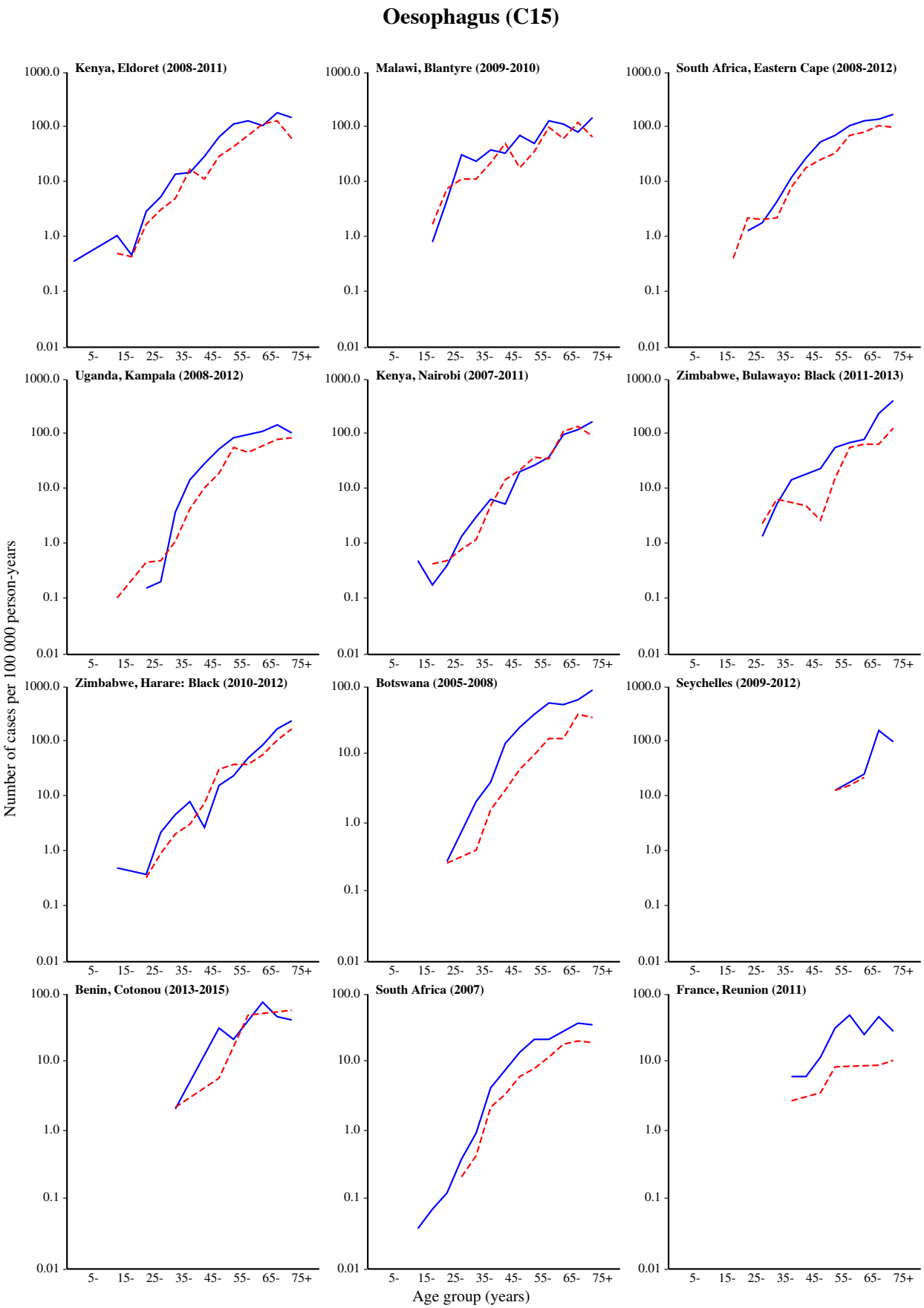


Fig. 7.28. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the oesophagus among males (solid blue lines) and females (dashed red lines) in 23 of the 25 registry populations of sub-Saharan Africa included in this volume

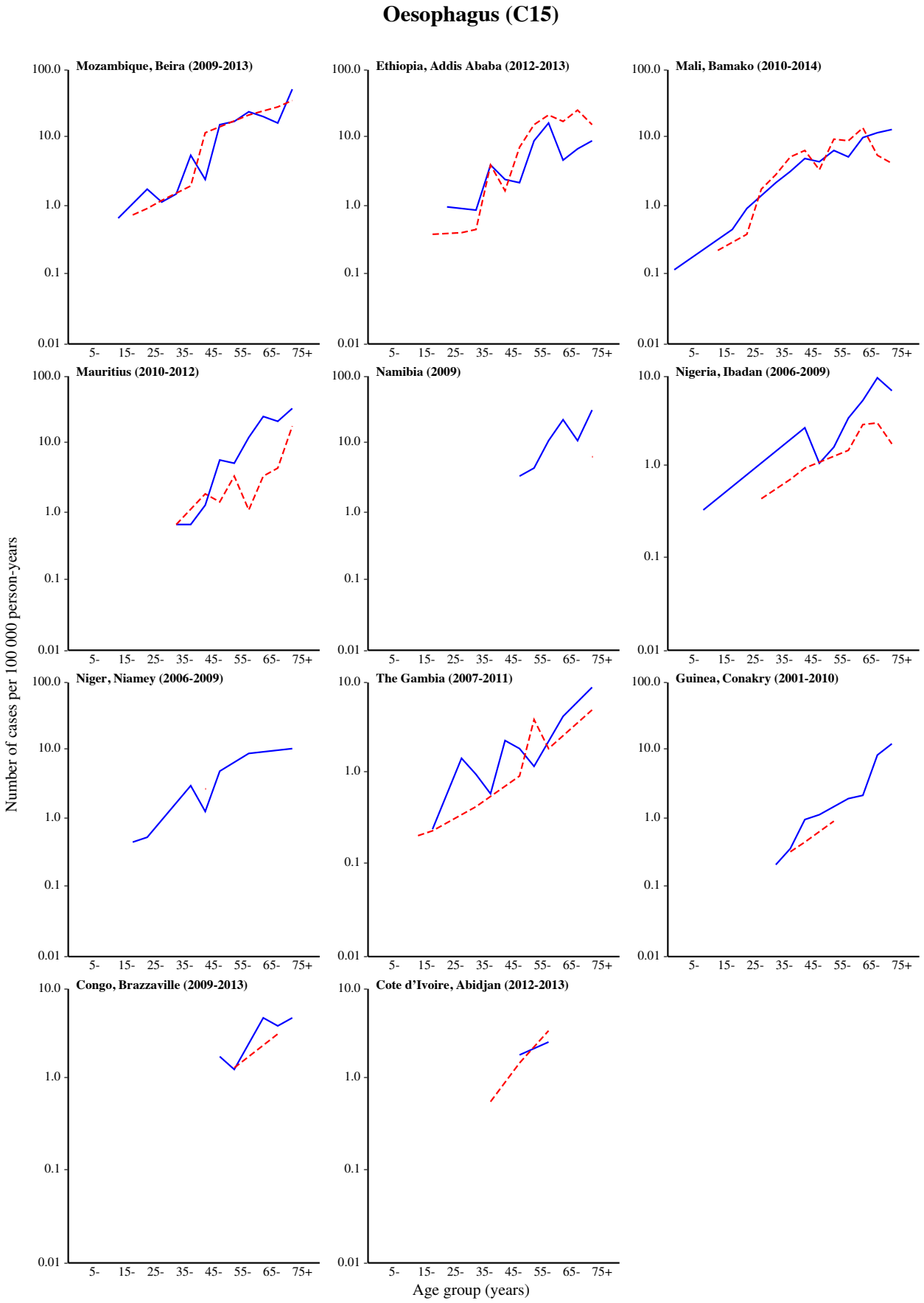


Fig. 7.28 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the oesophagus among males (solid blue lines) and females (dashed red lines) in 23 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the stomach

About 24 000 new cases of stomach cancer and 22 000 deaths from stomach cancer were estimated to have occurred in 2012 in Africa, with three quarters (18 000 new cases) occurring in sub-Saharan Africa. Stomach cancer is slightly more common in males than in females (sex ratio, 1.2). Incidence rates are relatively low by world standards: the cumulative incidence rate up to and including the age of 74 years is 0.46% in sub-Saharan Africa (very similar to that in the USA), compared with 1.39% globally.

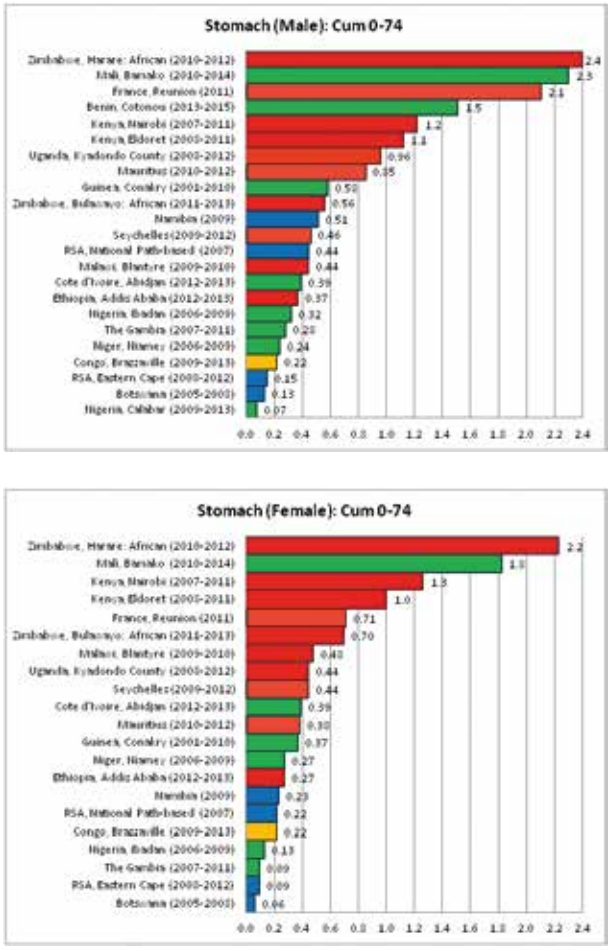


Fig. 7.29. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the stomach among males and females in sub-Saharan Africa, by registry population

The centres with the highest recorded cumulative incidence rates are Harare (Zimbabwe), Bamako (Mali), Kenya, and Réunion (France) (Fig. 7.29). This scattered occurrence is reflected in the GLOBOCAN 2012 estimates (Fig. 7.30). It seems probable that gastric cancer is somewhat underdiagnosed, or is confused with cancers of the oesophagus, when endoscopy services are not well developed; a significant proportion

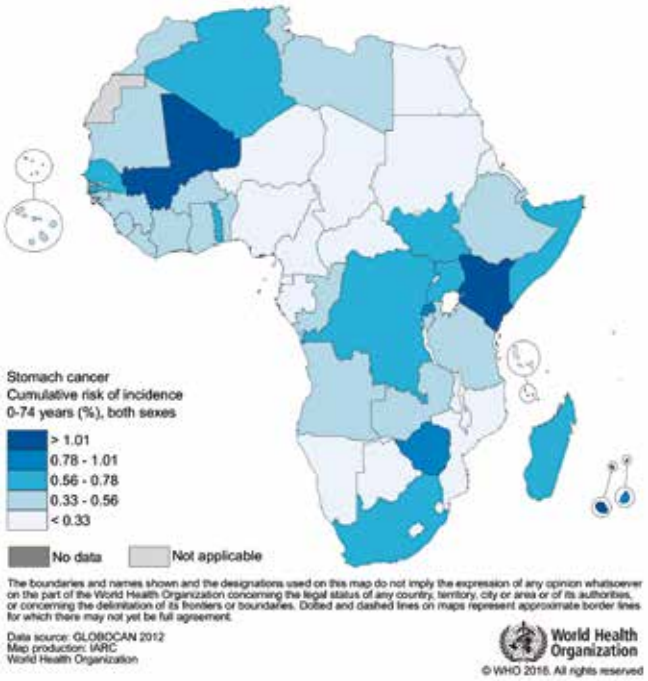


Fig. 7.30. Cumulative risk (up to and including the age of 74 years) of cancer of the stomach among both sexes in Africa, expressed as a percentage, by country

of cases in several centres are diagnosed without histology. In rural Kenya, the reported incidence of stomach cancer increased when the region's main hospital acquired an endoscope (McFarlane et al., 2001).

The relatively high rates in Mali have been previously noted (Bayo et al., 1990). Historical data also suggest an area of relatively high risk in the Great Lakes region. A relatively high frequency of stomach cancers has been recorded in Rwanda (Newton et al., 1996). In western Uganda, stomach cancer was reported to be the second most common cancer, accounting for 12% of all cancers in males and 6% of all cancers in females (Parkin et al., 2003).

The dramatic decline in the incidence of gastric cancer in high-income countries is a well-known phenomenon (Howson et al., 1986), which is linked to improvements in food preservation and a decline in transmission of and infection by *Helicobacter pylori*. However, there is no indication that the incidence of stomach cancer is declining in Africa; time trends for the cancer registries in Kampala (Uganda) (Wabinga et al., 2014), Harare (Zimbabwe) (Chokunonga et al., 2013), and Bamako (Mali) (this volume) indicate little or no change in incidence during the past 20 years. No decline was noted in rates of histologically diagnosed cases in South Africa between 1986 and 1995 (Sitas et al., 1998).

H. pylori infection is now recognized as the most important risk factor for non-cardia gastric cancers (IARC, 2012). The fact that the prevalence of infection

with *H. pylori* appears to be high in African populations (IARC, 1994) but that, in many areas, the incidence of gastric cancer is low has been referred to as "an enigma" (Holcombe, 1992). However, the pathway from infection to cancer is indirect, involving chronic inflammation, resulting in progressively severe and then chronic atrophic gastritis and, ultimately, intestinal metaplasia. This process is modulated by host-determined inflammatory responses and specific *H. pylori* virulence factors, including cytotoxin-associated gene A (CagA). *H. pylori* CagA-positive strains are the predominant strains in Africa (Mitchell et al., 2002), but there is much genetic variation within CagA-positive *H. pylori*, with different carcinogenic potential (Kidd et al., 1999; Yamaoka et al., 2008). In addition to the large differences in the carcinogenic potential of generic variants of *H. pylori*, other factors are involved in modulating risk, including diets low in intake of fruit, vegetables, and vitamin C and/or high in intake of salts, and tobacco smoking. There has been almost no research in Africa in this area; although there are many places where food is salted or pickled to aid preservation, the relative importance of these risk factors in local settings is unknown.

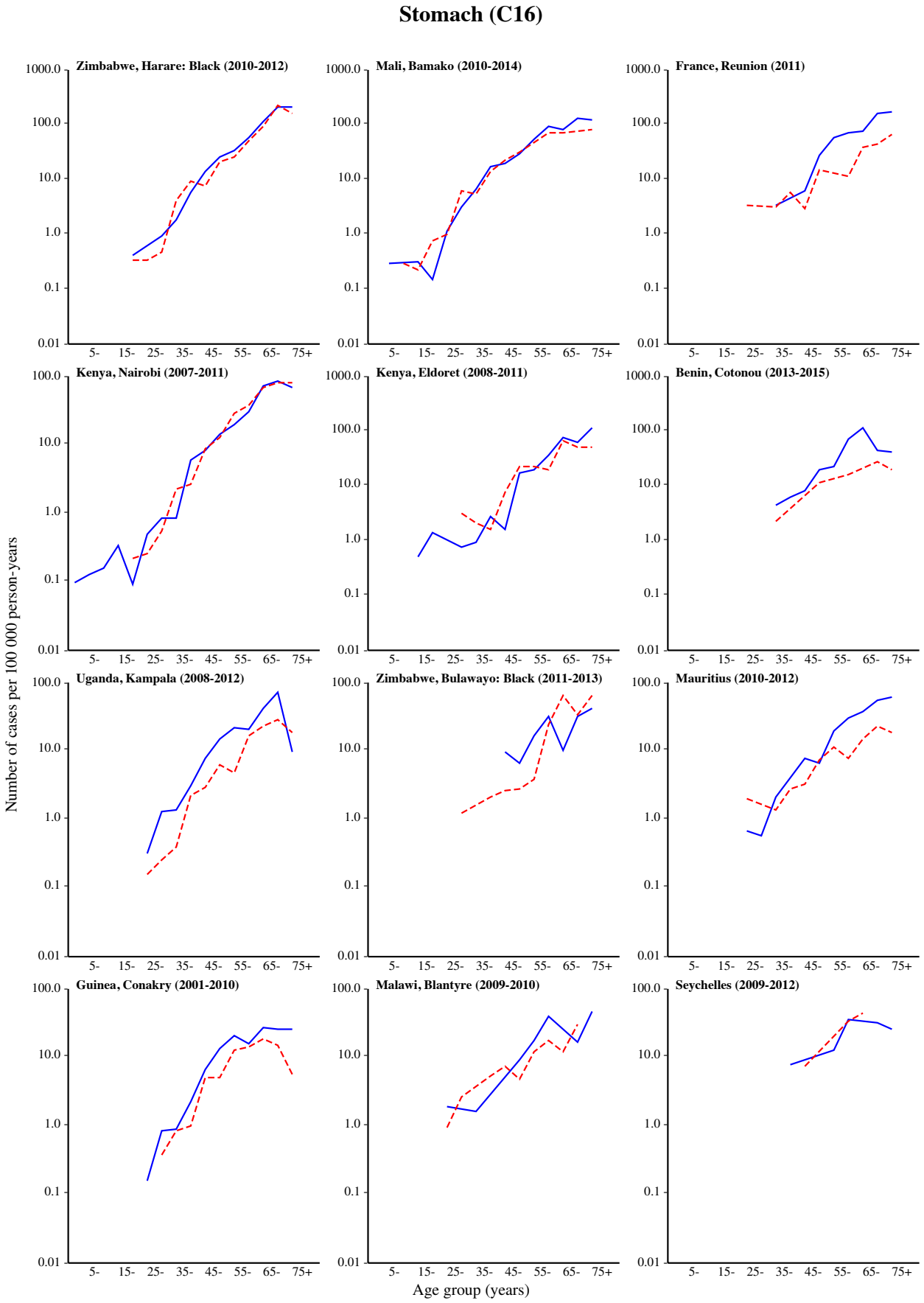


Fig. 7.31. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the stomach among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

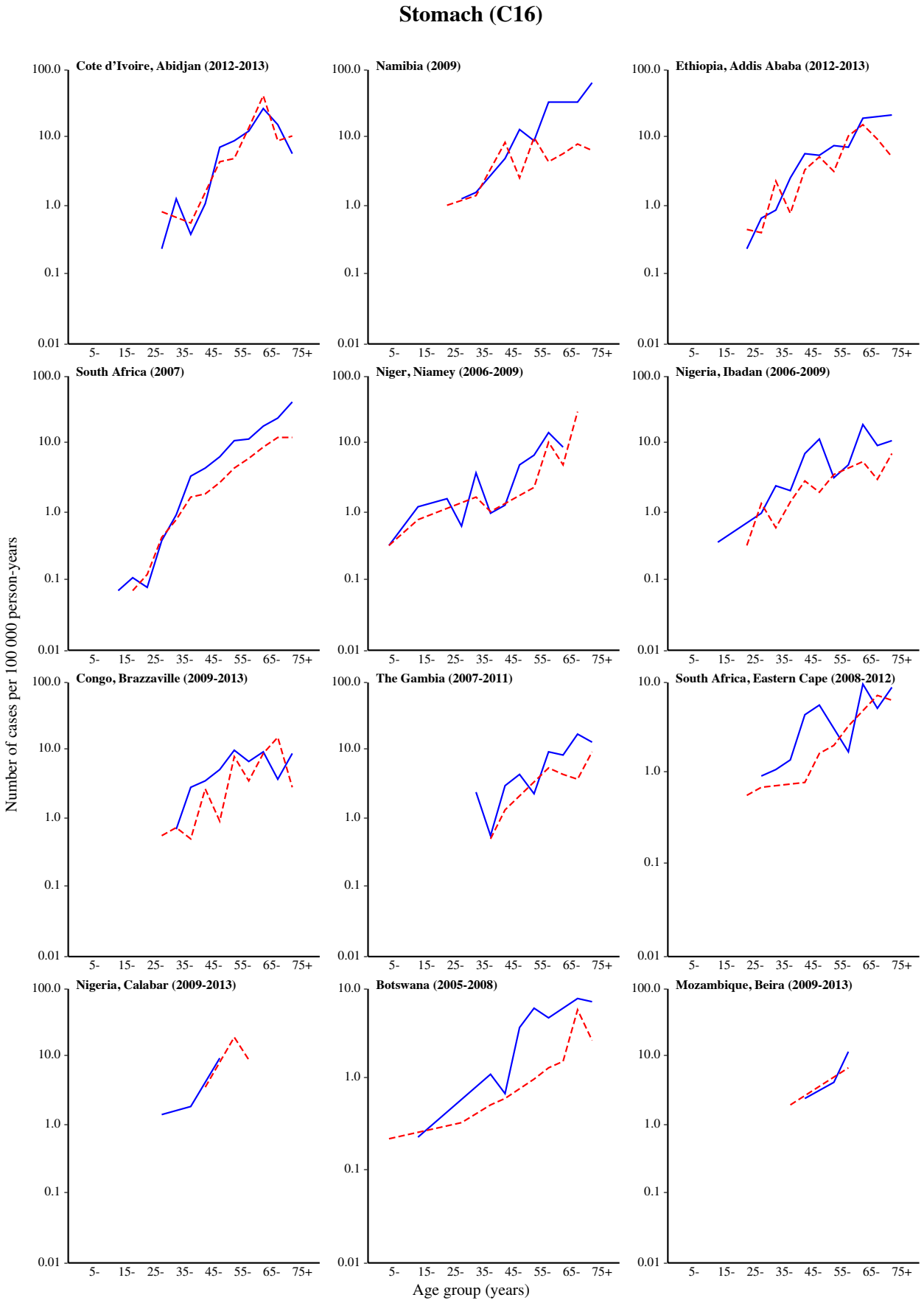


Fig. 7.31 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the stomach among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the trachea, bronchus, and lung

About 30 300 new lung cancer cases and 27 000 deaths from lung cancer were estimated to have occurred in 2012 in Africa, with men accounting for > 70% of the total cases and deaths (Ferlay et al., 2015).

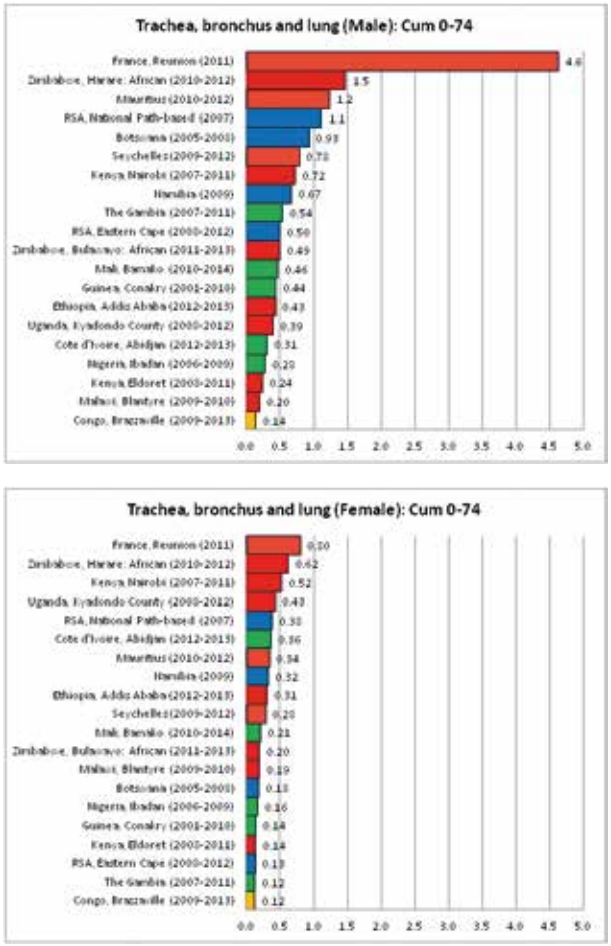


Fig. 7.32. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the trachea, bronchus, and lung among males and females in sub-Saharan Africa, by registry population

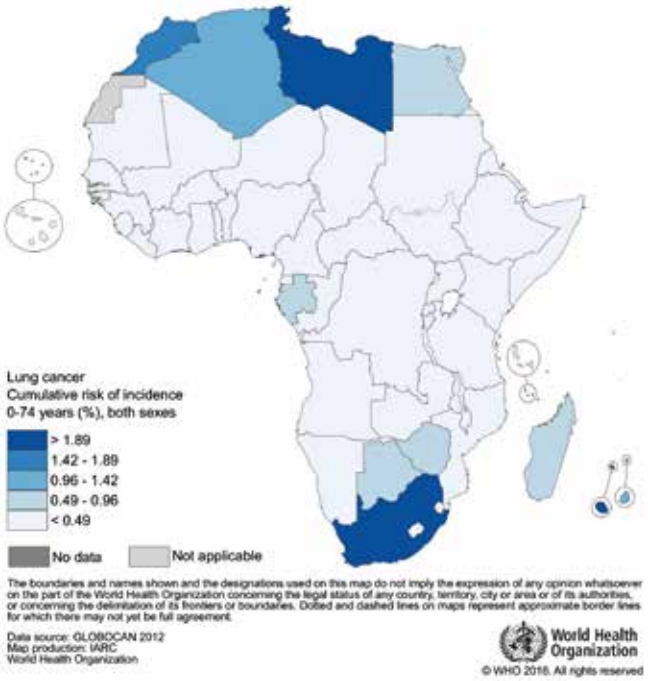


Fig. 7.33. Cumulative risk (up to and including the age of 74 years) of cancer of the trachea, bronchus, and lung among both sexes in Africa, expressed as a percentage, by country

The risk of lung cancer varies substantially across countries (registries), with cumulative risk (up to and including the age of 74 years) ranging from < 0.2% in Brazzaville (Congo) to > 4.5% in Réunion (France) in males, and from < 0.2% in Brazzaville (Congo) to 0.80% in Réunion (France) in females. In general, the highest incidence rates are found in parts of northern Africa (Libya, Tunisia, and Morocco), South Africa, and the Indian Ocean island populations (Mauritius, Réunion, and Seychelles) (Fig. 7.33). In all of these countries and a few additional countries, lung cancer is the leading cause of cancer death. Incidence rates increase exponentially with age, and rates are substantially higher in males than in females, with some exceptions, such as Abidjan (Côte d'Ivoire) and Kyadondo County (Uganda), where rates are generally similar between males and females.

Few studies have been published on temporal trends in lung cancer rates in Africa, and these studies showed decreasing rates in males in rural Eastern Cape (South Africa) and in the Black population of Zimbabwe (Chokunonga et al., 2013; Somdyala et al., 2015), and increasing rates in women in Kampala (Uganda) (Wabinga et al., 2014). Notwithstanding the lack of trend data, the substantial variation in lung cancer incidence rates across countries and between men and women reflects differences in the degree of the tobacco epidemic. In 2012, > 25% of men in parts of northern Africa and southern Africa were current smokers, compared with < 10% of men in most of western and central Africa (Ng et al., 2014). In women, in contrast, smoking prevalence was < 5% in almost all parts of Africa (Ng et al., 2014). Despite the large variation in incidence rates within the continent, Africa is the region with the lowest incidence rates in the world. For example, the cumulative risk in men in sub-Saharan Africa in 2012 (0.58%) was less than one sixth of the global average (3.92%). This is because of the early stage of the tobacco epidemic in this region, as well as the low intensity of smoking; in most countries in sub-Saharan Africa, consumption by smokers is < 10 cigarettes per day (Ng et al., 2014). This low intensity is related to the cost of cigarettes, which results in them being purchased as single cigarettes instead of in packs in most parts of Africa.

However, the prevalence and intensity of smoking are expected to increase in both men and women in Africa because of the economic transition (increases in the affordability of cigarettes) and intensified marketing by tobacco companies as they attempt to increase their market share and maximize profits (Drope, 2011). According to findings from the Global Youth Tobacco Survey administered in 2009–2011 in 10 selected countries in Africa, the prevalence of smoking within the previous 30 days in girls and boys aged 13–15 years ranged from 3.4% in Malawi to 13.6% in Côte d'Ivoire for cigarettes and from 8.6% in Niger to 25.4% in Zambia for all tobacco products (Zhao et al., 2015). Notably, in some of these countries, the prevalence of cigarette smoking in girls was as high as in boys and higher than in adults (Eriksen et al., 2015; Ng et al., 2014).

Lung cancer is the most preventable cause of cancer death. In response to the growing tobacco epidemic, the WHO Member States adopted the WHO Framework Convention on Tobacco Control (FCTC) in 2005 (WHO, 2005b). As of April 2016, 43 of the 47 countries in the WHO African Region are parties to the FCTC; the non-parties are Eritrea, Malawi, Mozambique, and South Sudan (Framework Convention Alliance, 2017). Husain et al. (2016) examined the status of tobacco control efforts in 2014 relative to the provisions of the WHO FCTC and the MPOWER package (six evidence-based tobacco control measures that are most effective in reducing tobacco use) in 23 African countries and found large variations in the overall FCTC implementation rates, ranging from 9% in Sierra Leone to 78% in Kenya. Another recent study showed that implementation of tobacco policies as suggested by WHO in western African countries, although at low levels, was correlated with reduced smoking prevalence (Winkler et al., 2015). These findings underscore the continued need for broad implementation of the FCTC provisions to curb the growing burden of lung cancer and other smoking-related diseases in Africa.

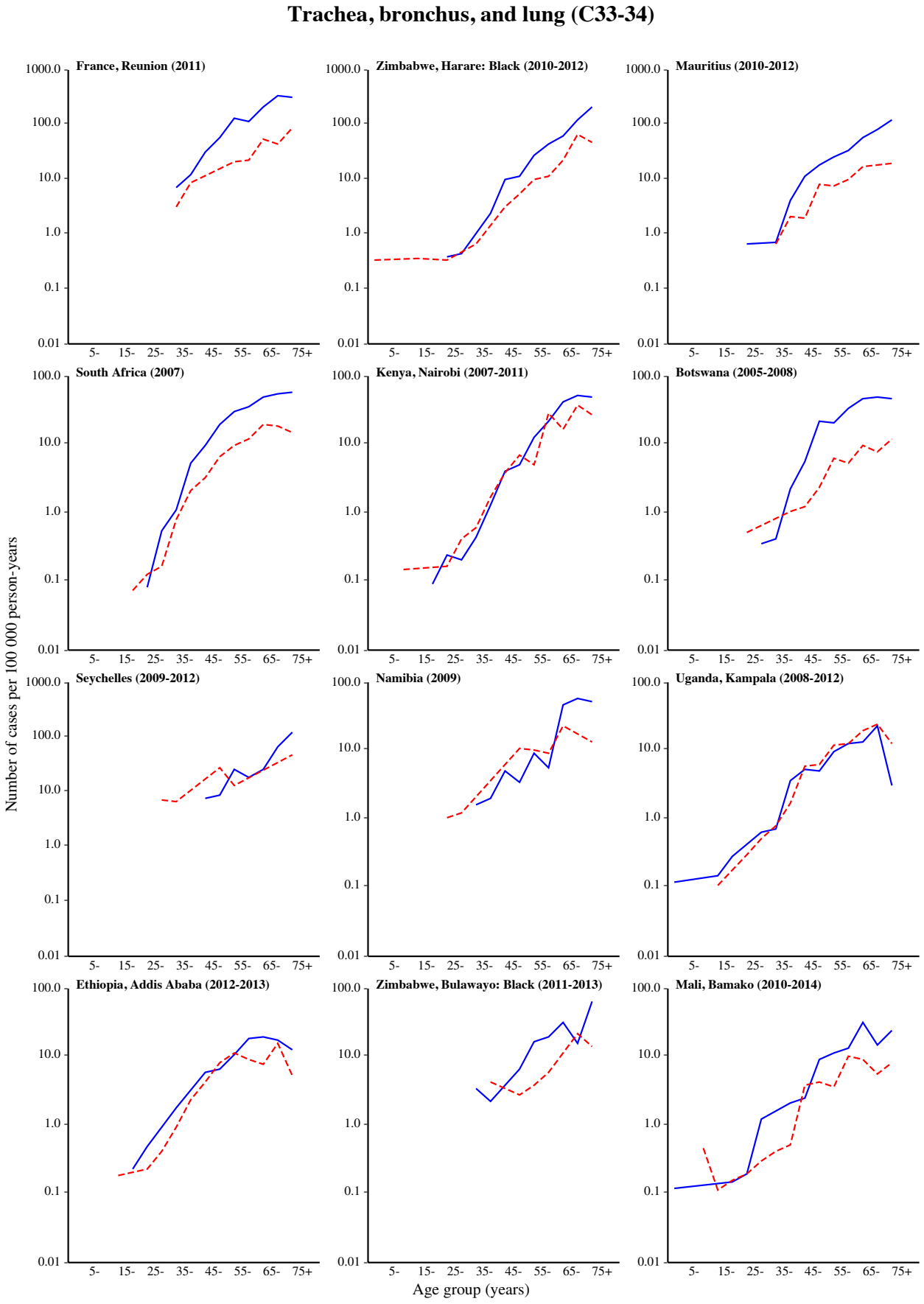


Fig. 7.34. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the trachea, bronchus, and lung among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

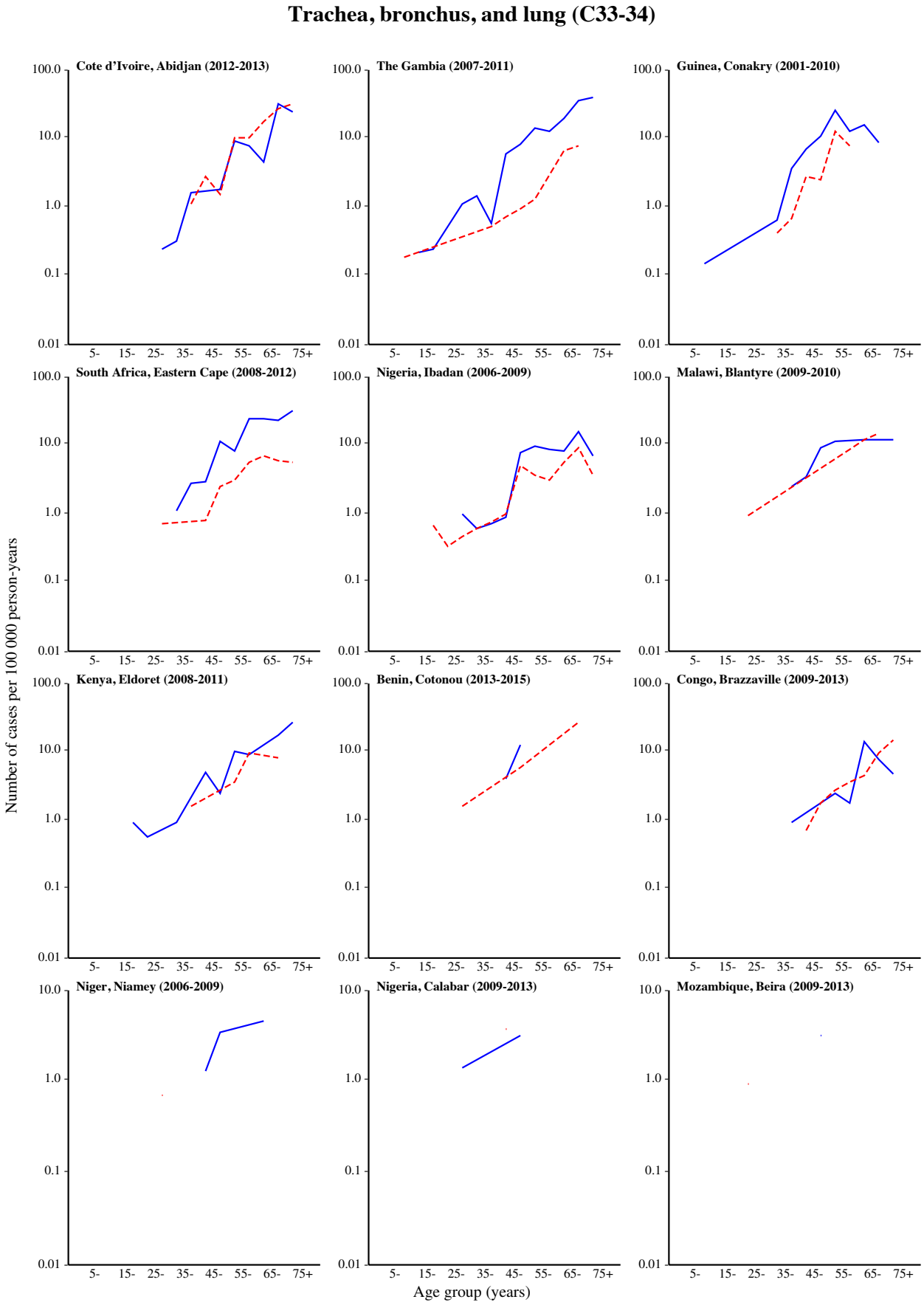


Fig. 7.34 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the trachea, bronchus, and lung among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Leukaemia

An estimated 15 200 new cases and 13 700 deaths from leukaemia occurred in sub-Saharan Africa in 2012, making it the 14th most common cancer type. Leukaemia is slightly more common in males than in females (sex ratio, 1.2), and about one fifth of the cases occurred in the childhood age range.

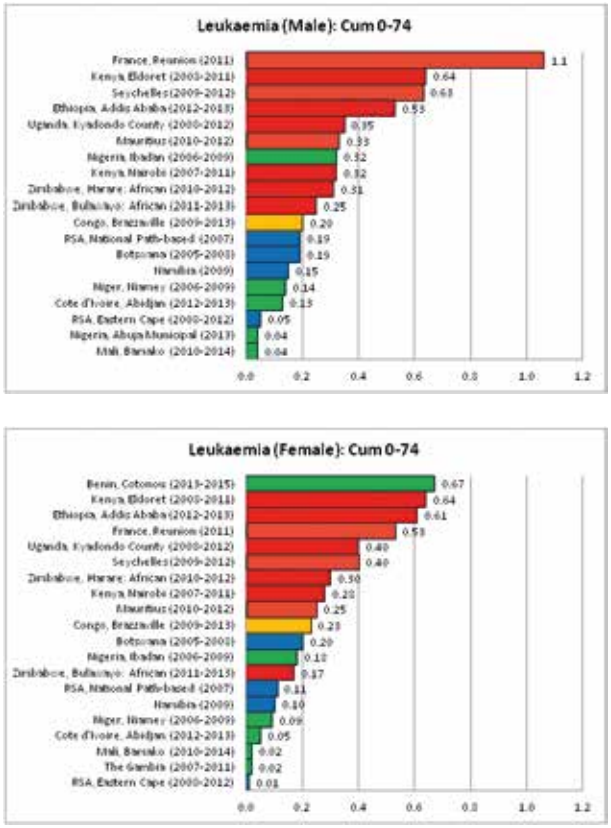


Fig. 7.35. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of leukaemia among males and females in sub-Saharan Africa, by registry population

Overall, incidence rates are much lower than those observed in developed countries. GLOBOCAN 2012 gives the following estimates of cumulative incidence rate (up to and including the age of 74 years): world, 0.44%; more developed regions, 0.69%; less developed regions, 0.34%; Africa, 0.30%; sub-Saharan Africa, 0.25% (Ferlay et al., 2013).

With respect to the rates recorded in the cancer registries, the incidence appears to be higher in eastern Africa, although the highest cumulative incidence rate in females (0.67%; 95% confidence interval: 0.24–1.10) was recorded in Cotonou (Benin). Of note are the relatively high incidence rates in Addis Ababa (Ethiopia), where leukaemia is the second most common cancer in males (after colorectal cancer) and the fourth most common cancer in females.

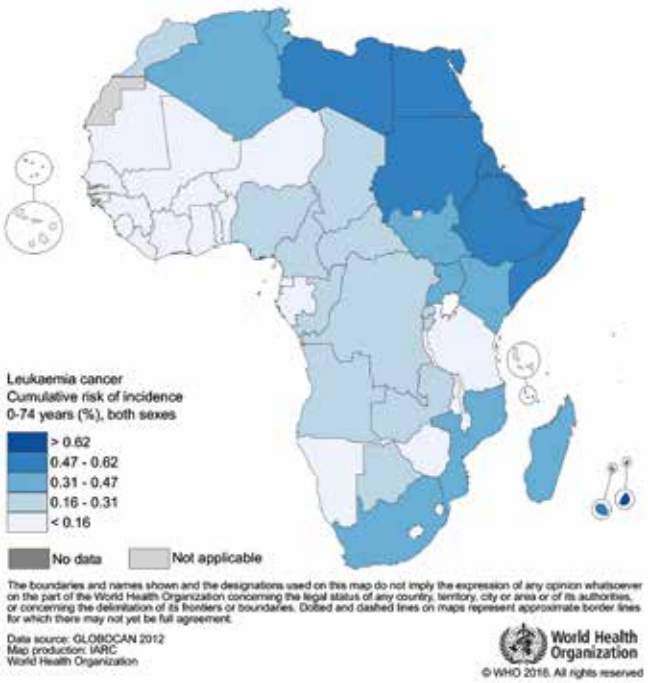


Fig. 7.36. Cumulative risk (up to and including the age of 74 years) of leukaemia among both sexes in Africa, expressed as a percentage, by country

It is possible that the low incidence rates reported by some cancer registries are due to deficiencies in the availability of diagnostic services of clinical haematology, or, when these exist, the failure of the registries to identify haematological malignancies.

Most descriptions of leukaemia in Africa are based on clinical series; therefore, it is difficult to know how much the age structure of the population and selective factors such as access to hospitals and diagnostic facilities, and the technical diagnostic methods available, influence the reported patterns.

The older literature (until 1985) was summarized by Fleming (1986). In many series, chronic leukaemias apparently outnumbered acute leukaemias, and in early series from western Africa, chronic myeloid leukaemias appeared to be more frequent than chronic lymphoid leukaemias (Edington & Hendrickse, 1973; Williams, 1985). The ratio between lymphoid and myeloid leukaemias is variable, but in general there is no excess of lymphoid leukaemias, as is observed in high-income countries.

Although there are many reports suggesting that human T-cell lymphotropic virus type I (HTLV-I) seroprevalence rates are elevated in several African countries, only a few epidemiological studies of acute T-cell leukaemia/lymphoma are available; it appears to be relatively rare (Iwanaga et al., 2012).

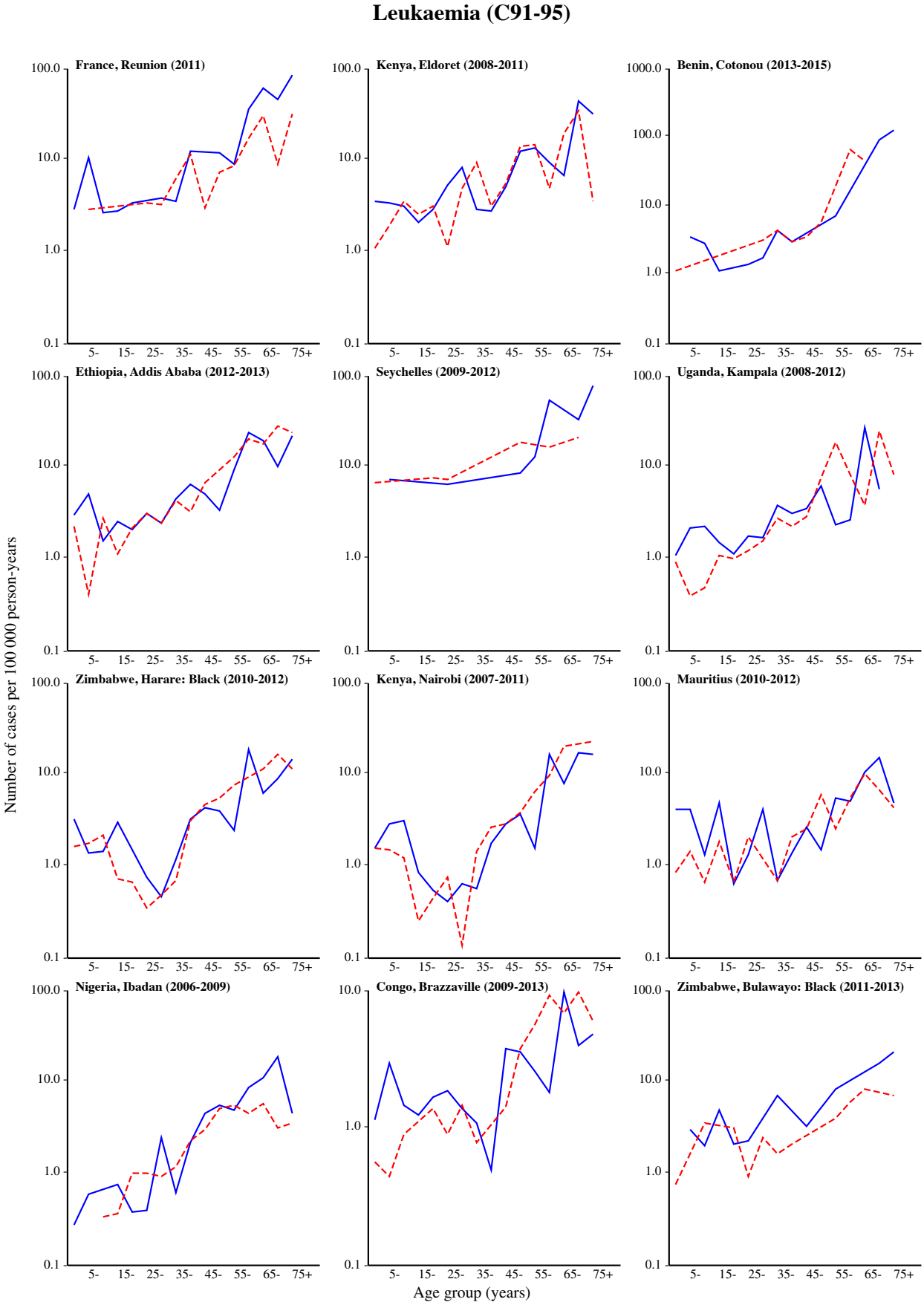


Fig. 7.37. Age-specific incidence rates (expressed as cases per 100 000 person-years) of leukaemia among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

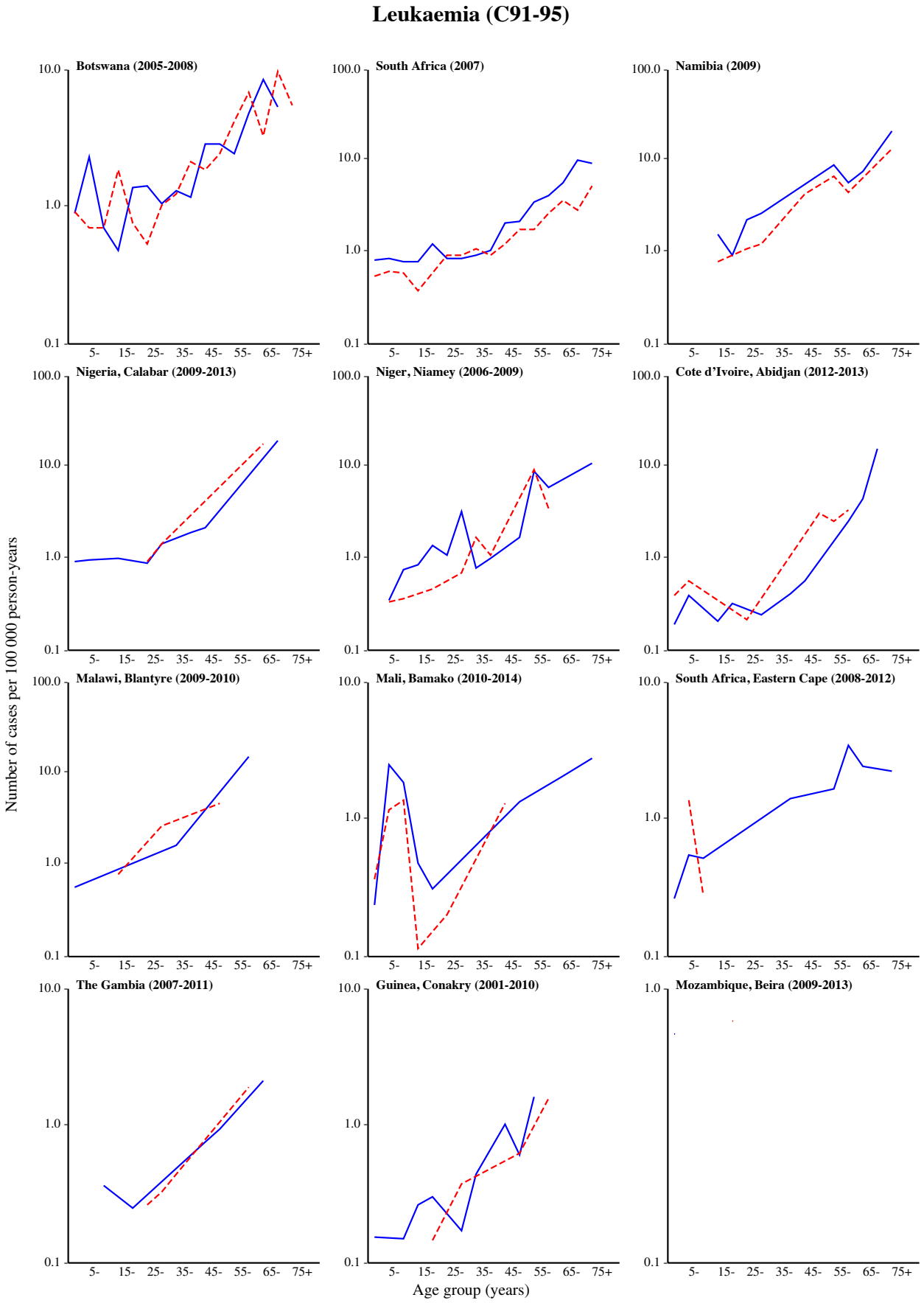


Fig. 7.37 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of leukaemia among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the lip and oral cavity

Cancers of the oral cavity (C00–06, including lip, tongue, and mouth cancers), plus the relatively rare malignant tumours of salivary glands (C07–08), were responsible for an estimated 13 500 cases of cancers of the oral cavity and pharynx in sub-Saharan Africa in 2012 (3.6% of all cancers combined), with 64% of tumours occurring in males.

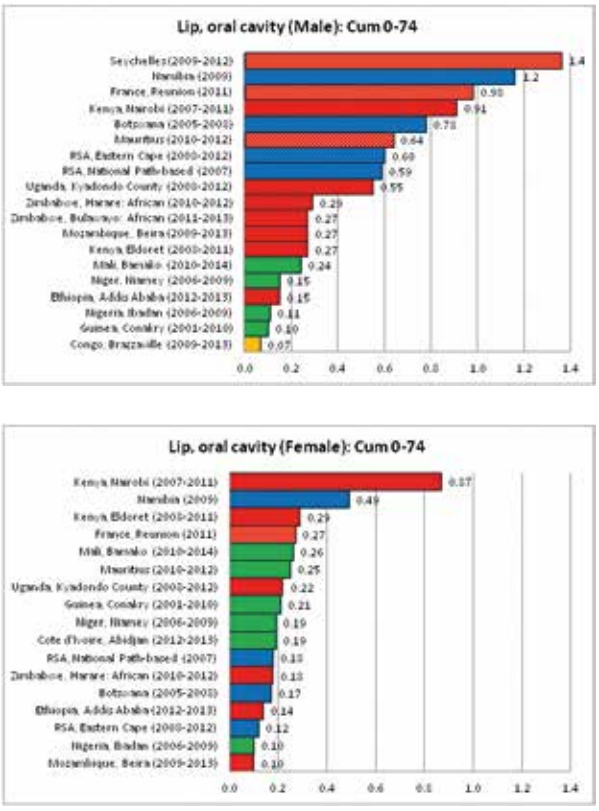


Fig. 7.38. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the lip and oral cavity among males and females in sub-Saharan Africa, by registry population

The cumulative risk of incidence is < 0.5% in most registry populations in sub-Saharan Africa in both sexes, although the risk is almost 1% in Nairobi (Kenya), Réunion (France), and Namibia in males, and an elevated risk is also seen in females (Fig. 7.38). However, the cumulative incidence of oral cancer in males was highest in Seychelles (1.4%); the cumulative incidence of oral cancer in females was highest in Nairobi (0.9%).

Age-specific incidence rates tend to increase linearly with age (Fig. 7.40). In some registry populations, there is a clear male preponderance at every age: Botswana, Eastern Cape (South Africa), Namibia, Réunion (France), and Seychelles. In others, rates are similar across ages: the Black population of Harare (Zimbabwe), Conakry (Guinea), and

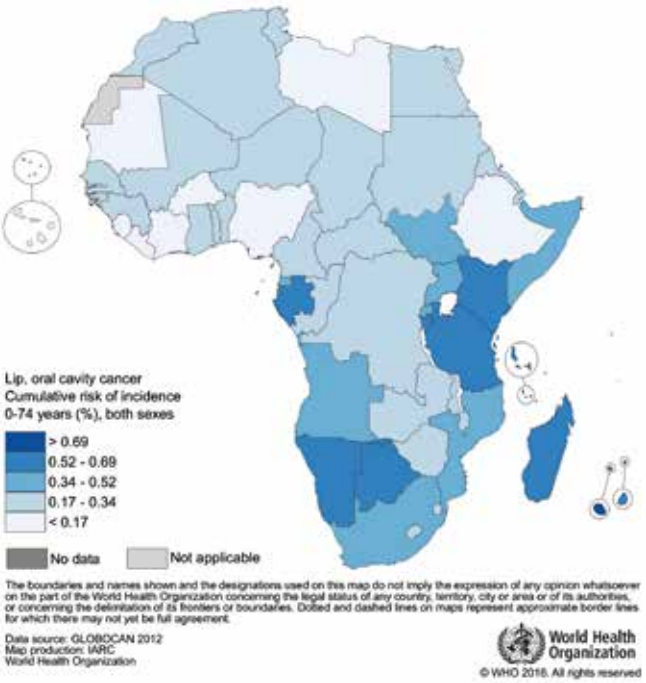


Fig. 7.39. Cumulative risk (up to and including the age of 74 years) of cancer of the lip and oral cavity among both sexes in Africa, expressed as a percentage, by country

Brazzaville (Congo). In Bamako (Mali), rates appear elevated in females in older age groups. Based on the GLOBOCAN 2012 estimates, rates in both sexes are highest in Mozambique, Madagascar, and Seychelles (Fig. 7.39).

The patterns probably reflect the historical and current prevalence of the major risk factors: use of tobacco (either by smoking or in chewed form) and alcohol consumption. These two risk factors combine multiplicatively in increasing the risk of cancers of the oral cavity and pharynx. Diets that are limited in intake of fruit and vegetables may also have a role in increasing risk, and human papillomaviruses (HPVs) are a major cause of a subset of cancers of the oral cavity and pharynx (including the oropharyngeal region, the tonsils, and the base of the tongue).

The relatively high rates observed in Nairobi (Kenya) are not the result of higher risks in the population of Asian (Indian) ancestry (Korir et al., 2017); indeed, it was noted some decades ago that chewing habits (tobacco with or without betel) were relatively uncommon in Asians in Kenya (Chopra et al., 1975).

Lip cancer is a rare tumour in sub-Saharan Africa, because it affects mainly Caucasians; these cancers develop through exposure to solar radiation (Safe Work Australia, 2010) or the transfer of heat from using pipes to smoke or resting a cigarette on the lower lip while smoking (Czerninski et al., 2010).

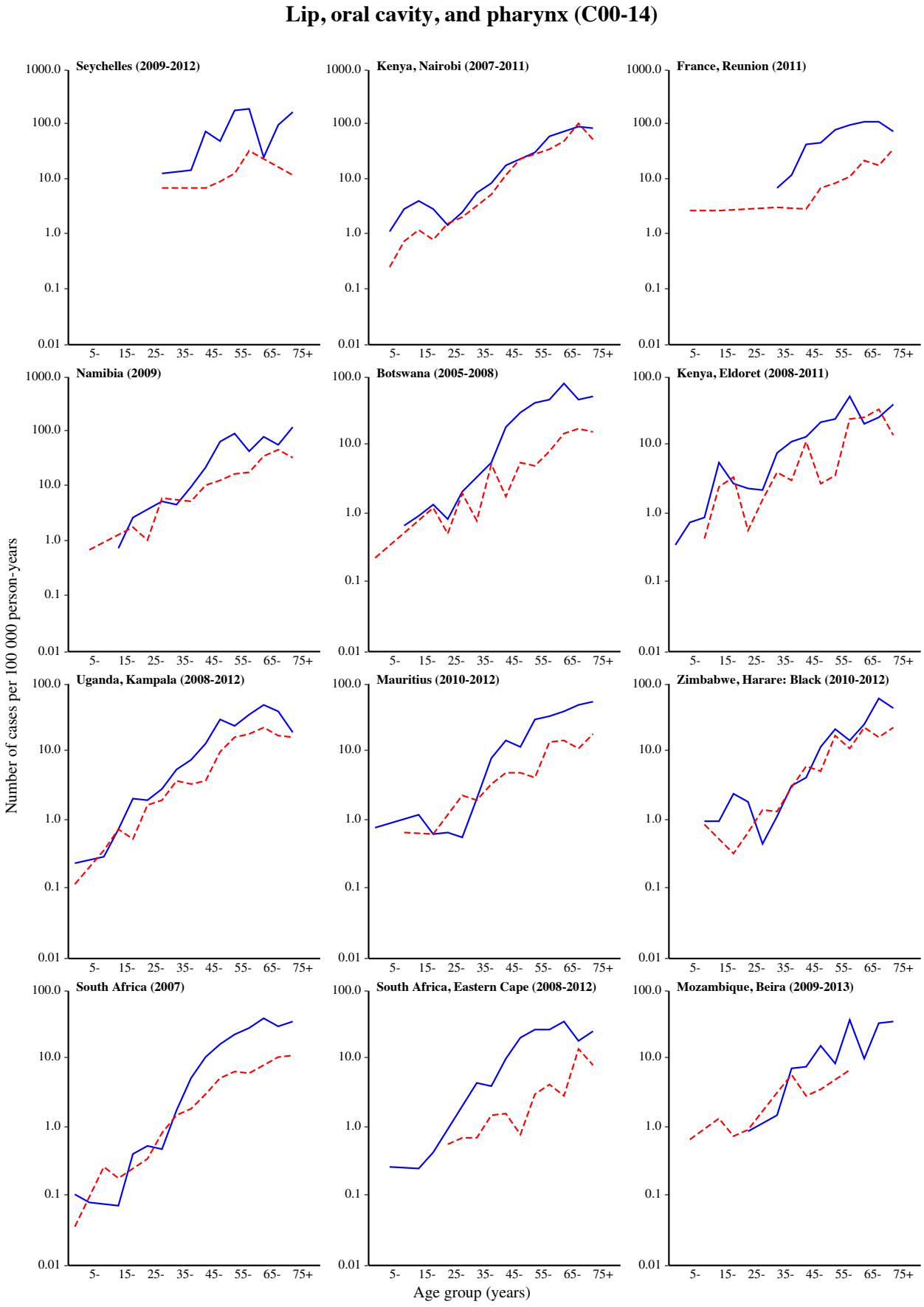


Fig. 7.40. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the lip, oral cavity, and pharynx among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

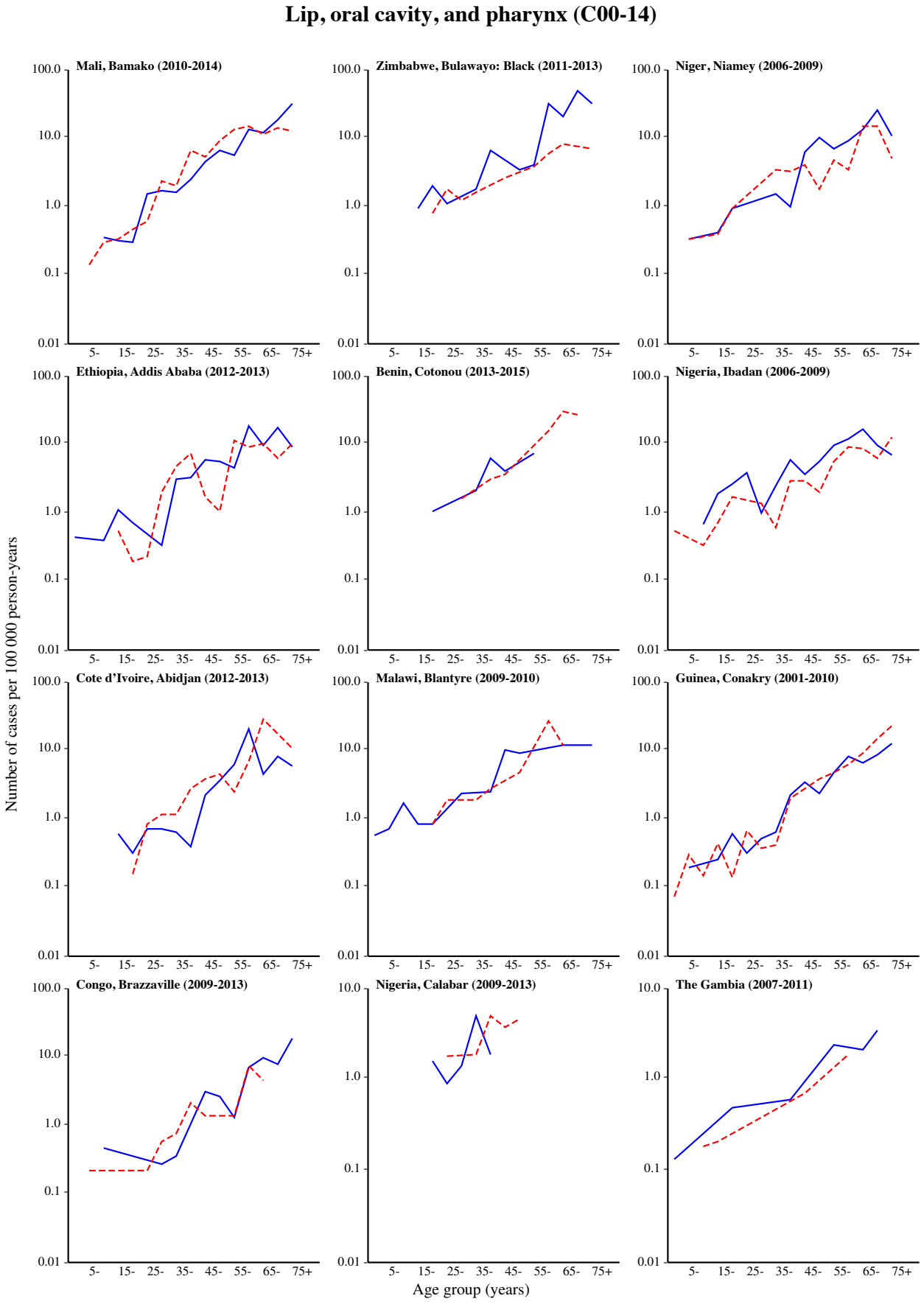


Fig. 7.40 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the lip, oral cavity, and pharynx among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the ovary

More than 12 500 cases of ovarian cancer were estimated to have occurred in sub-Saharan Africa in 2012, representing 2% of all cancer cases. Ovarian cancer is the sixth most common neoplasm in females and the 13th most common in both sexes combined.

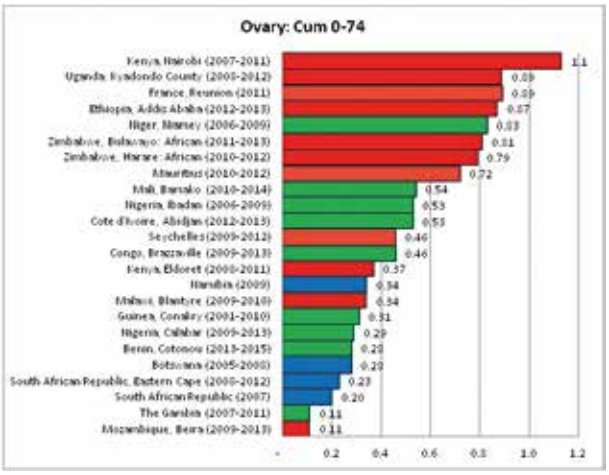


Fig. 7.41. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the ovary among females in sub-Saharan Africa, by registry population

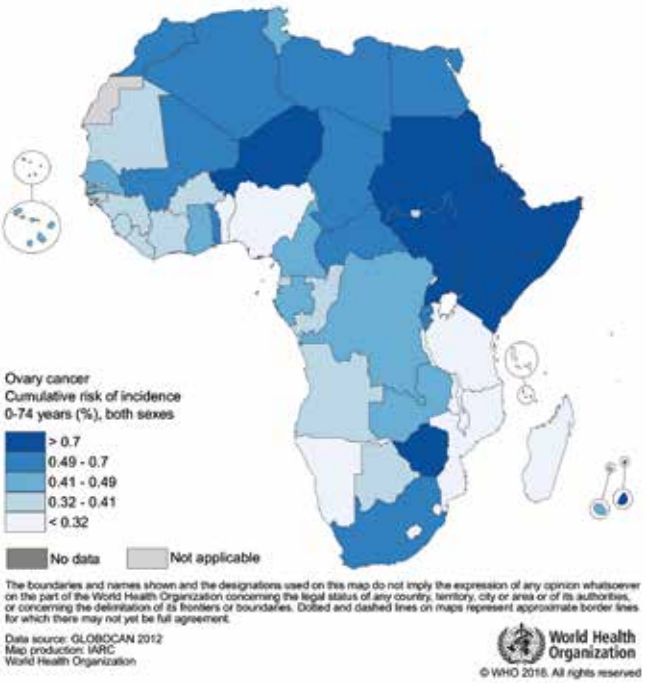


Fig. 7.42. Cumulative risk (up to and including the age of 74 years) of cancer of the ovary among females in Africa, expressed as a percentage, by country

The cumulative risk varies 10-fold in the region (Fig. 7.41), with a 5–10-fold difference in cumulative incidence rates in the registry populations; in most of the populations, these risks are equivalent to < 1 cancer in 200 being diagnosed as being ovarian, although risks approaching 1% or greater, as observed in Addis Ababa (Ethiopia), Réunion (France), Kyadondo County (Uganda), and Nairobi (Kenya), are similar to those seen in the highest-risk populations in Europe, for example in the Nordic countries (Klint et al., 2010). Estimated national rates tend to be elevated in much of eastern Africa, including Mauritius (0.95%), Ethiopia, Uganda, Zimbabwe, and Kenya (Fig. 7.42). The high rate in Niger is an estimate based on results from the registry of Niamey (Fig. 7.41); however, two thirds of the cases in this registry were diagnosed without morphological proof. Low incidence rates are recorded by those registries that rely solely on pathological diagnoses: Beira (Mozambique) and South Africa.

Although there is some variability due to the relative rarity of ovarian cancer, the age-specific patterns indicate that the rate of increase diminishes at postmenopausal ages, following the Pike model of a rapidly increasing rate of "effective tissue ageing" at menarche and steep declines at menopause (Pike et al., 2004).

In broad terms, the vast majority of ovarian cancers are epithelial in origin. Early age at menarche, late age at menopause, ovulation (lifetime number of menstrual cycles), nulliparity, low parity, and use of hormone therapy at menopausal ages increase the risk of ovarian cancer, whereas use of combined oral contraceptives is protective. Genetic predisposition is responsible for 10% of cases of ovarian cancer. It is not clear the extent to which a higher or lower prevalence of each of these epidemiological risk factors affects the current cancer profile in sub-Saharan Africa. It is worth noting that ovarian cancer is a leading cause of cancer in women in The Gambia (Bah et al., 2001) and rural South Africa (Somdyala et al., 2015), despite the relatively low rates. The changes that are occurring in reproductive patterns and behaviour signify that rates of ovarian cancer are likely to increase in the future in many countries in the region.

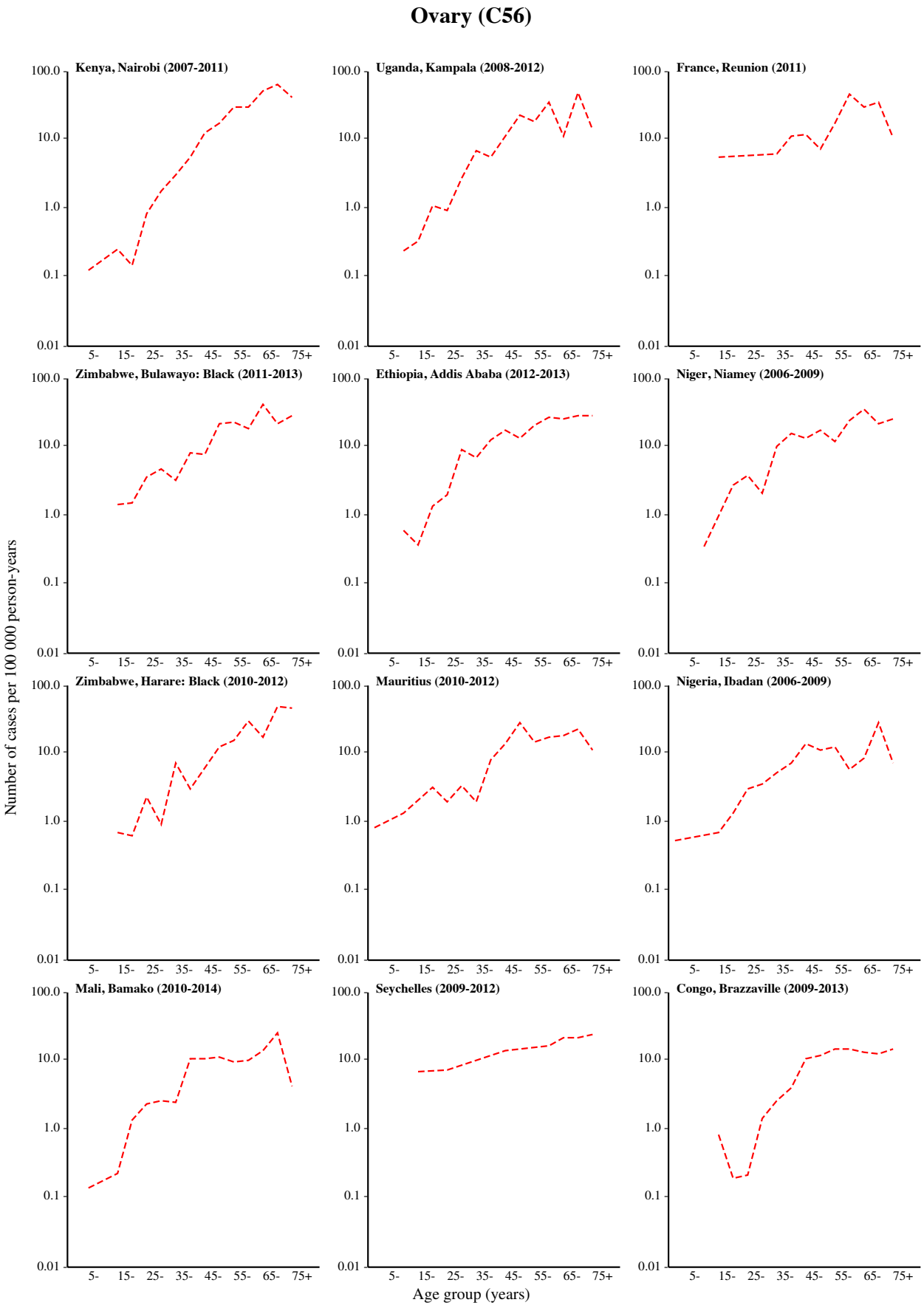


Fig. 7.43. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the ovary among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

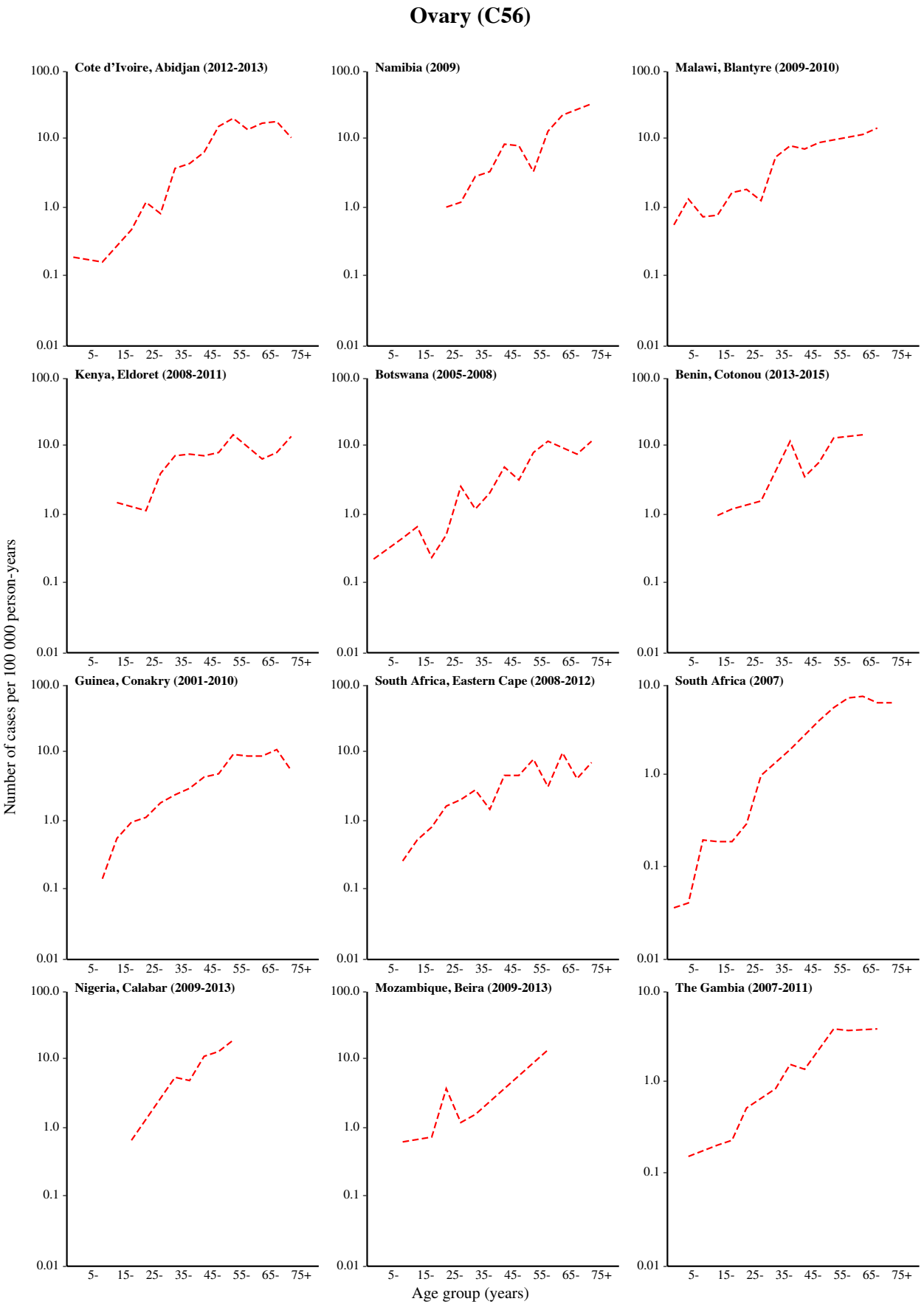


Fig. 7.43 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the ovary among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the bladder

With an estimated 10 500 new cases in 2012 (1.7% of all cancer cases), bladder cancer is the 15th most commonly diagnosed cancer in sub-Saharan Africa in both sexes, but it ranks within the top 10 among males. More than 60% of bladder cancers are diagnosed in males, and although cumulative incidence rates are generally low, a 10–15-fold variation in cumulative risk is observed (Fig. 7.44), with elevated lifetime risks – corresponding to 1 in 100 men being diagnosed with bladder cancer before the age of 75 years – seen in the registry populations of Bamako (Mali) and Blantyre (Malawi). It is worth noting that some of the highest rates of bladder cancer among females worldwide are estimated in these countries (Antoni et al., 2017).

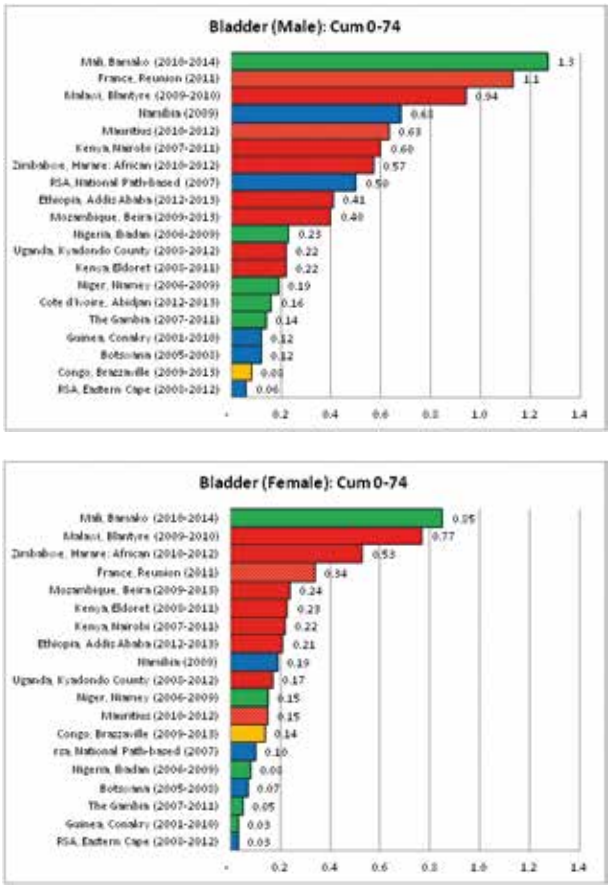


Fig. 7.44. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the bladder among males and females in sub-Saharan Africa, by registry population

Although bladder cancer is the fourth most common neoplasm in males in northern Africa, and rates are striking in certain countries – in Egypt, 1 in 40 men are diagnosed with bladder cancer in a lifetime – the incidence in sub-Saharan Africa tends to be much lower (Fig. 7.45).

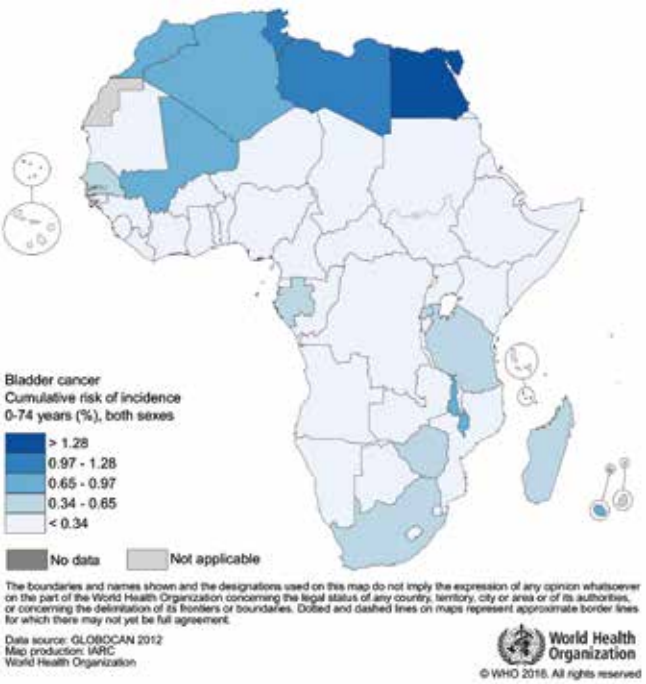


Fig. 7.45. Cumulative risk (up to and including the age of 74 years) of cancer of the bladder among both sexes in Africa, expressed as a percentage, by country

Age-specific patterns indicate some variability across age groups, but generally rates increase with age in a log-linear fashion from age 25 years (Fig. 7.46).

Unlike in most Caucasian populations, where transitional cell carcinomas (TCCs) constitute most new cases of bladder cancer, a greater proportion of bladder cancer cases in Africa are squamous cell carcinomas (SCCs), linked to the prevalence of infection with *Schistosoma haematobium* (IARC, 2012). This divergent pattern by histological subtype is seen in certain western and eastern African countries, including Mali, Malawi, and Zimbabwe (Table 7.01), where *S. haematobium* infection is common. In South Africa, marked differences have been reported between Black (36% SCC, 41% TCC) and White (2% SCC, 94% TCC) populations (Parkin et al., 2003).

Integration of preventive measures that overlap with those for other infections can target populations at high risk (e.g. due to poor hygiene, lack of safe water, and/or inadequate sanitation) and, together with mass drug administration, can control schistosomiasis (Inobaya et al., 2014) and reduce rates of bladder SCC in sub-Saharan Africa. However, with social and economic transitions under way in the region, further urbanization and increases in the prevalence of cigarette smoking in some African countries may lead to an increasing incidence of TCC relative to SCC.

In developed countries, a critical factor in the interpretation of incidence rates has been local registration practices with respect to the coding and reporting of non-invasive (in situ) tumours (Antoni et

al., 2017), which can constitute a large proportion of all bladder tumours. However, such comparability issues, and divergent practices in cystoscopy, biopsy, and the extent of histological examination of biopsy specimens, are expected to be less important in sub-Saharan Africa, because an incident case usually constitutes a manifestly invasive and often relatively advanced tumour.

Number of microscopically verified cases by histological type

Bladder (C67) - Both sexes (all ages)

	Carcinoma					Sarcoma	Other	Unspec.	Number of cases	
	Squamous	Transitional	Adeno.	Other	Unspec.				MV	Total
Africa, central										
Congo, Brazzaville (2009-2013)	4	1	3	-	7	1	-	-	**16**	33
Africa, east										
Ethiopia, Addis Ababa (2012-2013)	2	51	2	-	3	-	-	3	**61**	80
France, Reunion (2011)	4	41	2	1	-	-	-	2	**50**	58
Kenya, Eldoret (2008-2011)	4	15	2	-	4	1	-	-	**26**	27
Kenya, Nairobi (2007-2011)	7	51	3	-	19	3	-	1	**84**	105
Malawi, Blantyre (2009-2010)	28	2	3	-	-	-	-	-	**33**	72
Mauritius (2010-2012)	4	102	3	-	16	2	-	5	**132**	136
Mozambique, Beira (2009-2013)	19	-	-	-	5	1	-	-	**25**	29
Seychelles (2009-2012)	1	8	1	-	-	-	-	-	**10**	13
Uganda, Kampala (2008-2012)	5	14	2	-	4	1	-	2	**28**	59
Zimbabwe, Bulawayo: Black (2011-2013)	-	3	1	-	2	-	-	-	**6**	16
Zimbabwe, Harare: Black (2010-2012)	22	15	1	1	2	1	-	-	**42**	84
Africa, south										
Botswana (2005-2008)	4	17	5	-	2	1	-	-	**29**	33
Namibia (2009)	7	34	3	-	1	-	-	-	**45**	45
South Africa (2007)	53	767	26	3	34	8	2	-	**893**	893
South Africa, Eastern Cape (2008-2012)	-	9	1	-	1	-	-	-	**11**	16
Africa, west										
Benin, Cotonou (2013-2015)	-	1	1	-	1	-	-	-	**3**	9
Cote d Ivoire, Abidjan (2012-2013)	-	1	-	-	3	-	-	2	**6**	25
The Gambia (2007-2011)	2	2	1	-	-	-	-	4	**9**	30
Guinea, Conakry (2001-2010)	4	12	4	1	4	1	-	5	**31**	33
Mali, Bamako (2010-2014)	151	63	19	2	55	5	-	17	**312**	429
Niger, Niamey (2006-2009)	6	7	-	-	-	-	1	-	**14**	31
Nigeria, Abuja (2013)	-	5	-	-	-	-	-	-	**5**	5
Nigeria, Calabar (2009-2013)	-	1	1	-	2	-	-	-	**4**	4
Nigeria, Ibadan (2006-2009)	6	22	4	-	1	3	-	-	**36**	44

Table 7.01. Number of microscopically verified cases by histological type – bladder (C67), both sexes, all ages

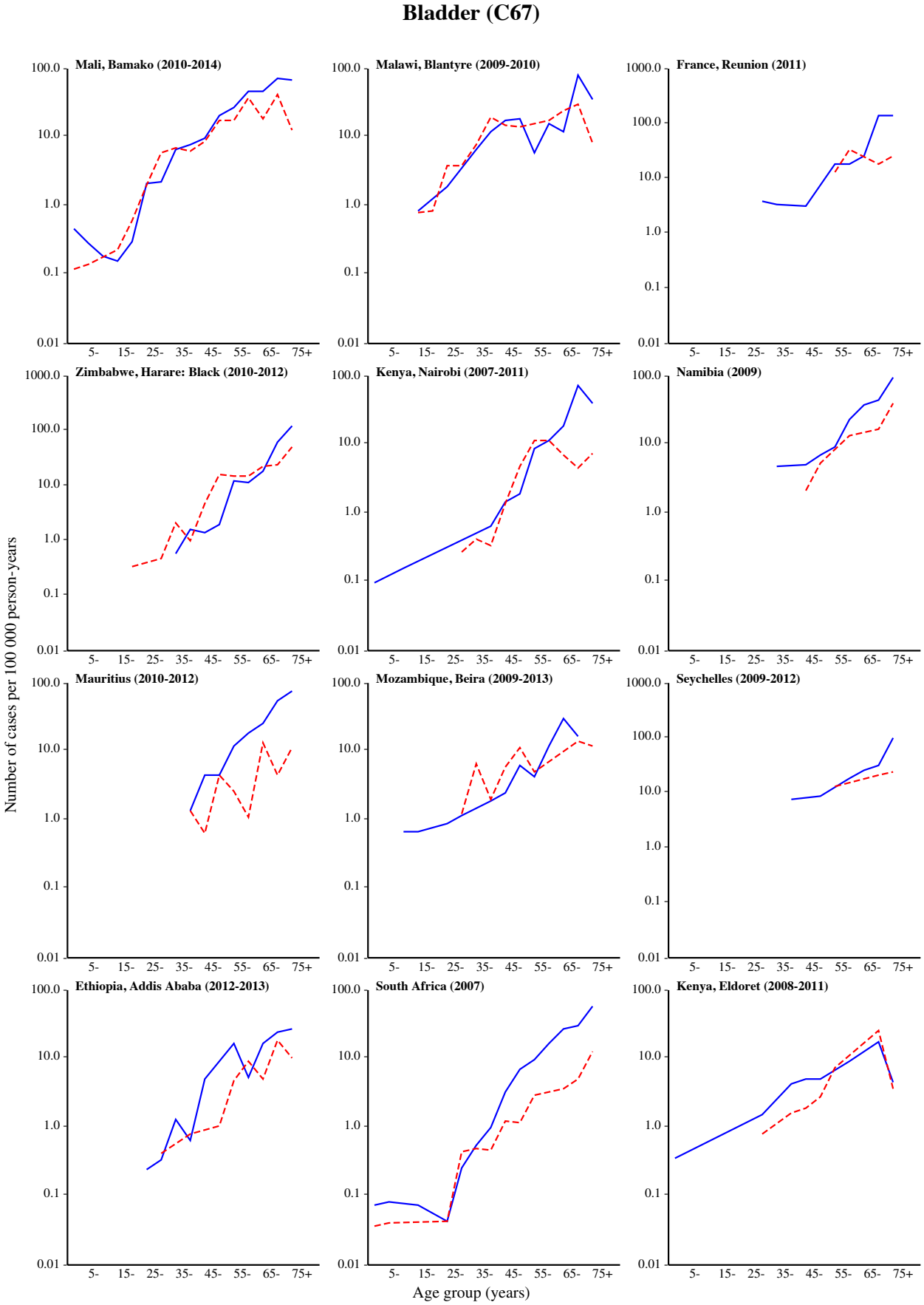


Fig. 7.46. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the bladder among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

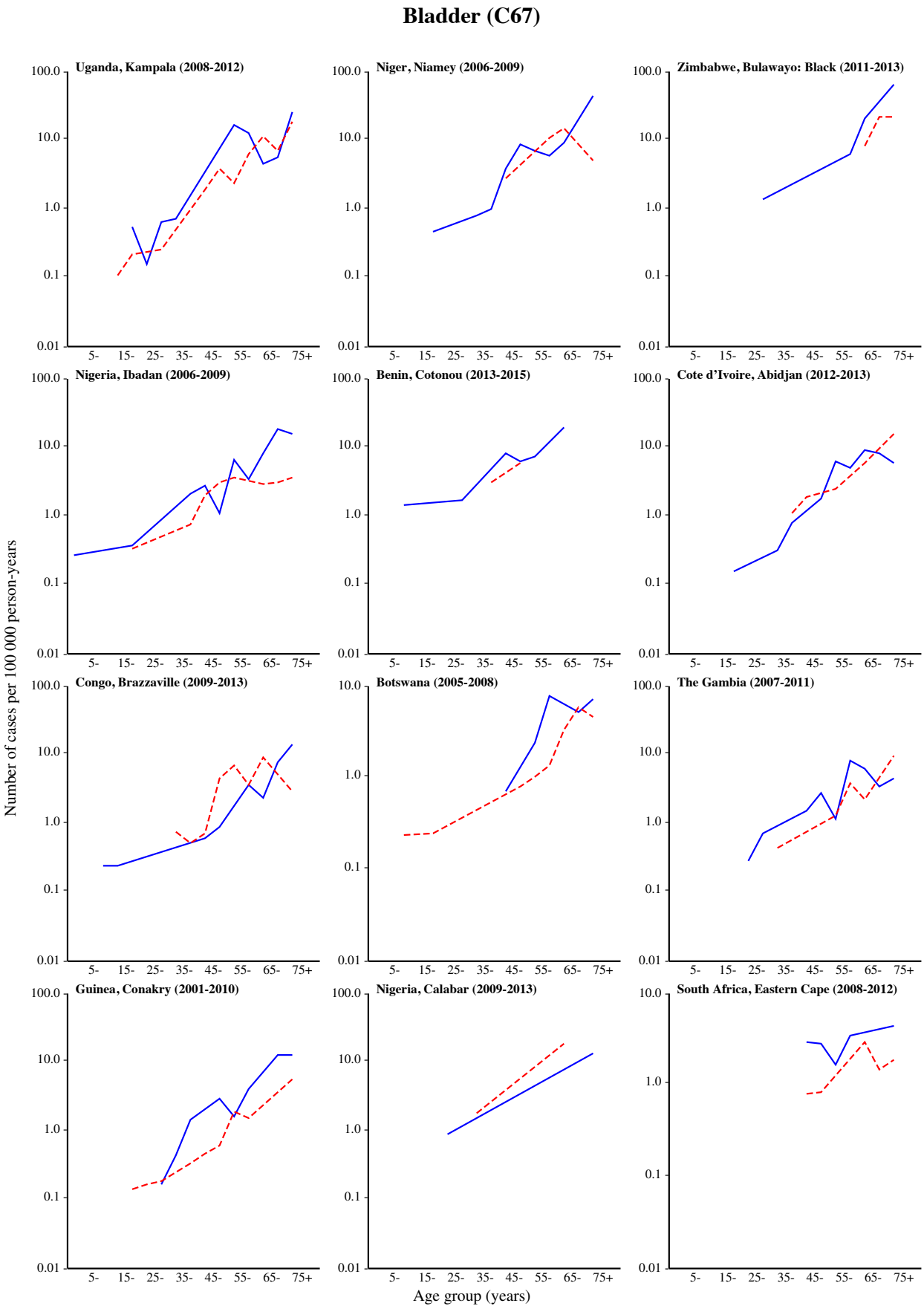


Fig. 7.46 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the bladder among males (solid blue lines) and females (dashed red lines) in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

Cancer of the corpus uteri

There were an estimated 8700 new cases of cancer of the corpus uteri in sub-Saharan Africa in 2012, and a 10-fold variation in cumulative incidence rates among the registry populations (Fig. 7.47); the rates ranged from < 0.2% in The Gambia and Beira (Mozambique) to > 1% in Nairobi (Kenya), Mauritius, and the Black population of Harare and Bulawayo (Zimbabwe).

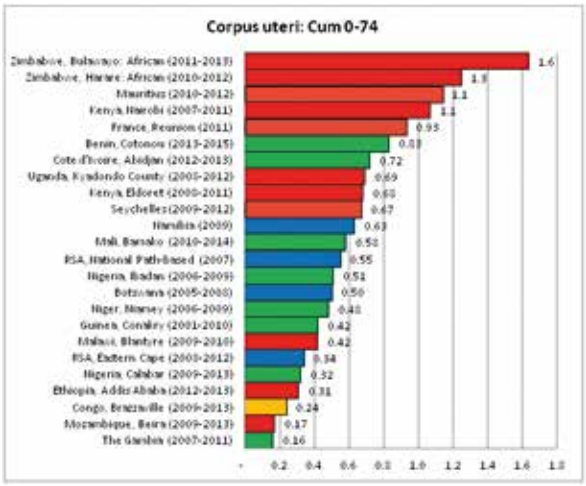


Fig. 7.47. Cumulative incidence rates up to and including the age of 74 years (expressed as percentages) of cancer of the corpus uteri among females in sub-Saharan Africa, by registry population

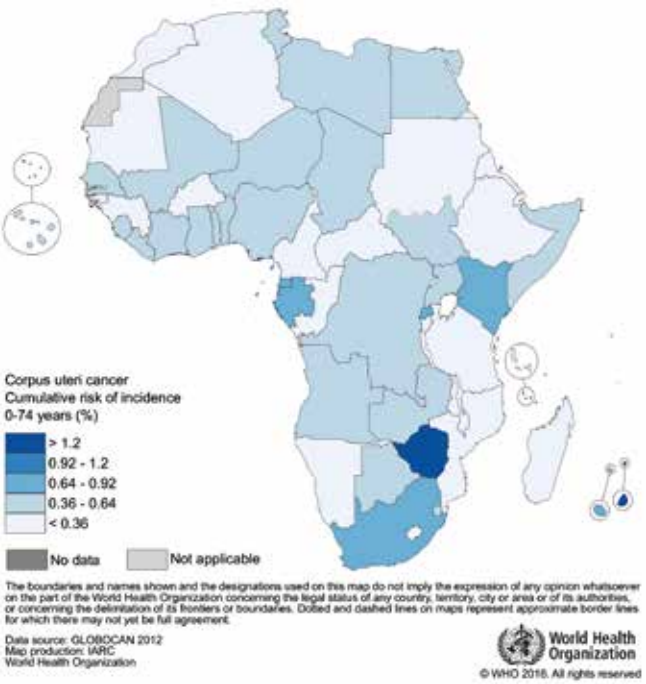


Fig. 7.48. Cumulative risk (up to and including the age of 74 years) of cancer of the corpus uteri among females in Africa, expressed as a percentage, by country

There is little geographical correlation between national estimated rates of cancer of the corpus uteri, although rates tend to be elevated in several eastern African countries (Fig. 7.48), including Mauritius (the highest cumulative risk, at 1.5%), Kenya, Rwanda, and Uganda, as well as in Zimbabwe and South Africa.

Although there is considerable random variation, the age-specific incidence curves reveal increasing rates until postmenopausal ages, followed by a stabilization, or at least a decline in the rate of increase, at a relatively advanced age, at about 60–65 years (Fig. 7.49).

The epidemiology of endometrial cancer, at least from the perspective of developed countries, is fairly well understood. Obesity and family history of endometrial cancer are associated with an increase in risk, whereas high parity and late age at last birth are considered to provide long-lasting protection, as does use of combined oral contraceptives, particularly among long-term users – an observation that was confirmed in a study of Black South African patients by Urban et al. (2012). Use of hormone therapy is an important risk factor in countries where its prescription has been common practice, and smoking appears to be protective. Current incidence patterns in sub-Saharan Africa probably relate mainly to historical and changing reproductive patterns and lifestyle-related factors – particularly overweight and obesity, which is a rapidly increasing problem, especially in urban populations (Ziraba et al., 2009). As with other female cancers under hormonal control (cancers of the breast and ovary), the changes that are occurring in the prevalence of these cancers would indicate that a rising incidence of cancers of the corpus uteri can be expected across the region in future decades.

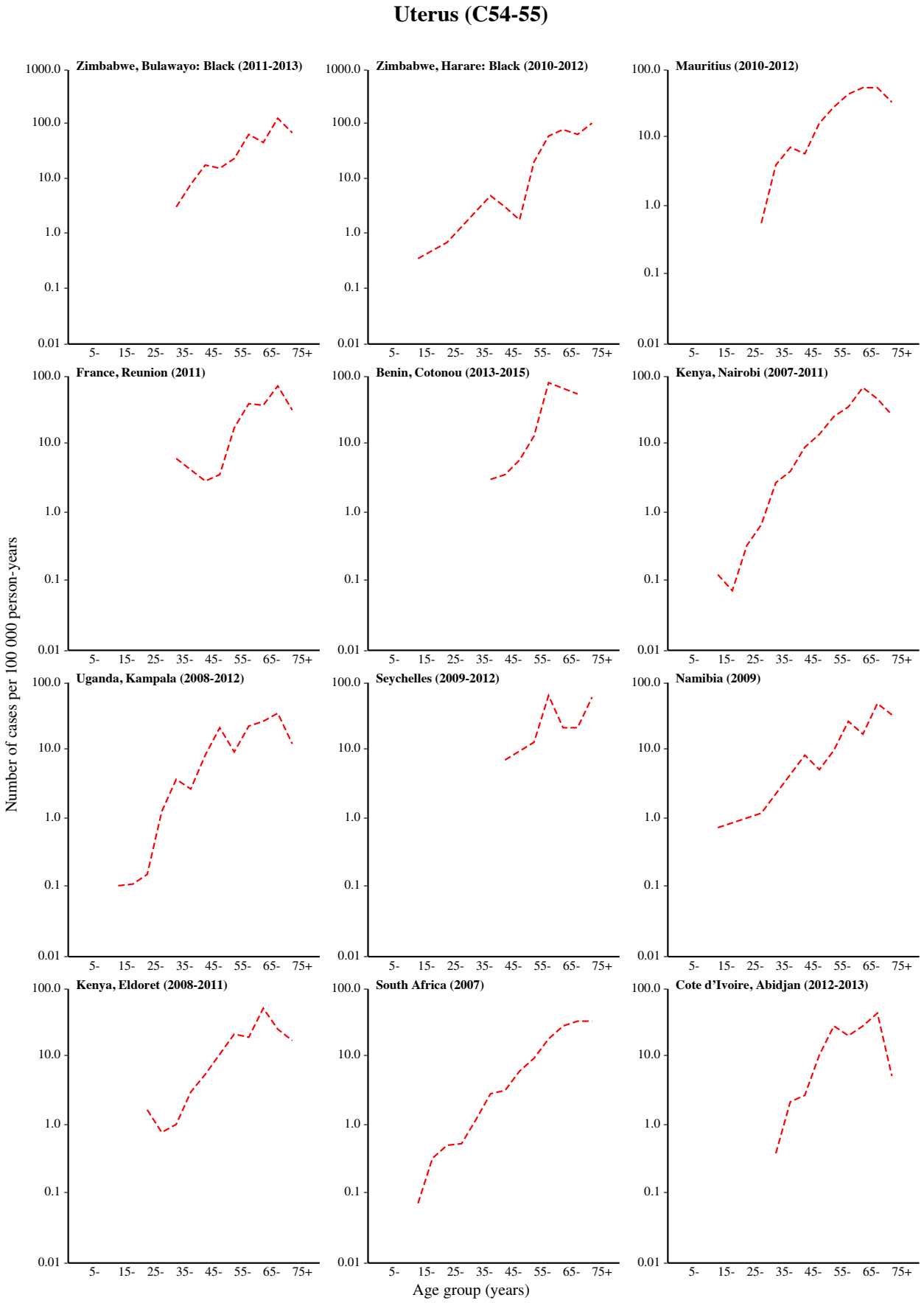


Fig. 7.49. Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the uterus among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

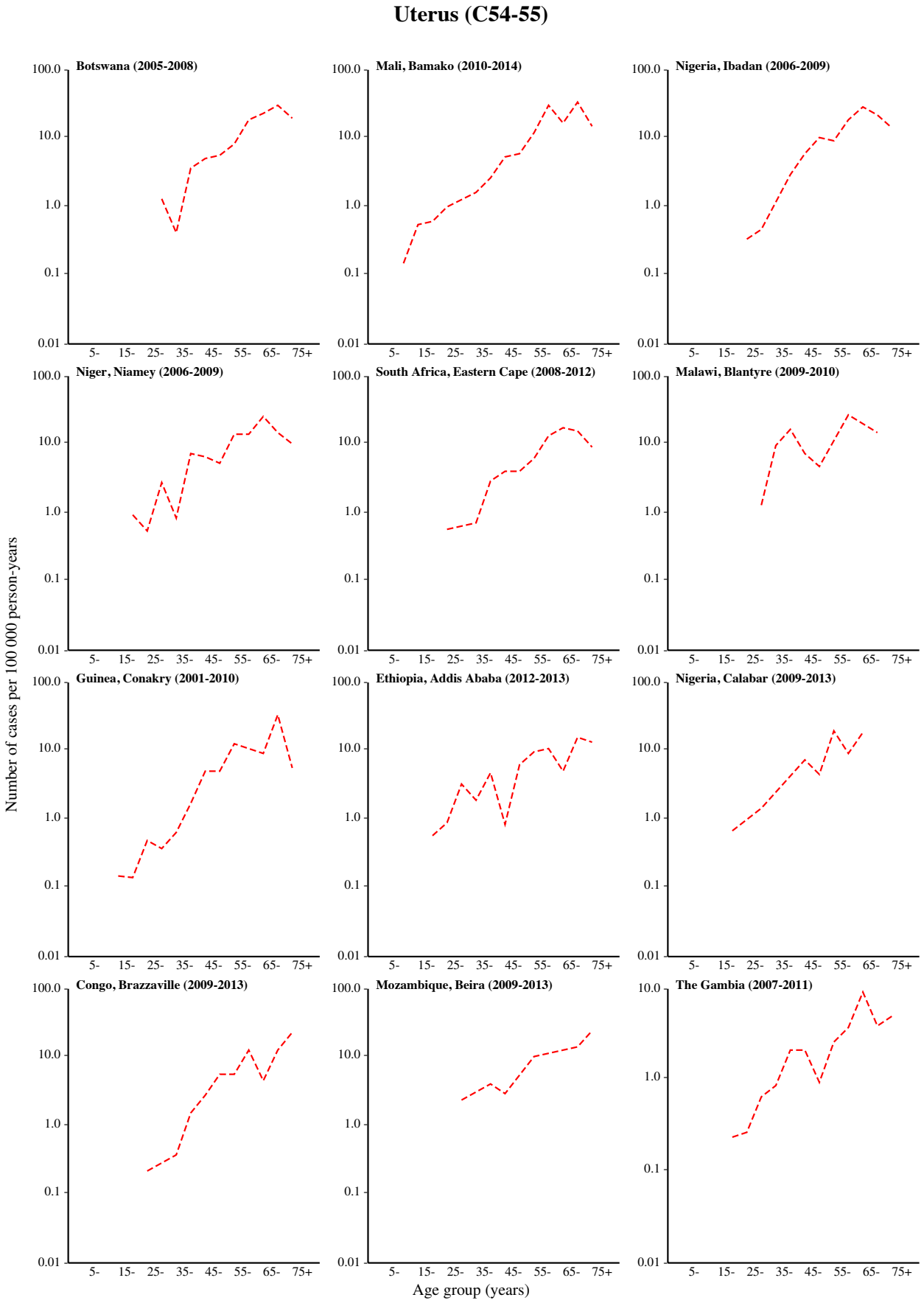


Fig. 7.49 (continued). Age-specific incidence rates (expressed as cases per 100 000 person-years) of cancer of the uterus among females in 24 of the 25 registry populations of sub-Saharan Africa included in this volume

References

Abayomi EA, Somers A, Grewal R, Sissolak G, Bassa F, Maartens D, et al. (2011). Impact of the HIV epidemic and Anti-Retroviral Treatment policy on lymphoma incidence and subtypes seen in the Western Cape of South Africa, 2002-2009: preliminary findings of the Tygerberg Lymphoma Study Group. Transfus Apher Sci. 44(2):161–6. http://dx.doi.org/10.1016/j.transci.2011.01.007 PMID:21402310

Abdel-Wahab M, Bourque JM, Pynda Y, Iżewska J, Van der Merwe D, Zubizarreta E, et al. (2013). Status of radiotherapy resources in Africa: an International Atomic Energy Agency analysis. Lancet Oncol. 14(4):e168–75. http://dx.doi.org/10.1016/S1470-2045(12)70532-6 PMID:23561748

Abuidris DO, Elsheikh A, Ali M, Musa H, Elgaili E, Ahmed AO, et al. (2013). Breast-cancer screening with trained volunteers in a rural area of Sudan: a pilot study. Lancet Oncol. 14(4):363–70. http://dx.doi.org/10.1016/S1470-2045(12)70583-1 PMID:23375833

Adebamowo CA, Adekunle OO (1999). Case-controlled study of the epidemiological risk factors for breast cancer in Nigeria. Br J Surg. 86(5):665–8. http://dx.doi.org/10.1046/j.1365-2168.1999.01117.x PMID:10361191

Aka P, Kawira E, Masalu N, Emmanuel B, Brubaker G, Magatti J, et al. (2012). Incidence and trends in Burkitt lymphoma in northern Tanzania from 2000 to 2009. Pediatr Blood Cancer. 59(7):1234–8. http://dx.doi.org/10.1002/pbc.24194 PMID:22618958

Allemani C, Weir HK, Carreira H, Harewood R, Spika D, Wang XS, et al.; CONCORD Working Group (2015). Global surveillance of cancer survival 1995-2009: analysis of individual data for 25,676,887 patients from 279 population-based registries in 67 countries (CONCORD-2). Lancet. 385(9972):977–1010. http://dx.doi.org/10.1016/S0140-6736(14)62038-9 PMID:25467588

Alter MJ (2007). Epidemiology of hepatitis C virus infection. World J Gastroenterol. 13(17):2436–41. PMID:17552026

Anderson BO (2014). Breast cancer in sub-Saharan Africa: where can we go from here? J Surg Oncol. 110(8):901–2 http://dx.doi.org/10.1002/jso.23825 PMID:25351870

Andersson MI, Rajbhandari R, Kew MC, Vento S, Preiser W, Hoepelman AI, et al. (2015). Mother-to-child transmission of hepatitis B virus in sub-Saharan Africa: time to act. Lancet Glob Health. 3(7):e358–9. http://dx.doi.org/10.1016/S2214-109X(15)00056-X PMID:26087980

Antoni S, Ferlay J, Soerjomataram I, Znaor A, Jemal A, Bray F (2017). Bladder cancer incidence and mortality: a global overview and recent trends. Eur Urol. 71(1):96–108. http://dx.doi.org/10.1016/j.eururo.2016.06.010 PMID:27370177

Arnold M, Karim-Kos HE, Coebergh JW, Byrnes G, Antilla A, Ferlay J, et al. (2015). Recent trends in incidence of five common cancers in 26 European countries since 1988: analysis of the European Cancer Observatory. Eur J Cancer. 51(9):1164–87. http://dx.doi.org/10.1016/j.ejca.2013.09.002 PMID:24120180

Association of the Nordic Cancer Registries (2016). NORDCAN: Cancer incidence, mortality, prevalence and survival in the Nordic countries, version 7.3. Available from: http://www.ancr.nu, accessed 8 July 2016.

Bah E, Parkin DM, Hall AJ, Jack AD, Whittle H (2001). Cancer in The Gambia: 1988-97. Br J Cancer. 84(9):1207–14. http://dx.doi.org/10.1054/bjoc.2001.1730 PMID:11336472

Bassett MT, Levy L, Chokunonga E, Mauchaza B, Ferlay J, Parkin DM (1995). Cancer in the European population of Harare, Zimbabwe, 1990-1992. Int J Cancer. 63(1):24–8. http://dx.doi.org/10.1002/ijc.2910630106 PMID:7558447

Bayo S, Parkin DM, Koumaré AK, Diallo AN, Ba T, Soumaré S, et al. (1990). Cancer in Mali, 1987-1988. Int J Cancer. 45(4):679–84. http://dx.doi.org/10.1002/ijc.2910450418 PMID:2323845

Binagwaho A, Ngabo F, Wagner CM, Mugeni C, Gatera M, Nutt CT, et al. (2013). Integration of comprehensive women's health programmes into health systems: cervical cancer prevention, care and control in Rwanda. Bull World Health Organ. 91(9):697–703. http://dx.doi.org/10.2471/BLT.12.116087 PMID:24101786

Binagwaho A, Wagner CM, Gatera M, Karema C, Nutt CT, Ngabo F (2012). Achieving high coverage in Rwanda's national human papillomavirus vaccination programme. Bull World Health Organ. 90(8):623–8. http://dx.doi.org/10.2471/BLT.11.097253 PMID:22893746

Blot WJ, McLaughlin JK, Fraumeni JF Jr (2006). Esophageal cancer. In: Schottenfeld D, Fraumeni JF Jr, editors. Cancer epidemiology and prevention. 3rd ed. Oxford: Oxford University Press; pp. 697–706.

Bouchardy C, Mirra AP, Khlat M, Parkin DM, de Souza JM, Gotlieb SL (1991). Ethnicity and cancer risk in São Paulo, Brazil. Cancer Epidemiol Biomarkers Prev. 1(1):21–7. PMID:1845164

Bowen RL, Duffy SW, Ryan DA, Hart IR, Jones JL (2008). Early onset of breast cancer in a group of British black women. Br J Cancer. 98(2):277–81. http://dx.doi.org/10.1038/sj.bjc.6604174 PMID:18182985

Bray F (2014). Transitions in human development and the global cancer burden. In: Stewart BW, Wild CP, editors. World cancer report 2014. Lyon: International Agency for Research on Cancer; pp. 54–68. Available from: http://publications.iarc.fr/396.

Bray F, Ferlay J (2014). Chapter 7: Age standardization. In: Forman D, Bray F, Brewster DH, Gombe Mbalawa C, Kohler B, Piñeros M, et al. Cancer incidence in five continents, Vol X. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 164; pp. 112–5. Available from: http://publications.iarc.fr/319.

Bray F, Parkin DM (2009). Evaluation of data quality in the cancer registry: principles and methods. Part I: comparability, validity and timeliness. Eur J Cancer. 45(5):747–55. http://dx.doi.org/10.1016/j.ejca.2008.11.032 PMID:19117750

Bray F, Znaor A, Cueva P, Korir A, Swaminathan R, Ullrich A, et al. (2014). Planning and developing population-based cancer registration in low- and middle-income settings. Lyon: International Agency for Research on Cancer. IARC Technical Publication No. 43. Available from: http://publications.iarc.fr/370.

Brinton LA, Figueroa JD, Awuah B, Yarney J, Wiafe S, Wood SN, et al. (2014). Breast cancer in sub-Saharan Africa: opportunities for prevention. Breast Cancer Res Treat. 144(3):467–78. http://dx.doi.org/10.1007/s10549-014-2868-z PMID:24604092

Cardoso F, Bese N, Distelhorst SR, Bevilacqua JL, Ginsburg O, Grunberg SM, et al. (2013). Supportive care during treatment for breast cancer: resource allocations in low- and middle-income countries. A Breast Health Global Initiative 2013 consensus statement. Breast. 22(5):593–605. http://dx.doi.org/10.1016/j.breast.2013.07.050 PMID:24001709

Centers for Disease Control and Prevention (CDC) (2012). Progress toward prevention and control of hepatitis C virus infection – Egypt, 2001-2012. MMWR Morb Mortal Wkly Rep. 61(29):545–9. PMID:22832935

Chasela CS, Kourtis AP, Wall P, Drobeniuc J, King CC, Thai H, et al.; BAN Study Team (2014). Hepatitis B virus infection among HIV-infected pregnant women in Malawi and transmission to infants. J Hepatol. 60(3):508–14. http://dx.doi.org/10.1016/j.jhep.2013.10.029 PMID:24211737

Chen F, Chen GK, Stram DO, Millikan RC, Ambrosone CB, John EM, et al. (2013). A genome-wide association study of breast cancer in women of African ancestry. Hum Genet. 132(1):39–48. http://dx.doi.org/10.1007/s00439-012-1214-y PMID:22923054

Cheng ML, Zhang L, Borok M, Chokunonga E, Dzamamala C, Korir A, et al. (2015). The incidence of oesophageal cancer in eastern Africa: identification of a new geographic hot spot? Cancer Epidemiol. 39(2):143–9. http://dx.doi.org/10.1016/j.canep.2015.01.001 PMID:25662402

Chiang CJ, Yang YW, You SL, Lai MS, Chen CJ (2013). Thirty-year outcomes of the national hepatitis B immunization program in Taiwan. JAMA. 310(9):974–6. http://dx.doi.org/10.1001/jama.2013.276701 PMID:24002285

Chokunonga E, Borok MZ, Chirenje ZM, Nyakabau AM, Parkin DM (2013). Trends in the incidence of cancer in the black population of Harare, Zimbabwe 1991-2010. Int J Cancer. 133(3):721–9. http://dx.doi.org/10.1002/ijc.28063 PMID:23364833

Chokunonga E, Levy LM, Bassett MT, Borok MZ, Mauchaza BG, Chirenje MZ, et al. (1999). AIDS and cancer in Africa: the evolving epidemic in Zimbabwe. AIDS. 13(18):2583–8. http://dx.doi.org/10.1097/00002030-199912240-00012 PMID:10630528

Chokunonga E, Windridge P, Sasieni P, Borok M, Parkin DM (2016). Black-white differences in cancer risk in Harare, Zimbabwe, during 1991-2010. Int J Cancer. 138(6):1416–21. http://dx.doi.org/10.1002/ijc.29883 PMID:26437451

Chopra SA, Linsell CA, Peers FG, Chopra FS (1975). Cancer of Asians in Kenya. Int J Cancer. 15(4):684–93. http://dx.doi.org/10.1002/ijc.2910150418 PMID:1140868

Chu KC, Anderson WF (2002). Rates for breast cancer characteristics by estrogen and progesterone receptor status in the major racial/ethnic groups. Breast Cancer Res Treat. 74(3):199–211. http://dx.doi.org/10.1023/A:1016361932220 PMID:12206512

Collaborative Group on Hormonal Factors in Breast Cancer (2002). Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50302 women with breast cancer and 96973 women without the disease. Lancet. 360(9328):187–95. http://dx.doi.org/10.1016/S0140-6736(02)09454-0 PMID:12133652

Coogan PF, Rosenberg L, Shapiro S, Hoffman M (1999). Lactation and breast carcinoma risk in a South African population. Cancer. 86(6):982–9. http://dx.doi.org/10.1002/(SICI)1097-0142(19990915)86:6<982::AID-CNCR13>3.0.CO;2-B PMID:10491524

Cook PJ, Doll R, Fellingham SA (1969). A mathematical model for the age distribution of cancer in man. Int J Cancer. 4(1):93–112. http://dx.doi.org/10.1002/ijc.2910040113 PMID:5346480

Cook-Mozaffari P, Newton R, Beral V, Burkitt DP (1998). The geographical distribution of Kaposi's sarcoma and of lymphomas in Africa before the AIDS epidemic. Br J Cancer. 78(11):1521–8. http://dx.doi.org/10.1038/bjc.1998.717 PMID:9836488

Corbex M, Bouzbid S, Boffetta P (2014). Features of breast cancer in developing countries, examples from North-Africa. Eur J Cancer. 50(10):1808–18. http://dx.doi.org/10.1016/j.ejca.2014.03.016 PMID:24767469

Cubasch H, Joffe M, Hanisch R, Schuz J, Neugut AI, Karstaedt A, et al. (2013). Breast cancer characteristics and HIV among 1,092 women in Soweto, South Africa. Breast Cancer Res Treat. 140(1):177–86. http://dx.doi.org/10.1007/s10549-013-2606-y PMID:23801159

Cunningham MS, Davison C, Aronson KJ (2014). HPV vaccine acceptability in Africa: a systematic review. Prev Med. 69:274–9. http://dx.doi.org/10.1016/j.ypmed.2014.08.035 PMID:25451327

Czerninski R, Zini A, Sgan-Cohen HD (2010). Lip cancer: incidence, trends, histology and survival: 1970-2006. Br J Dermatol. 162(5):1103–9. http://dx.doi.org/10.1111/j.1365-2133.2010.09698.x PMID:20163415

Dedicoat M, Newton R (2003). Review of the distribution of Kaposi's sarcoma-associated herpesvirus (KSHV) in Africa in relation to the incidence of Kaposi's sarcoma. Br J Cancer. 88(1):1–3. http://dx.doi.org/10.1038/sj.bjc.6600745 PMID:12556950

Denny LA, Franceschi S, de Sanjosé S, Heard I, Moscicki AB, Palefsky J (2012). Human papillomavirus, human immunodeficiency virus and immunosuppression. Vaccine. 30(Suppl 5):F168–74. http://dx.doi.org/10.1016/j.vaccine.2012.06.045 PMID:23199960

Denny L, Kuhn L, De Souza M, Pollack AE, Dupree W, Wright TC Jr (2005). Screen-and-treat approaches for cervical cancer prevention in low-resource settings: a randomized controlled trial. JAMA. 294(17):2173–81. http://dx.doi.org/10.1001/jama.294.17.2173 PMID:16264158

Dickens C, Joffe M, Jacobson J, Venter F, Schüz J, Cubasch H, et al. (2014). Stage at breast cancer diagnosis and distance from diagnostic hospital in a periurban setting: a South African public hospital case series of over 1,000 women. Int J Cancer. 135(9):2173–82. http://dx.doi.org/10.1002/ijc.28861 PMID:24658866

Dorn HF, Cutler SJ (1959). Morbidity from cancer in the United States. Public Health Monogr. 56:1–207. PMID:13634308

Drolet M, Bénard É, Boily MC, Ali H, Baandrup L, Bauer H, et al. (2015). Population-level impact and herd effects following human papillomavirus vaccination programmes: a systematic review and meta-analysis. Lancet Infect Dis. 15(5):565–80. http://dx.doi.org/10.1016/S1473-3099(14)71073-4 PMID:25744474

Drope J, editor (2011). Tobacco control in Africa: people, politics, and policies. London: Anthem Press and International Development Research Centre. Available from: https://www.idrc.ca/en/book/tobacco-control-africa-people-politics-and-policies.

Echimane AK, Ahnoux AA, Adoubi I, Hien S, M'Bra K, D'Horpock A, et al. (2000). Cancer incidence in Abidjan, Ivory Coast: first results from the cancer registry, 1995-1997. Cancer. 89(3):653–63. http://dx.doi.org/10.1002/1097-0142(20000801)89:3<653::AID-CNCR22>3.0.CO;2-Z PMID:10931466

Edington GM, Hendrickse M (1973). Incidence and frequency of lymphoreticular tumors in Ibadan and the Western State of Nigeria. J Natl Cancer Inst. 50(6):1623–31. PMID:4577771

Egal S, Hounsa A, Gong YY, Turner PC, Wild CP, Hall AJ, et al. (2005). Dietary exposure to aflatoxin from maize and groundnut in young children from Benin and Togo, West Africa. Int J Food Microbiol. 104(2):215–24. http://dx.doi.org/10.1016/j.ijfoodmicro.2005.03.004 PMID:15979184

Ekra D, Herbinger KH, Konate S, Leblond A, Fretz C, Cilote V, et al. (2008). A non-randomized vaccine effectiveness trial of accelerated infant hepatitis B immunization schedules with a first dose at birth or age 6 weeks in Côte d'Ivoire. Vaccine. 26(22):2753–61. http://dx.doi.org/10.1016/j.vaccine.2008.03.018 PMID:18436354

Eng A, McCormack V, dos-Santos-Silva I (2014). Receptor-defined subtypes of breast cancer in indigenous populations in Africa: a systematic review and meta-analysis. PLoS Med. 11(9):e1001720. http://dx.doi.org/10.1371/journal.pmed.1001720 PMID:25202974

Eriksen M, Mackay J, Schluger N, Islami F, Drope J (2015). The tobacco atlas. 5th ed. Atlanta: American Cancer Society.

Ferlay J, Burkhard C, Whelan S, Parkin DM (2005). Check and conversion programs for cancer registries (IARC/IACR tools for cancer registries). Lyon: International Agency for Research on Cancer. Available from: www.iacr.com.fr/iacr_iarccrgtools.htm.

Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. (2015). Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer. 136(5):E359–86. http://dx.doi.org/10.1002/ijc.29210 PMID:25220842

Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. (2013). GLOBOCAN 2012. Lyon: International Agency for Research on Cancer. Available from: http://globocan.iarc.fr.

Fleming AF (1986). A bibliography of the leukaemias in Africa, 1904-1985. Leuk Res. 10(11):1353–65. http://dx.doi.org/10.1016/0145-2126(86)90345-0 PMID:2879072

Forman D, Bray F, Brewster DH, Gombe Mbalawa C, Kohler B, Piñeros M, et al., editors (2014). Cancer incidence in five continents, Vol. X. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 164. Available from: http://publications.iarc.fr/319.

Framework Convention Alliance (2017). Regional breakdown of FCTC parties. Available from: http://www.fctc.org/about-fca/tobacco-control-treaty/latest-ratifications/regional-breakdown.

Fritz A, Percy CL, Jack A, Shanmugaratnam K, Sobin L, Parkin DM, et al., editors (2000). International classification of diseases for oncology. 3rd ed. (ICD-O-3). Geneva: World Health Organization.

Gomez F, Hirbo J, Tishkoff SA (2014). Genetic variation and adaptation in Africa: implications for human evolution and disease. Cold Spring Harb Perspect Biol. 6(7):a008524. http://dx.doi.org/10.1101/cshperspect.a008524 PMID:24984772

Gondos A, Brenner H, Wabinga H, Parkin DM (2005). Cancer survival in Kampala, Uganda. Br J Cancer. 92(9):1808–12. http://dx.doi.org/10.1038/sj.bjc.6602540 PMID:15827554

Gondos A, Chokunonga E, Brenner H, Parkin DM, Sankila R, Borok MZ, et al. (2004). Cancer survival in a southern African urban population. Int J Cancer. 112(5):860–4. http://dx.doi.org/10.1002/ijc.20471 PMID:15386382

Guerra J, Garenne M, Mohamed MK, Fontanet A (2012). HCV burden of infection in Egypt: results from a nationwide survey. J Viral Hepat. 19(8):560–7. http://dx.doi.org/10.1111/j.1365-2893.2011.01576.x PMID:22762140

Guthold R, Louazani SA, Riley LM, Cowan MJ, Bovet P, Damasceno A, et al. (2011). Physical activity in 22 African countries: results from the World Health Organization STEPwise approach to chronic disease risk factor surveillance. Am J Prev Med. 41(1):52–60. http://dx.doi.org/10.1016/j.amepre.2011.03.008 PMID:21665063

Hatcher D, Daniels G, Osman I, Lee P (2009). Molecular mechanisms involving prostate cancer racial disparity. Am J Transl Res. 1(3):235–48. PMID:19956434

Hino K, Katoh Y, Vardas E, Sim J, Okita K, Carman WF (2001). The effect of introduction of universal childhood hepatitis B immunization in South Africa on the prevalence of serologically negative hepatitis B virus infection and the selection of immune escape variants. Vaccine. 19(28–29):3912–8. http://dx.doi.org/10.1016/S0264-410X(01)00121-9 PMID:11427265

Holcombe C (1992). *Helicobacter pylori*: the African enigma. Gut. 33(4):429–31. http://dx.doi.org/10.1136/gut.33.4.429 PMID:1582581

Hou N, Ndom P, Jombwe J, Ogundiran T, Ademola A, Morhason-Bello I, et al. (2014). An epidemiologic investigation of physical activity and breast cancer risk in Africa. Cancer Epidemiol Biomarkers Prev. 23(12):2748–56. http://dx.doi.org/10.1158/1055-9965.EPI-14-0675 PMID:25242052

Howlader N, Altekruse SF, Li CI, Chen VW, Clarke CA, Ries LA, et al. (2014). US incidence of breast cancer subtypes defined by joint hormone receptor and HER2 status. J Natl Cancer Inst. 106(5):dju055. http://dx.doi.org/10.1093/jnci/dju055 PMID:24777111

Howlader N, Noone AM, Krapcho M, Garshell J, Miller D, Altekruse SF, et al., editors (2015). SEER cancer statistics review, 1975–2012. Bethesda: National Cancer Institute. Available from: http://seer.cancer.gov/csr/1975_2012.

Howlader N, Noone AM, Krapcho M, Miller D, Bishop K, Kosary CL, et al. (2013). SEER cancer statistics review, 1975–2010. Bethesda: National Cancer Institute.

Howson CP, Hiyama T, Wynder EL (1986). The decline in gastric cancer: epidemiology of an unplanned triumph. Epidemiol Rev. 8(1):1–27. http://dx.doi.org/10.1093/oxfordjournals.epirev.a036288 PMID:3533579

Huo D, Adebamowo CA, Ogundiran TO, Akang EE, Campbell O, Adenipekun A, et al. (2008). Parity and breastfeeding are protective against breast cancer in Nigerian women. Br J Cancer. 98(5):992–6. http://dx.doi.org/10.1038/sj.bjc.6604275 PMID:18301401

Husain MJ, English LM, Ramanandraibe N (2016). An overview of tobacco control and prevention policy status in Africa. Prev Med. 91(Suppl):S16–22. http://dx.doi.org/10.1016/j.ypmed.2016.02.017 PMID:26876626

Hutt MS (1981). The epidemiology of Kaposi's sarcoma. Antibiot Chemother (1971). 29:3–8. http://dx.doi.org/10.1159/000397432 PMID:7294742

IARC (1994). Schistosomes, liver flukes and *Helicobacter pylori*. IARC Monogr Eval Carcinog Risks Hum. 61:1–241. PMID:7715068. Available from: http://publications.iarc.fr/79.

IARC (1996). Human immunodeficiency viruses and human T-cell lymphotropic viruses. IARC Monogr Eval Carcinog Risks Hum. 67:1–424. PMID:9190379. Available from: http://publications.iarc.fr/85.

IARC (2002). Breast cancer screening. Lyon: International Agency for Research on Cancer. IARC Handbook of Cancer Prevention, Vol. 7. Available from: http://publications.iarc.fr/377.

IARC (2004a). Guidelines on confidentiality for population-based cancer registration. Lyon: International Agency for Research on Cancer. Internal Report No. 2004/03. Available from: http://www.iacr.com.fr/images/doc/confidentiality2004.pdf.

IARC (2004b). International rules for multiple primary cancers (ICD-O-3). Lyon: International Agency for Research on Cancer. Internal Report No. 2004/02. Available from: http://www.iacr.com.fr/images/doc/MPrules_july2004.pdf.

IARC (2012). Biological agents. IARC Monogr Eval Carcinog Risks Hum. 100B:1–441. PMID:23189750. Available from: http://publications.iarc.fr/119.

Inobaya MT, Olveda RM, Chau TN, Olveda DU, Ross AG (2014). Prevention and control of schistosomiasis: a current perspective. Res Rep Trop Med. 2014(5):65–75. PMID:25400499

Irabor DO, Arowolo A, Afolabi AA (2010). Colon and rectal cancer in Ibadan, Nigeria: an update. Colorectal Dis. 12(7 Online):e43–9. http://dx.doi.org/10.1111/j.1463-1318.2009.01928.x PMID:19438886

Islami F, Lortet-Tieulent J, Okello C, Adoubi I, Mbalawa CG, Ward EM, et al. (2015). Tumor size and stage of breast cancer in Côte d'Ivoire and Republic of Congo – results from population-based cancer registries. Breast. 24(6):713–7. http://dx.doi.org/10.1016/j.breast.2015.08.011 PMID:26371692

Iwanaga M, Watanabe T, Yamaguchi K. (2012). Adult T-cell leukemia: a review of epidemiological evidence. Front Microbiol. 3:322. http://dx.doi.org/10.3389/fmicb.2012.00322 PMID:22973265

Jemal A, Fedewa SA (2012). Is the prevalence of ER-negative breast cancer in the US higher among Africa-born than US-born black women? Breast Cancer Res Treat. 135(3):867–73. http://dx.doi.org/10.1007/s10549-012-2214-2 PMID:22915073

Kahesa C, Mwaiselage J, Wabinga HR, Ngoma T, Kalyango JN, Karamagi CA (2008). Association between invasive cancer of the cervix and HIV-1 infection in Tanzania: the need for dual screening. BMC Public Health. 8(1):262. http://dx.doi.org/10.1186/1471-2458-8-262 PMID:18664298

Kamadjeu RM, Edwards R, Atanga JS, Kiawi EC, Unwin N, Mbanya JC (2006). Anthropometry measures and prevalence of obesity in the urban adult population of Cameroon: an update from the Cameroon Burden of Diabetes Baseline Survey. BMC Public Health. 6(1):228. http://dx.doi.org/10.1186/1471-2458-6-228 PMID:16970806

Kantelhardt EJ, Zerche P, Mathewos A, Trocchi P, Addissie A, Aynalem A, et al. (2014). Breast cancer survival in Ethiopia: a cohort study of 1,070 women. Int J Cancer. 135(3):702–9. http://dx.doi.org/10.1002/ijc.28691 PMID:24375396

Kayamba V, Bateman AC, Asombang AW, Shibemba A, Zyambo K, Banda T, et al. (2015). HIV infection and domestic smoke exposure, but not human papillomavirus, are risk factors for esophageal squamous cell carcinoma in Zambia: a case-control study. Cancer Med. 4(4):588–95. http://dx.doi.org/10.1002/cam4.434 PMID:25641622

Kew MC (1992). Chronic hepatitis B virus infection and hepatocellular carcinoma in Africa. S Afr J Sci. 88:524–8.

Kew MC (2003). Synergistic interaction between aflatoxin B_1 and hepatitis B virus in hepatocarcinogenesis. Liver Int. 23(6):405–9. PMID:14986813

Kew MC (2013a). Aflatoxins as a cause of hepatocellular carcinoma. J Gastrointestin Liver Dis. 22(3):305–10. PMID:24078988

Kew MC (2013b). Epidemiology of hepatocellular carcinoma in sub-Saharan Africa. Ann Hepatol. 12(2):173–82. PMID:23396727

Kidd M, Lastovica AJ, Atherton JC, Louw JA (1999). Heterogeneity in the *Helicobacter pylori vacA* and *cagA* genes: association with gastroduodenal disease in South Africa? Gut. 45(4):499–502. http://dx.doi.org/10.1136/gut.45.4.499 PMID:10486355

Kirk GD, Bah E, Montesano R (2006). Molecular epidemiology of human liver cancer: insights into etiology, pathogenesis and prevention from The Gambia, West Africa. Carcinogenesis. 27(10):2070–82. http://dx.doi.org/10.1093/carcin/bgl060 PMID:16679307

Klint Å, Tryggvadóttir L, Bray F, Gislum M, Hakulinen T, Storm HH, et al. (2010). Trends in the survival of patients diagnosed with cancer in female genital organs in the Nordic countries 1964-2003 followed up to the end of 2006. Acta Oncol. 49(5):632-43. http://dx.doi.org/10.3109/02841861003691945 PMID:20307243

Korir A, Okerosi N, Ronoh V, Mutuma G, Parkin M (2015). Incidence of cancer in Nairobi, Kenya (2004-2008). Int J Cancer. 137(9):2053–9. http://dx.doi.org/10.1002/ijc.29674 PMID:26139540

Korir A, Yu Wang E, Sasieni P, Okerosi N, Ronoh V, Maxwell Parkin D (2017). Cancer risks in Nairobi (2000-2014) by ethnic group. Int J Cancer. 140(4):788–97. http://dx.doi.org/10.1002/ijc.30502 PMID:27813082

Lambert R, Sauvaget C, Sankaranarayanan R (2009). Mass screening for colorectal cancer is not justified in most developing countries. Int J Cancer. 125(2):253–6. http://dx.doi.org/10.1002/ijc.24371 PMID:19384945

Lim JN, Ojo AA (2017). Barriers to utilisation of cervical cancer screening in sub Sahara Africa: a systematic review. Eur J Cancer Care (Engl). 26(1):e12444. http://dx.doi.org/10.1111/ecc.12444 PMID:26853214

Louie KS, de Sanjose S, Mayaud P (2009). Epidemiology and prevention of human papillomavirus and cervical cancer in sub-Saharan Africa: a comprehensive review. Trop Med Int Health. 14(10):1287–302. http://dx.doi.org/10.1111/j.1365-3156.2009.02372.x PMID:19772550

Magoni M, Ekra KD, Aka LN, Sita KS, Kanga K (2009). Effectiveness of hepatitis-B vaccination in Ivory Coast: the case of the Grand Bassam health district. Ann Trop Med Parasitol. 103(6):519–27. http://dx.doi.org/10.1179/136485909X451816 PMID:19695157

Marasas WF (2001). Discovery and occurrence of the fumonisins: a historical perspective. Environ Health Perspect. 109(Suppl 2):239–43. http://dx.doi.org/10.1289/ehp.01109s2239 PMID:11359691

Martinez P, Røislien J, Naidoo N, Clausen T (2011). Alcohol abstinence and drinking among African women: data from the World Health Surveys. BMC Public Health. 11(1):160. http://dx.doi.org/10.1186/1471-2458-11-160 PMID:21392398

Maruthappu M, Barnes I, Sayeed S, Ali R (2015). Incidence of prostate and urological cancers in England by ethnic group, 2001-2007: a descriptive study. BMC Cancer. 15(1):753. http://dx.doi.org/10.1186/s12885-015-1771-2 PMID:26486598

Mathers CD, Fat DM, Inoue M, Rao C, Lopez AD (2005). Counting the dead and what they died from: an assessment of the global status of cause of death data. Bull World Health Organ. 83(3):171–7. PMID:15798840

Mbulaiteye SM, Bhatia K, Adebamowo C, Sasco AJ (2011). HIV and cancer in Africa: mutual collaboration between HIV and cancer programs may provide timely research and public health data. Infect Agent Cancer. 6(1):16. http://dx.doi.org/10.1186/1750-9378-6-16 PMID:22004990

McFarlane G, Forman D, Sitas F, Lachlan G (2001). A minimum estimate for the incidence of gastric cancer in Eastern Kenya. Br J Cancer. 85(9):1322–5. http://dx.doi.org/10.1054/bjoc.2001.1994 PMID:11720468

McGinley KF, Tay KJ, Moul JW (2016). Prostate cancer in men of African origin. Nat Rev Urol. 13(2):99–107. http://dx.doi.org/10.1038/nrurol.2015.298 PMID:26718455

Middleton LP, Chen V, Perkins GH, Pinn V, Page D (2003). Histopathology of breast cancer among African-American women. Cancer. 97(1 Suppl):253–7. http://dx.doi.org/10.1002/cncr.11021 PMID:12491489

Mills EJ, Bakanda C, Birungi J, Chan K, Ford N, Cooper CL, et al. (2011). Life expectancy of persons receiving combination antiretroviral therapy in low-income countries: a cohort analysis from Uganda. Ann Intern Med. 155(4):209–16. http://dx.doi.org/10.7326/0003-4819-155-4-201108160-00358 PMID:21768555

Missaoui N, Trabelsi A, Parkin DM, Jaidene L, Chatti D, Mokni M, et al. (2010). Trends in the incidence of cancer in the Sousse region, Tunisia, 1993-2006. Int J Cancer. 127(11):2669–77. http://dx.doi.org/10.1002/ijc.25490 PMID:20521249

Mitchell HM, Ally R, Wadee A, Wiseman M, Segal I (2002). Major differences in the IgG subclass response to *Helicobacter pylori* in the first and third worlds. Scand J Gastroenterol. 37(5):517–22. http://dx.doi.org/10.1080/00365520252903044 PMID:12059051

Molyneux EM, Rochford R, Griffin B, Newton R, Jackson G, Menon G, et al. (2012). Burkitt's lymphoma. Lancet. 379(9822):1234–44. http://dx.doi.org/10.1016/S0140-6736(11)61177-X PMID:22333947

Mordukhovich I, Reiter PL, Backes DM, Family L, McCullough LE, O'Brien KM, et al. (2011). A review of African American-White differences in risk factors for cancer: prostate cancer. Cancer Causes Control. 22(3):341–57. http://dx.doi.org/10.1007/s10552-010-9712-5 PMID:21184263

Mugisha E, LaMontagne DS, Katahoire AR, Murokora D, Kumakech E, Seruyange R, et al. (2015). Feasibility of delivering HPV vaccine to girls aged 10 to 15 years in Uganda. Afr Health Sci. 15(1):33–41. http://dx.doi.org/10.4314/ahs.v15i1.5 PMID:25834528

National Comprehensive Cancer Network (2015). NCCN Framework for Resource Stratification of NCCN Guidelines: (NCCN Framework™). Available from: http://www.nccn.org/framework/, accessed 5 December 2015.

NCD Risk Factor Collaboration (NCD-RisC) (2016). Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19·2 million participants. Lancet. 387(10026):1377–96. http://dx.doi.org/10.1016/S0140-6736(16)30054-X PMID:27115820

Newman LA (2014). Breast cancer disparities: high-risk breast cancer and African ancestry. Surg Oncol Clin N Am. 23(3):579–92. http://dx.doi.org/10.1016/j.soc.2014.03.014 PMID:24882352

Newton R, Ngilimana PJ, Grulich A, Beral V, Sindikubwabo B, Nganyira A, et al. (1996). Cancer in Rwanda. Int J Cancer. 66(1):75–81. http://dx.doi.org/10.1002/(SICI)1097-0215(19960328)66:1<75::AID-IJC14>3.0.CO;2-A PMID:8608971

Ng M, Freeman MK, Fleming TD, Robinson M, Dwyer-Lindgren L, Thomson B, et al. (2014). Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. JAMA. 311(2):183–92. http://dx.doi.org/10.1001/jama.2013.284692 PMID:24399557

Ngoma T, Mandeli J, Holland JF (2015). Downstaging cancer in rural Africa. Int J Cancer. 136(12):2875–9. http://dx.doi.org/10.1002/ijc.29348 PMID:25408458

Nieminen MT, Novak-Frazer L, Collins R, Dawsey SP, Dawsey SM, Abnet CC, et al. (2013). Alcohol and acetaldehyde in African fermented milk *mursik* – a possible etiologic factor for high incidence of esophageal cancer in western Kenya. Cancer Epidemiol Biomarkers Prev. 22(1):69–75. http://dx.doi.org/10.1158/1055-9965.EPI-12-0908 PMID:23155139

Nordenstedt H, White DL, El-Serag HB (2010). The changing pattern of epidemiology in hepatocellular carcinoma. Dig Liver Dis. 42(Suppl 3):S206–14. http://dx.doi.org/10.1016/S1590-8658(10)60507-5 PMID:20547305

Norman R, Mqoqi N, Sitas F (2006). Lifestyle-induced cancer in South Africa. In: Steyn K, Fourie J, Temple N, editors. Chronic diseases of lifestyle in South Africa: 1995-2005. Technical report. Cape Town: South African Medical Research Council; pp. 142–85. Available from: http://www.mrc.ac.za/noncomm/cdl1995-2005.pdf.

Nsondé Malanda J, Nkoua Mbon JB, Bambara AT, Ibara G, Minga B, Nkoua Epala B, et al. (2013). Twelve years of working of Brazzaville cancer registry. Bull Cancer. 100(2):135–9. [French] http://dx.doi.org/10.1684/bdc.2013.1701 PMID:23406573

Oettle AG (1962). Geographical and racial differences in the frequency of Kaposi's sarcoma as evidence of environmental or genetic causes. Acta Unio Int Contra Cancrum. 18:330–63. PMID:14481196

Ogundiran TO, Huo D, Adenipekun A, Campbell O, Oyesegun R, Akang E, et al. (2010). Case-control study of body size and breast cancer risk in Nigerian women. Am J Epidemiol. 172(6):682–90. http://dx.doi.org/10.1093/aje/kwq180 PMID:20716701

O'Keefe SJ, Li JV, Lahti L, Ou J, Carbonero F, Mohammed K, et al. (2015). Fat, fibre and cancer risk in African Americans and rural Africans. Nat Commun. 6:6342. http://dx.doi.org/10.1038/ncomms7342 PMID:25919227

Okobia M, Bunker C, Zmuda J, Kammerer C, Vogel V, Uche E, et al. (2006). Case-control study of risk factors for breast cancer in Nigerian women. Int J Cancer. 119(9):2179–85. http://dx.doi.org/10.1002/ijc.22102 PMID:16823837

Oluwagbemiga LA, Oluwole A, Kayode AA (2012). Seventeen years after BRCA1: what is the BRCA mutation status of the breast cancer patients in Africa? – a systematic review. SpringerPlus. 1(1):83. http://dx.doi.org/10.1186/2193-1801-1-83 PMID:23519070

Ott JJ, Stevens GA, Groeger J, Wiersma ST (2012). Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. Vaccine. 30(12):2212–9. http://dx.doi.org/10.1016/j.vaccine.2011.12.116 PMID:22273662

Pacella-Norman R, Urban MI, Sitas F, Carrara H, Sur R, Hale M, et al. (2002). Risk factors for oesophageal, lung, oral and laryngeal cancers in black South Africans. Br J Cancer. 86(11):1751–6. http://dx.doi.org/10.1038/sj.bjc.6600338 PMID:12087462

Parkin DM (2006). The global health burden of infection-associated cancers in the year 2002. Int J Cancer. 118(12):3030–44. http://dx.doi.org/10.1002/ijc.21731 PMID:16404738

Parkin DM, Bray F (2009). Evaluation of data quality in the cancer registry: principles and methods Part II. Completeness. Eur J Cancer. 45(5):756–64. http://dx.doi.org/10.1016/j.ejca.2008.11.033 PMID:19128954

Parkin DM, Ferlay J, Hamdi-Chérif M, Sitas F, Thomas JO, Wabinga H, et al., editors (2003). Cancer in Africa: epidemiology and prevention. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 153. Available from: http://publications.iarc.fr/308.

Parkin DM, Muir CS, Whelan SL, Gao Y-T, Ferlay J, Powell J, editors (1992). Cancer incidence in five continents, Vol. VI. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 120. Available from: http://publications.iarc.fr/265.

Parkin DM, Nambooze S, Wabwire-Mangen F, Wabinga HR (2010). Changing cancer incidence in Kampala, Uganda, 1991-2006. Int J Cancer. 126(5):1187–95. http://dx.doi.org/10.1002/ijc.24838 PMID:19688826

Parkin DM, Plummer M (2002). Comparability and quality of data. In: Parkin DM, Whelan SL, Ferlay J, Teppo L, Thomas DB, editors. Cancer incidence in five continents, Vol. VIII. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 155; pp. 57–73. Available from: http://publications.iarc.fr/310.

Parkin DM, Vizcaino AP, Skinner ME, Ndhlovu A (1994). Cancer patterns and risk factors in the African population of southwestern Zimbabwe, 1963-1977. Cancer Epidemiol Biomarkers Prev. 3(7):537–47. PMID:7827583

Parkin DM, Wabinga H, Nambooze S, Wabwire-Mangen F (1999). AIDS-related cancers in Africa: maturation of the epidemic in Uganda. AIDS. 13(18):2563–70. http://dx.doi.org/10.1097/00002030-199912240-00010 PMID:10630526

Parkin DM, Whelan SL, Ferlay J, Raymond L, Young J, editors (1997). Cancer incidence in five continents, Vol. VII. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 143. Available from: http://publications.iarc.fr/298.

Parkin DM, Whelan SL, Ferlay J, Teppo L, Thomas DB, editors (2002). Cancer incidence in five continents, Vol. VIII. Lyon: International Agency for Research on Cancer. IARC Scientific Publication No. 155. Available from: http://publications.iarc.fr/310.

Perlman S, Wamai RG, Bain PA, Welty T, Welty E, Ogembo JG (2014). Knowledge and awareness of HPV vaccine and acceptability to vaccinate in sub-Saharan Africa: a systematic review. PLoS One. 9(3):e90912. http://dx.doi.org/10.1371/journal.pone.0090912 PMID:24618636

Peto TJ, Mendy ME, Lowe Y, Webb EL, Whittle HC, Hall AJ (2014). Efficacy and effectiveness of infant vaccination against chronic hepatitis B in The Gambia Hepatitis Intervention Study (1986-90) and in the nationwide immunisation program. BMC Infect Dis. 14(1):7. http://dx.doi.org/10.1186/1471-2334-14-7 PMID:24397793

Petrick JL, Wyss AB, Butler AM, Cummings C, Sun X, Poole C, et al. (2014). Prevalence of human papillomavirus among oesophageal squamous cell carcinoma cases: systematic review and meta-analysis. Br J Cancer. 110(9):2369–77. http://dx.doi.org/10.1038/bjc.2014.96 PMID:24619077

Pike MC, Pearce CL, Wu AH (2004). Prevention of cancers of the breast, endometrium and ovary. Oncogene. 23(38):6379–91. PMID:15322512

Pink RC, Bailey TA, Iputo JE, Sammon AM, Woodman AC, Carter DR (2011). Molecular basis for maize as a risk factor for esophageal cancer in a South African population via a prostaglandin E2 positive feedback mechanism. Nutr Cancer. 63(5):714–21. http://dx.doi.org/10.1080/01635581.2011.570893 PMID:21667399

Qian F, Ogundiran T, Hou N, Ndom P, Gakwaya A, Jombwe J, et al. (2014). Alcohol consumption and breast cancer risk among women in three sub-Saharan African countries. PLoS One. 9(9):e106908. http://dx.doi.org/10.1371/journal.pone.0106908 PMID:25198723

Raesima MM, Forhan SE, Voetsch AC, Hewitt S, Hariri S, Wang SA, et al. (2015). Human papillomavirus vaccination coverage among school girls in a demonstration project – Botswana, 2013. MMWR Morb Mortal Wkly Rep. 64(40):1147–9. http://dx.doi.org/10.15585/mmwr.mm6440a5 PMID:26468997

Rebbeck TR, Devesa SS, Chang BL, Bunker CH, Cheng I, Cooney K, et al. (2013). Global patterns of prostate cancer incidence, aggressiveness, and mortality in men of African descent. Prostate Cancer. 2013:560857.

Rosenberg L, Kelly JP, Shapiro S, Hoffman M, Cooper D (2002). Risk factors for breast cancer in South African women. S Afr Med J. 92(6):447–8. PMID:12146129

Safe Work Australia (2010). National hazard exposure worker surveillance: exposure to direct sunlight and the provision of sun exposure controls in Australian workplaces. Barton: Safe Work Australia.

Sammon AM, Iputo JE (2006). Maize meal predisposes to endemic squamous cancer of the oesophagus in Africa: breakdown of esterified linoleic acid to the free form in stored meal leads to increased intragastric PGE2 production and a low-acid reflux. Med Hypotheses. 67(6):1431–6. http://dx.doi.org/10.1016/j.mehy.2006.05.037 PMID:16824700

Sankaranarayanan R, Anorlu R, Sangwa-Lugoma G, Denny LA (2013). Infrastructure requirements for human papillomavirus vaccination and cervical cancer screening in sub-Saharan Africa. Vaccine. 31(Suppl 5):F47–52. http://dx.doi.org/10.1016/j.vaccine.2012.06.066 PMID:24331747

Sankaranarayanan R, Prabhu PR, Pawlita M, Gheit T, Bhatla N, Muwonge R, et al.; Indian HPV Vaccine Study Group (2016). Immunogenicity and HPV infection after one, two, and three doses of quadrivalent HPV vaccine in girls in India: a multicentre prospective cohort study. Lancet Oncol. 17(1):67–77. http://dx.doi.org/10.1016/S1470-2045(15)00414-3 PMID:26652797

Schaafsma T, Wakefield J, Hanisch R, Bray F, Schüz J, Joy EJ, et al. (2015). Africa's oesophageal cancer corridor: geographic variations in incidence correlate with certain micronutrient deficiencies. PLoS One. 10(10):e0140107. http://dx.doi.org/10.1371/journal.pone.0140107 PMID:26448405

Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ (2015). Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. Lancet. 386(10003):1546–55. http://dx.doi.org/10.1016/S0140-6736(15)61412-X PMID:26231459

Sewram V, Sitas F, O'Connell D, Myers J (2014). Diet and esophageal cancer risk in the Eastern Cape Province of South Africa. Nutr Cancer. 66(5):791–9. http://dx.doi.org/10.1080/01635581.2014.916321 PMID:24877989

Shaukat A, Mongin SJ, Geisser MS, Lederle FA, Bond JH, Mandel JS, et al. (2013). Long-term mortality after screening for colorectal cancer. N Engl J Med. 369(12):1106–14. http://dx.doi.org/10.1056/NEJMoa1300720 PMID:24047060

Shimakawa Y, Bah E, Wild CP, Hall AJ (2013). Evaluation of data quality at The Gambia National Cancer Registry. Int J Cancer. 132(3):658–65. http://dx.doi.org/10.1002/ijc.27646 PMID:22618962

Shimakawa Y, Lemoine M, Mendy M, Njai HF, D'Alessandro U, Hall A, et al. (2014). Population-based interventions to reduce the public health burden related with hepatitis B virus infection in The Gambia, West Africa. Trop Med Health. 42(2 Suppl):59–64. http://dx.doi.org/10.2149/tmh.2014-S08 PMID:25425952

Siegel R, Desantis C, Jemal A (2014). Colorectal cancer statistics, 2014. CA Cancer J Clin. 64(2):104–17. http://dx.doi.org/10.3322/caac.21220 PMID:24639052

Silverberg MJ, Lau B, Achenbach CJ, Jing Y, Althoff KN, D'Souza G, et al.; North American AIDS Cohort Collaboration on Research and Design of the International Epidemiologic Databases to Evaluate AIDS (2015). Cumulative incidence of cancer among persons with HIV in North America: a cohort study. Ann Intern Med. 163(7):507–18. http://dx.doi.org/10.7326/M14-2768 PMID:26436616

Sitas F, Carrara H, Beral V, Newton R, Reeves G, Bull D, et al. (1999). Antibodies against human herpesvirus 8 in black South African patients with cancer. N Engl J Med. 340(24):1863–71. http://dx.doi.org/10.1056/NEJM199906173402403 PMID:10369849

Sitas F, Madhoo J, Wessie J (1998). Incidence of histologically diagnosed cancer in South Africa 1993–1995. Johannesburg: National Cancer Registry, South African Institute for Medical Research.

Snyman LC, Dreyer G, Botha MH, van der Merwe FH, Becker PJ (2015). The Vaccine and Cervical Cancer Screen (VACCS) project: linking cervical cancer screening to HPV vaccination in the South-West District of Tshwane, Gauteng, South Africa. S Afr Med J. 105(2):115–20. http://dx.doi.org/10.7196/SAMJ.8418 PMID:26242529

Somdyala NI, Parkin DM, Sithole N, Bradshaw D (2015). Trends in cancer incidence in rural Eastern Cape Province; South Africa, 1998-2012. Int J Cancer. 136(5):E470–4. http://dx.doi.org/10.1002/ijc.29224 PMID:25236502

Stefan C, Bray F, Ferlay J, Liu B, Maxwell Parkin D (2017). Cancer of childhood in sub-Saharan Africa. Ecancermedicalscience. 11:755. http://dx.doi.org/10.3332/ecancer.2017.755 PMID:28900468

Strickland GT (2006). Liver disease in Egypt: hepatitis C superseded schistosomiasis as a result of iatrogenic and biological factors. Hepatology. 43(5):915–22. http://dx.doi.org/10.1002/hep.21173 PMID:16628669

Turner PC, Sylla A, Gong YY, Diallo MS, Sutcliffe AE, Hall AJ, et al. (2005). Reduction in exposure to carcinogenic aflatoxins by postharvest intervention measures in west Africa: a community-based intervention study. Lancet. 365(9475):1950–6. http://dx.doi.org/10.1016/S0140-6736(05)66661-5 PMID:15936422

UNAIDS (2017). AIDSinfo. Geneva: Joint United Nations Programme on HIV/AIDS. Available from: http://aidsinfo.unaids.org.

Urban M, Banks E, Egger S, Canfell K, O'Connell D, Beral V, et al. (2012). Injectable and oral contraceptive use and cancers of the breast, cervix, ovary, and endometrium in black South African women: case-control study. PLoS Med. 9(3):e1001182. http://dx.doi.org/10.1371/journal.pmed.1001182 PMID:22412354

Vaccarella S, Franceschi S, Engholm G, Lönnberg S, Khan S, Bray F (2014). 50 years of screening in the Nordic countries: quantifying the effects on cervical cancer incidence. Br J Cancer. 111(5):965–9. http://dx.doi.org/10.1038/bjc.2014.362 PMID:24992581

Viviani S, Carrieri P, Bah E, Hall AJ, Kirk GD, Mendy M, et al.; Gambia Hepatitis Intervention Study (2008). 20 years into The Gambia Hepatitis Intervention Study: assessment of initial hypotheses and prospects for evaluation of protective effectiveness against liver cancer. Cancer Epidemiol Biomarkers Prev. 17(11):3216–23. http://dx.doi.org/10.1158/1055-9965.EPI-08-0303 PMID:18990765

Viviani S, Jack A, Hall AJ, Maine N, Mendy M, Montesano R, et al. (1999). Hepatitis B vaccination in infancy in The Gambia: protection against carriage at 9 years of age. Vaccine. 17(23–24):2946–50. http://dx.doi.org/10.1016/S0264-410X(99)00178-4 PMID:10462228

Wabinga HR, Colebunders B, Odida M, Ocama P, Colebunders R (2004). Risk factors for and types of oesophageal cancer. Lancet. 364(9450):2018. http://dx.doi.org/10.1016/S0140-6736(04)17508-9 PMID:15582056

Wabinga HR, Nambooze S, Amulen PM, Okello C, Mbus L, Parkin DM (2014). Trends in the incidence of cancer in Kampala, Uganda 1991-2010. Int J Cancer. 135(2):432–9. http://dx.doi.org/10.1002/ijc.28661 PMID:24615279

Walker AR, Adam F, Walker J, Walker BF (2002). Cancer of the oesophagus in Africans in sub-Saharan Africa: any hopes for its control? Eur J Cancer Prev. 11(5):413–8. PMID:12394237

Walker AR, Segal I (2002). Colorectal cancer in an African city population in transition. Eur J Cancer Prev. 1(2):187–91. PMID:11984138

White RE, Abnet CC, Mungatana CK, Dawsey SM (2002). Oesophageal cancer: a common malignancy in young people of Bomet District, Kenya. Lancet. 360(9331):462–3. http://dx.doi.org/10.1016/S0140-6736(02)09639-3 PMID:12241722

Whittle HC, Bradley AK, McLauchlan K, Ajdukiewicz AB, Howard CR, Zuckerman AJ, et al. (1983). Hepatitis B virus infection in two Gambian villages. Lancet. 321(8335):1203–6. http://dx.doi.org/10.1016/S0140-6736(83)92477-7 PMID:6133999

WHO (1992). International statistical classification of diseases and related health problems. 10th rev. (ICD-10). Geneva: World Health Organization.

WHO (2002). National cancer control programmes: policies and managerial guidelines. 2nd ed. Geneva: World Health Organization.

WHO (2005b). WHO Framework Convention on Tobacco Control. Available from: http://www.who.int/fctc/en/.

WHO (2005a). World Health Assembly resolution WHA58.22. Cancer prevention and control. Geneva: World Health Organization.

WHO (2011). Global status report on noncommunicable diseases 2010. Geneva: World Health Organization.

WHO (2014). Human papillomavirus vaccines: WHO position paper, October 2014. Wkly Epidemiol Rec. 89(43):465–91. PMID:25346960

WHO (2016). Global Health Observatory (GHO) data. Geneva: World Health Organization. Available from: http://www.who.int/gho/.

WHO (2017). WHO Mortality Database. Geneva: World Health Organization. Available from: http://www.who.int/healthinfo/mortality_data/.

WHO (2018). Immunization, vaccines and biologicals: hepatitis B. Geneva: World Health Organization. Available from: http://www.who.int/immunization/diseases/hepatitisB/en/.

Wild CP, Miller JD, Groopman JD, editors (2015). Mycotoxin control in low- and middle-income countries. Lyon: International Agency for Research on Cancer. IARC Working Group Report No. 9. Available from: http://publications.iarc.fr/535.

Wild CP, Montesano R (2009). A model of interaction: aflatoxins and hepatitis viruses in liver cancer aetiology and prevention. Cancer Lett. 286(1):22–8. http://dx.doi.org/10.1016/j.canlet.2009.02.053 PMID:19345001

Williams CK (1985). Influence of life-style on the pattern of leukaemia and lymphoma subtypes among Nigerians. Leuk Res. 9(6):741–5. PMID:2989625

Winkler V, Lan Y, Becher H (2015). Tobacco prevention policies in west-African countries and their effects on smoking prevalence. BMC Public Health. 15(1):1216. http://dx.doi.org/10.1186/s12889-015-2562-z PMID:26646580

Yamaoka Y, Kato M, Asaka M (2008). Geographic differences in gastric cancer incidence can be explained by differences between *Helicobacter pylori* strains. Intern Med. 47(12):1077–83. http://dx.doi.org/10.2169/internalmedicine.47.0975 PMID:18552463

Zauber AG, Winawer SJ, O'Brien MJ, Lansdorp-Vogelaar I, van Ballegooijen M, Hankey BF, et al. (2012). Colonoscopic polypectomy and long-term prevention of colorectal-cancer deaths. N Engl J Med. 366(8):687–96. http://dx.doi.org/10.1056/NEJMoa1100370 PMID:22356322

Zhao L, Palipudi KM, Ramanandraibe N, Asma S (2015). Cigarette smoking and cigarette marketing exposure among students in selected African countries: findings from the Global Youth Tobacco Survey. Prev Med. 91S:S35–9. PMID:26743632

Ziraba AK, Fotso JC, Ochako R (2009). Overweight and obesity in urban Africa: a problem of the rich or the poor? BMC Public Health. 9(1):465. http://dx.doi.org/10.1186/1471-2458-9-465 PMID:20003478

Abbreviations

AFCRN	African Cancer Registry Network
AIDS	acquired immune deficiency syndrome
ASR	age-standardized incidence rate
DCO%	percentage of death-certificate-only cases
DCO case	death-certificate-only case
EBV	Epstein–Barr virus
ER	estrogen receptor
FCTC	Framework Convention on Tobacco Control
GICR	Global Initiative for Cancer Registry Development
HBV	hepatitis B virus
HCV	hepatitis C virus
HHV-8	human herpesvirus-8
HIV	human immunodeficiency virus
HPV	human papillomavirus
IACR	International Association of Cancer Registries
IARC	International Agency for Research on Cancer
ICD-10	*International Statistical Classification of Diseases and Related Health Problems, 10th revision*
ICD-O-3	*International Classification of Diseases for Oncology, 3rd edition*
INCTR	International Network for Cancer Treatment and Research
KSHV	Kaposi sarcoma-associated herpesvirus
M:I ratio	mortality-to-incidence ratio
MV%	percentage of microscopically verified cases
NCD	noncommunicable disease
NHL	non-Hodgkin lymphoma
O/E	ratio of observed value to expected value
SCC	squamous cell carcinoma
TCC	transitional cell carcinoma
WHO	World Health Organization

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