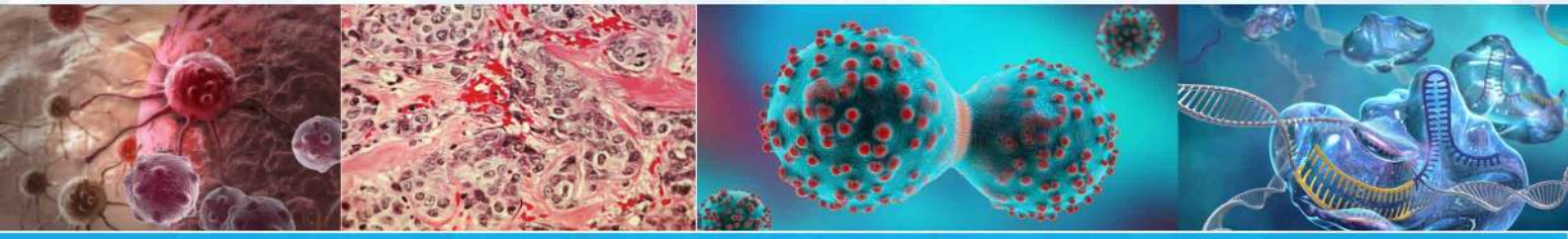
Kampala Cancer Registry Report 2010-2012



Kampala, Uganda September 2017

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2010-2012

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BACKGROUND, HISTORY

Reports of cancer in Uganda date back to end of 19th century, when the first missionary doctor established western medicine in Uganda by constructing Mengo Hospital in Kampala. Davies *et al.* (1964) reviewed the hospital records of Mengo Hospital from 1897 to 1956. Kampala Cancer Registry (KCR) was established in 1954, in the Department of Pathology of Makerere University Medical School. The aim was to obtain information on cancer occurrence in the population of Kyadondo County, in which the capital city of Kampala is situated. The registry functioned continuously both before and after independence (1962), until the military coup of General Idi Amin Dada in 1971. Thereafter, full population coverage was not possible, although a register was maintained within the Department of Pathology until 1980, when all registration ceased. With the return of political stability, the registry restarted in 1989 and has functioned continuously since. Initially, the registry used request/result forms of the department of pathology, redesigned specifically to permit registration of cancers. Thus, they contained demographic information on the patient, as well as the source of the specimen and the results of the examination. In addition to data collected in this way, tumour registrars have been employed to search for cancer cases admitted to, or treated in, the four main hospitals in Kampala (and, in recent years, the Uganda Hospice) and, for individuals resident in Kyadondo County, to extract somewhat more extensive information onto special notification forms.

Between 1954 and 1980, registration was manual, apart from the period 1964-1968, when the data were transferred to punched cards (Templeton, 1973), which are no longer available in Uganda. The details of all patients were entered into a large register. Since 1989 the registration process has been computerized, using the CanReg system of IARC. Results of the registry have been published in volumes 1, 7, 8, 9, 10 and 11 of “Cancer Incidence in Five Continents” (Doll et al, 1966; Parkin et al, 1997, 2002; Curado et al 2007, Forman et al. 2014, Bray et al 2017).

KCR is situated in the Department of Pathology, School of Biomedical Sciences, Makerere University College of Health Sciences. It is managed by a part-time Director (pathologist), the Cancer Registrar and an Assistant Cancer Registrar.

POPULATION COVERED

I. Geography

The cancer registry aims to cover the area of Kyadondo county, which comprises Kampala district and part of Wakiso district (Fig 1).

Fig 1. Map of (left) Uganda, showing administrative districts, and (right) Kampala and Kyadondo County: the area covered by the registry.

The population of Kyadondo consists mainly of the Baganda ethnic group (50%) and other ethnic groups from Uganda (30%). The other 20% is made up of immigrants from neighbouring countries, and small numbers of Asians (especially from India) and Europeans.

II. Population size and composition

The most recent population census in Uganda was in 2014. The Uganda Bureau of Statistics (UBoS) has published the provisional results, including figures (by sex) for Kampala district and the eleven sub counties of Wakiso district that are within Kyadondo County. However, the full breakdown by 5-year age groups was not available, and same assumptions concerning the age distribution (had to be made (for the Wakiso district municipalities, the age distribution of the 2002 census was assumed).

Annual estimates for 2010, 2011 and 2012 were prepared assuming constant growth rates, within sex and age group, between 2002 to 2014.

Using the population estimates for year 2010, 2011 and 2012, the average annual population of the registry area (Kyadondo county) by 2012 was 2,324,306 (1,100,984 males and 1,223,322 females).

The composition by sex and five year age group is shown in the population pyramid (Fig 2).

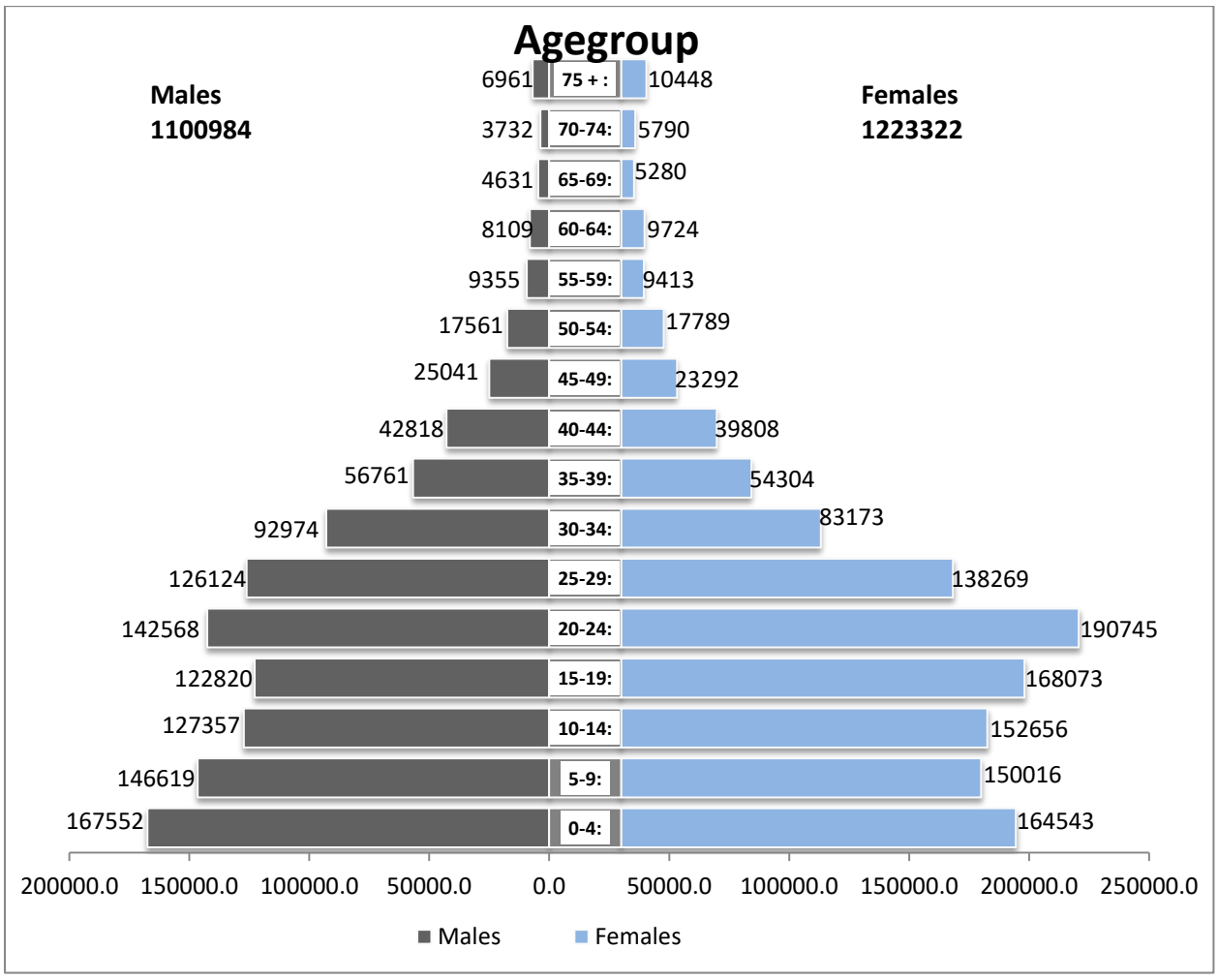


Fig 2. Population Pyramid

METHODS

I. Sources of data

The main sources of information on cancer cases are:-

A. Hospitals

- Mulago referral hospital & complex (including radiotherapy and haematology departments)
- The Uganda Cancer Institute
- Mengo hospital
- Rubaga hospital

- Nsambya hospital
- Private clinics and Nursing homes

B. Laboratories
- Makerere Histopathology laboratory
- Multi-system Histopathology laboratory
- Metro Med Histopathology laboratory
- Kampala Histopathology laboratory
- Mengo Histopathology laboratory
- Nsambya Histopathology laboratory
- Govt. And Private Haematology laboratories

C. Other sources
- Makindye Hospice

II. Methods of data collection

The registrars visit the hospitals on a scheduled time table, at a frequency depending on the anticipated number of cases to be registered. Designated staff in the hospital records departments assists in retrieving records of patients with a diagnosis of cancer. These are checked against registers of admissions and discharges. Data are abstracted from cases notes onto a registration form (Appendix 1).

The pathology laboratories actively assist the registration process, either by making the pathology logs and report forms available, or in sending copies of reports on cases diagnosed with cancer directly to the registry. Almost all of the required information is available, although place of residence is not recorded in a minority of cases, and must be traced via the referring hospital.

Patients are not interviewed in person. Place of residence is taken to be that recorded on the medical record. In Kampala, there are no detailed addresses for individuals – residence is given simply as the district (neighbourhood) of the city (or village for the peri-urban parts of Kyadondo) where the individual resides.

Death Certificates

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 copied into a death register in the hospital mortuary. This source of information is used by the registry. Status and date of last contact are updated for cases already registered. For other (unregistered) subjects, as attempt is made to locate their hospital record. If this fails, the case is registered as 'Death Certificate Only' (basis of diagnosis =0) with date of incidence = date of death.

III. Variables

The variables collected on each patient are shown on the data collection form (See Appendix 1)

Classification and coding

A. Site and histology

Tumour site (topography) and histology (morphology) are coded according to the International Classification of Diseases for Oncology, Third Edition (ICD-0 3) (Fritz et al, 2000). The pair of codes is converted automatically within the CANREG system to the appropriate code in the 10th revision of the International Classification of Diseases (ICD-10) (WHO, 1992), which is used for tabulation of results.

B. Incidence date

Incidence date is defined according to original recommendations of IACR (Jensen et al, 1991) (see text box).

incidence date refers to, in decreasing order of priority:

(*a*) date of first consultation at, or admission to, a hospital, clinic or institution for the cancer in question;

(*b*) date of first diagnosis of the cancer by a physician or the date of the first pathology report—a population-based registry should seek this information only when necessary for recording the incidence date;

(*c*) date of death (year only), when the cancer is first ascertained from the death certificate and follow-back attempts have been unsuccessful; or

(*d*) date of death preceding an autopsy, when this is the time at which cancer is first found and was unsuspected clinically (without even a vague statement, such as 'tumour suspected', 'malignancy suspected').

C. Multiple primaries

The registry defines multiple primary cancers according to the rules of the IARC/IACR (2004) and they are recorded and tabulated accordingly. Briefly, these rules imply that only one primary cancer at a given site can occur in an individual, unless the second such cancer is completely different histological type. Laterality (tumours in the opposite side of paired organs) and time (tumours in the same organ, years later are not considered as new primary cancers.

D. Basis of diagnosis

Table 1 IARC-IACR Basis of Diagnosis Codes

Code	Description	Criteria
0	Death Certificate Only	Information provided is from a death certificate.
Non-microscopic		
1	Clinical	Diagnosis made before death, but without any of the following (codes 2-7).
2	Clinical investigation	All diagnostic techniques, including x-ray, endoscopy, imaging, ultrasound, exploratory surgery (e.g., laparotomy), and autopsy, without a tissue diagnosis.
4	Specific tumor markers	Including biochemical and/or immunological markers that are specific for a tumor site.
Microscopic		
5	Cytology	Examination of cells from a primary or secondary site, including fluids aspirated by endoscopy or needle; also includes the microscopic examination of peripheral blood and bone marrow aspirates.
6	Histology of a metastasis	Histologic examination of tissue from a metastasis, including autopsy specimens.
7	Histology of a primary tumor	Histologic examination of tissue from primary tumor, however obtained, including all cutting techniques and bone marrow biopsies; also includes autopsy specimens of primary tumor.
9	Unknown	

Table 1. Basis of diagnosis is recorded according to the coding scheme of ICD-03

When multiple notifications are received for the same cancer, the highest code (most valid basis) is used on the tumour record.

The database (CANREG version)

The registry uses CANREG (version 4) for data entry, management and analysis (via EPI-INFO version 6), and CanReg 5 since 2015.

Confidentiality

The registry adheres to the guidelines of the IACR/IARC (2004) with respect to the preservation of confidentiality in connection with or during the process of collection, storage, use and transmission of identifiable data. Requests for the release of data should be made in writing to the registry; requests for data involving identification of individual subjects require special permission, involving appropriate safeguards for confidentiality.

Statistical methods

Results are presented as numbers of cases registered in the three year period (2010-2012) and average annual incidence rates. The latter are calculated as:-

$$\frac{\text{Number of cases} \times 100{,}000}{\text{Average. annual population at risk} \times 3}$$

Either for the whole population of males and females (crude rates) or for 5 year age groups (age specific rates), per 100,000 population Age Standardisation is carried out by two methods.

1 Direct standardization

Using age specific rates, applied to the 'World Population" (Doll & Smith, 1982) to obtain the (World) Age Standardised Rate (ASR) per 100,000 population.

2. Cumulative rates (to age 74).

This is obtained by adding age specific rates for individual years of age up to 74. If these rates are expressed per 100,000, the result is divided by 1000, to obtain the cumulative rate (Cum. Rate) per 100 (%). It is approximately equal to the probability (percentage chance) of developing the given cancer by age 74, given the age specific incidence rates in the tables.

RESULTS

During the three year period (2010-2012) 4,864 new cancer cases (ICD-10 codes C00-C95) were registered. Of these, 57% (2,752/4,864) were females.

Cases of cancer in situ (behaviour =2), benign tumours (behaviour code =0), and those of uncertain behaviour code =1) are excluded.

Detailed tabulations, showing numbers of cases registered, and incidence rates per 100,000, according to sex, cancer type and age group are shown in the Appendix Tables. These results are summarized in Figures 3-6.

I. Number of cases in period, by age group & sex

Fig 3 shows the distribution of cases registered in the three year period, by broad age grouping and sex. Overall (both sexes) some 6% of cancer cases occurred in childhood (ages 0-14), and 13% in the elderly (ages 70 or more) for males. The most affected age group was 30- 49 years with some 43% of cancers in females occurring in this age group. Even among males, the same age group (30 to 49) had the highest proportion of cancer cases 33% as shown in figure 3 below.

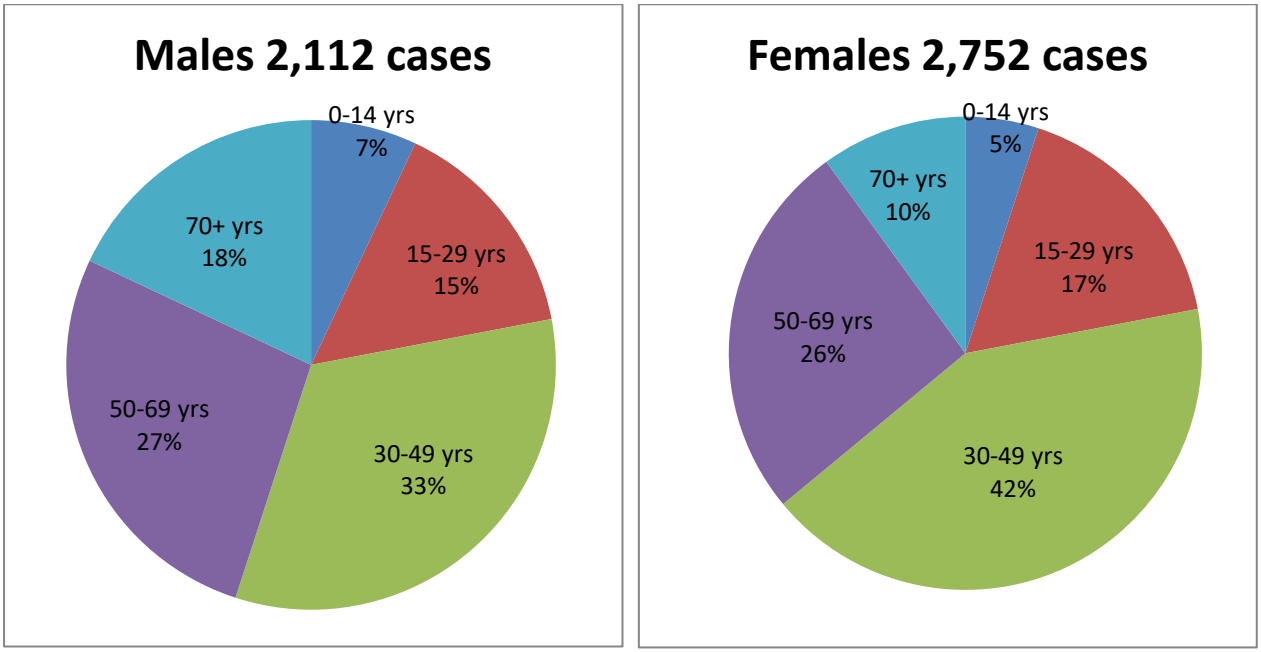


Figure 3: Distribution of cancer cases by age group in both males and females.

II. Numbers of cases by cancer type and sex

Fig 4a shows the 10 most common cases in men, according to the number of cases recorded in the three year period.

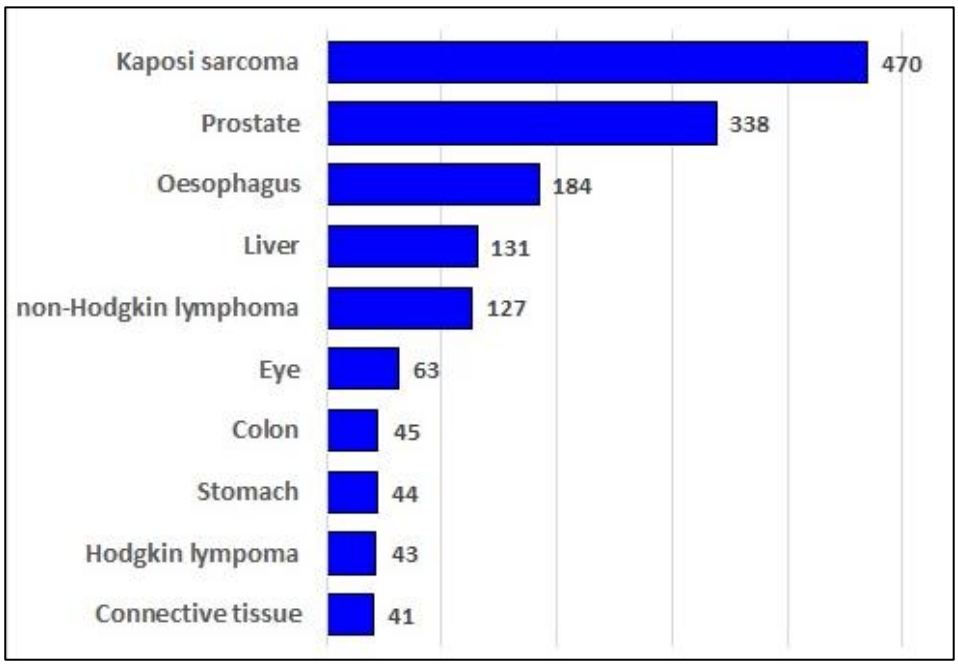


Figure 4a: Top ten cancers in males (numbers of cases)

Fig 4b shows the 10 most common cases in women. Cancer of the cervix was the most commonly diagnosed malignancy with 708 cases followed by breast cancer (396 cases).

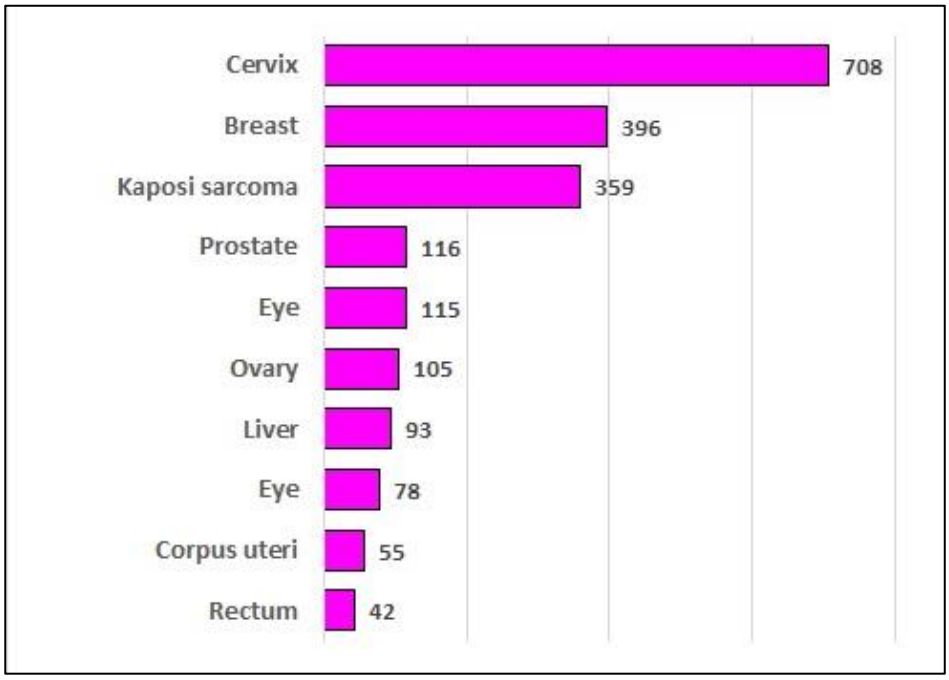


Figure 4b: Top ten cancers in females (numbers of cases)

III. Incidence rates by cancer type and sex

Fig 5a shows the ranking of cancer types in men according to the cumulative incidence (0-74). The highest cumulative incidence is for prostate cancer (6.69%) followed by oesophagus (2.85%) and Kaposi sarcoma (1.84%).

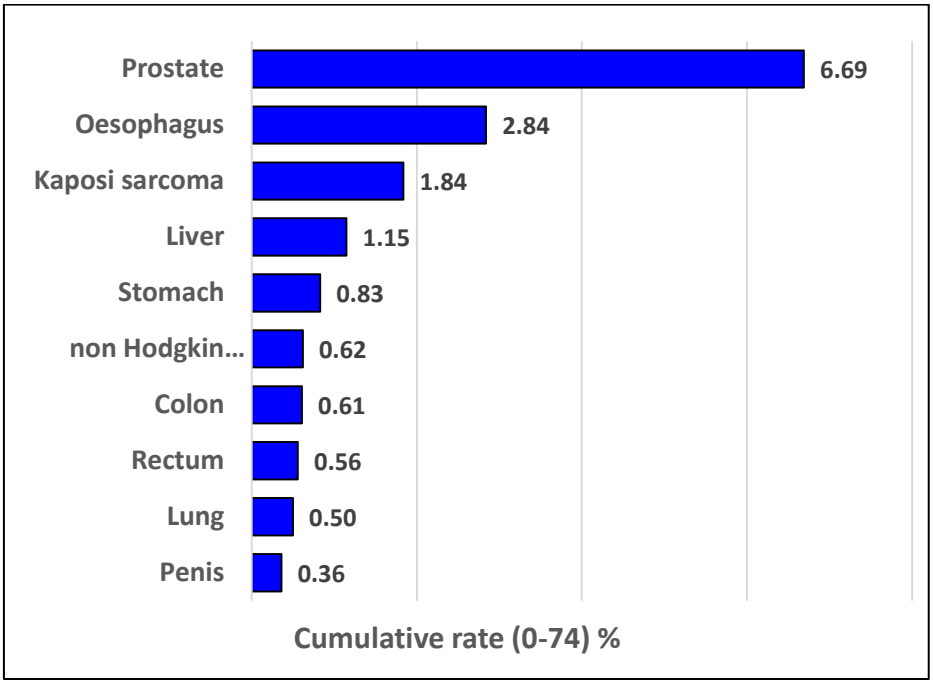


Figure 5a. Cumulative rate (0-74) in males (top ten)

In women (Fig 5b), the sequence is: cancer of cervix (5.9%), breast (3.1%) and oesophagus (1.54%).

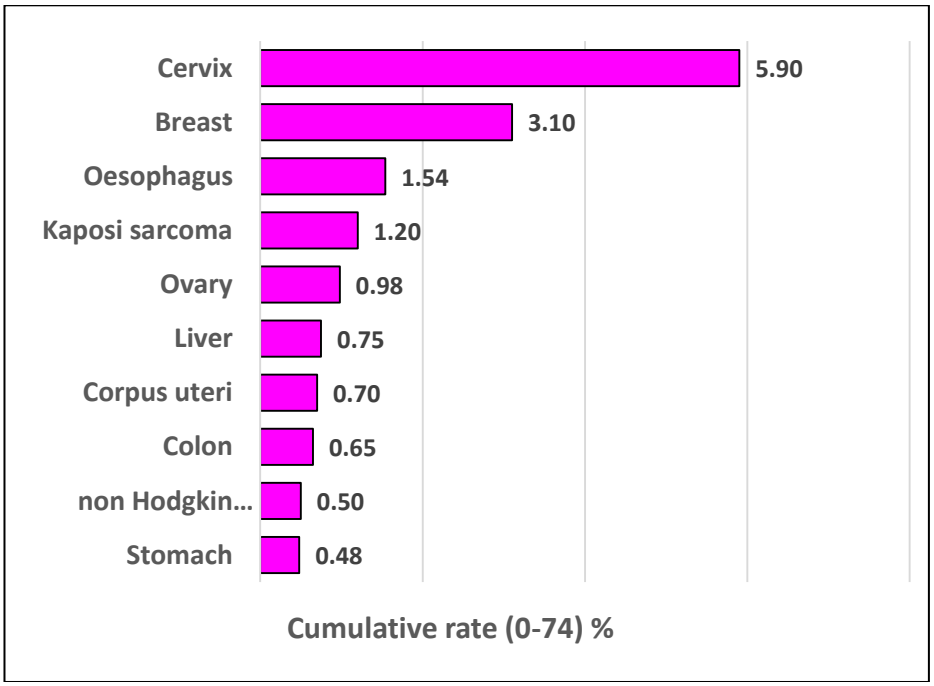


Figure 5b. Cumulative rate (0-74) in females (top ten)

IV. Age specific incidence rates (most common sites) by sex

Figure 6a shows age specific incidence rates for the four most common cancers of females. The incidence rates of cancers increased steadily with age, although the increase in incidence of Kaposi sarcoma starts at relatively young age. Cancer of the oesophagus affects mostly the older age-groups yet cancer of the ovary started among the early teens and increases gradually, as shown in the figure below.

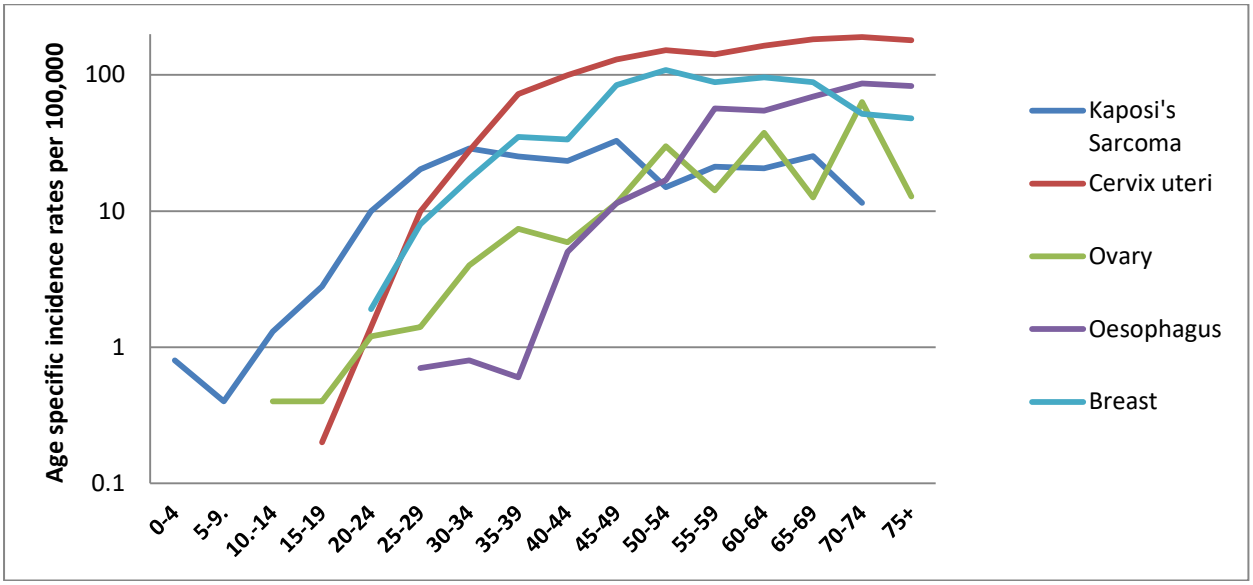


Figure 6a. Age specific incidence rates in females (top five)

Figure 6b Shows age specific incidence rates for the four most common cancers of men. Cancer of the oesophagus, liver and prostate all show steadily increasing incidence by age, although the increase begins at relatively young ages for liver cancer, and at relatively old ages for cancer of the prostate and oesophagus. Kaposi sarcoma shows a different pattern: a small peak in childhood (age 5-9), then a second peak in young adults (35-44) and a final peak in the elderly (75+) as shown in the figure below.

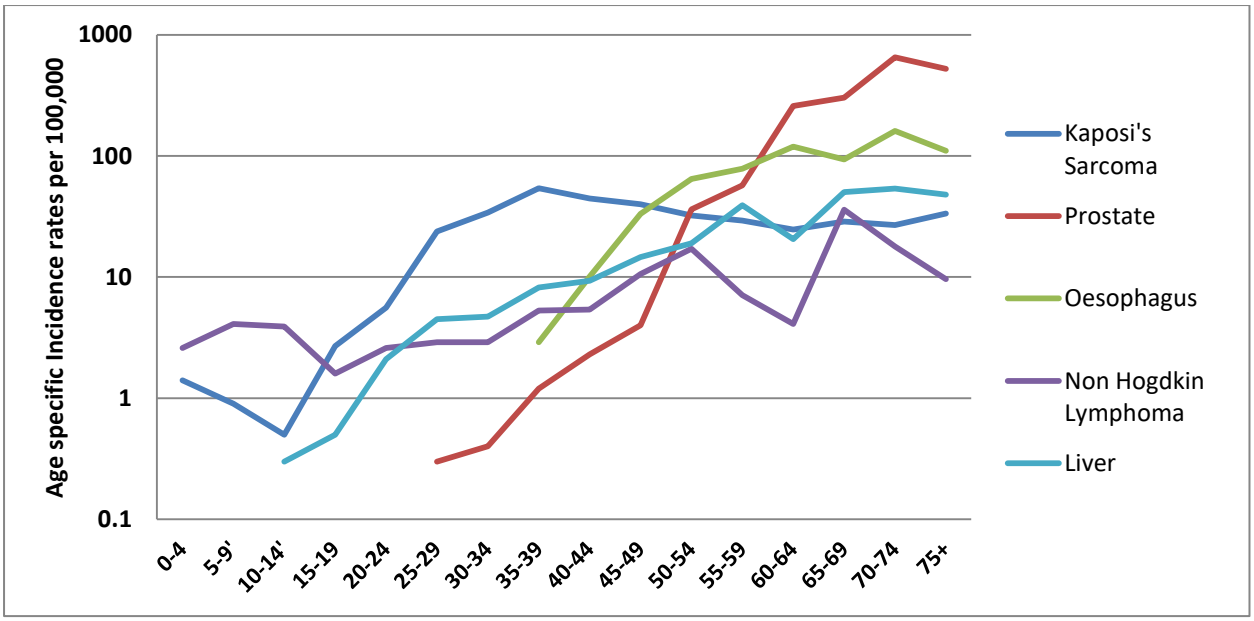


Figure 6b. Age specific incidence rates in males (top five)

V. Childhood cancers (0 to 14 years)

Table 2 shows incidence of childhood cancer, classified according to the International Classification of Childhood cancer (ICCC-3) (Steliarova-Foucher et al, 2005). Among childhood cancers, lymphomas were the most common during this period with an overall age standardised incidence rate of 34.2 per 100,000 populations. Burkitt Lymphoma was the most common type of lymphoma.

		NUMBER OF CASES					REL FREQ (%)	RATES PER MILLION				
ICCC3		0-4	5-9	10-14	**All**	*M/F*		0-4	5-9	10-14	Crude	**ASR**
I	LEUKAEMIA	9	7	12	28	*3.0*	9.7%	9.0	7.8	14.3	10.2	**10.2**
Ia	Acute lymph. leukaemia	6	2	7	15	*2.0*	5.2%	6.0	2.2	8.3	5.5	**5.5**
II	LYMPHOMA	28	34	32	94	*1.5*	32.6%	28.0	38.1	38.0	34.4	**34.2**
IIa	Hodgkin disease	3	8	5	16	*1.7*	5.6%	3.0	9.0	5.9	5.9	**5.8**
IIc	Burkitt lymphoma	8	13	14	35	*1.3*	12.2%	8.0	14.6	16.6	12.8	**12.6**
III	CNS NEOPLASMS	5	4	0	9	*0.5*	3.1%	5.0	4.5	0.0	3.3	**3.4**
IV	NEUROBLASTOMA	1	0	0	1	*0.0*	0.3%	1.0	0.0	0.0	0.4	**0.4**
V	RETINOBLASTOMA	14	2	4	20	*1.2*	6.9%	14.0	2.2	4.8	7.3	**7.5**
VI	WILMS TUMOUR	21	2	6	29	*1.2*	10.1%	21.0	2.2	7.1	10.6	**10.9**
VIII	BONE TUMOURS	0	14	4	18	*1.0*	6.3%	0.0	15.7	4.8	6.6	**6.4**
IX	SOFT TISSUE SARCOMAS	15	15	15	45	*0.6*	15.6%	15.0	16.8	17.8	16.5	**16.4**
IXc	Kaposi sarcoma	11	8	6	25	*1.1*	8.7%	11.0	9.0	7.1	9.1	**9.2**
X	GERM CELL TUMOURS	0	2	0	2	*1.1*	0.7%	0.0	2.2	0.0	0.7	**0.7**
	OTHER	19	14	9	42	*0.8*	14.6%	19.0	15.7	10.7	15.4	**15.5**
							0.0%					
	ALL	112	94	82	288	*0.7*	100.0%	112.1	105.3	97.4	105.3	**105.6**

Table 2. Incidence of childhood cancer

VI. Geographic subdivision

Detailed place of residence is not recorded by the registry. Table 3 shows the percentage frequency of the major cancers in cases giving their place of residence as within Kampala city (urban) or in the part of Kyadondo county that forms part of Wakiso District (see Fig 1), which is more semi-urban in character.

Male				**Female**			
Kampala		**Wakiso**		**Kampala**		**Wakiso**	
Cancer type	**% of total**	**Cancer type**	**% of total**	**Cancer type**	**% of total**	**Cancer type**	**% of total**
Kaposi sarcoma	22.6	Kaposi sarcoma	20.8	Cervix	24.9	Cervix	29.7
Prostate	15.3	Prostate	19.2	Breast	14.1	Breast	14.5
Oesophagus	8	Oesophagus	11.1	Kaposi sarcoma	13.4	Kaposi sarcoma	11.7
Liver	5.7	Liver	4.8	Oesophagus	4	Oesophagus	4.8
lymphoma	7.7	lymphoma	7.0	Ovary	3.8	Ovary	3.9
Rectum	1.6	Rectum	1.2	Lymphoma	5.3	Lymphoma	3.29
Colon	2.0	Colon	1.9	Leukaemia	2.7	Leukaemia	3.1
Leukaemia	3.5	Leukaemia	3.4	Liver	3.3	Liver	2.4
Stomach	1.5	Stomach	3.6	Endometrium	1.5	Endometrium	2.0
Nasopharynx	1.8	Nasopharynx	1.7	Rectum	1.2	Rectum	2.8

Table 3. Geographical distribution of cancer cases by sex

QUALITY

I. Quality control methods (descriptive)

The CANREG system carries out checks for internal validity (site vs. age, histology vs. site, etc)
Registration is considered relatively complete, and the registry results have been accepted for publication in Volumes VII – IX of "Cancer Incidence in Five Continents". Formal Evaluation of completeness has not been carried out since 1994-1996 (Parkin et al, 2001) at which time, by independent case ascertainment, completeness among adults was evaluated as 89.6%.

II. Basis of Diagnosis (DCO/Clinical/MV) by site

Table 4 shows the percentage of cases at the major sites that were registered on the basis of information from a death certificate only (DCO) and with morphological verification (MV%) – that is, based on cytology or histology (of the primary tumour, or a metastasis). The majority of the cancers of the oral cavity were diagnosed histologically with a percentage morphological verification of 80.7%.

Table 4. Distribution of basis of diagnosis by cancer site

		Basis of diagnosis				
Cancer site	ICD-10	No. Cases	(% total)	**% DCO**	**% Clinical**	**% M.V.**
Oral cavity	C00-C06	119	2.5	2.0	1.0	80.7
Nasopharynx	C11	67	1.4	0	39	59.7
Other pharynx	C09-10,C12-14	31	0.7	0	68	61
Oesophagus	C15	300	6.3	4	56	40
Stomach	C16	73	1.5	2.7	63	34.2
Large bowel	C18-C21	172	3.6	7	47	46
Liver	C22	233	4.9	2.2	64.4	33.5
Pancreas	C25	42	0.8	9.5	57.1	33.3
Larynx	C32	28	0.6	0.0	46.4	53.6
Lung	C33-C34	58	1.2	8.6	69	22.4
Bone	C40-C41	62	1.3	1.6	40.3	56.1
Other Skin	C44	840	17.6	2.0	32.3	67.7
Kaposi sarcoma	C46	829	17.4	2.2	28.8	69.0
Breast	C50	421	8.8	2.9	42.3	50.8
Cervix Uteri	C53	711	14.9	1.1	45	53.8
Corpus Uteri	C54	55	1.2	5.4	43.6	50.9
Ovary	C56	105	2.2	4.8	49.5	46
Prostate	C61	340	7.1	3.5	53.8	42.4
Kidney	C64	56	1.2	1.8	43	55.4
Bladder	C67	43	0.9	0.0	55.8	44.2
Eye	C69	142	3.0	1.4	23.2	75.4
CNS	C70-C72	74	1.6	1.4	77.0	21.6
Thyroid	C73	41	0.9	0.0	46.3	51.2
Hodgkin lymph	C81	101	2.1	5	17	78
N.H.L.	C82-C85;C96	74	1.6	12.2	16.2	71.6
Myeloma	C90	14	0.3	7.1	0.0	92.9
Leukaemia	C91-C95	36	0.8	33.3	0.0	67.7
All sites Total	All	4765	100	3.1	43.6	53.3

III. PSU.

The percentage of cases registered for which the primary site was ill specified, or uncertain, was 4.2% in men and 2.9% in women (Appendix Table I).

IV. Age unknown

There were 28 cases registered for which the age of the patient was unknown in men (1.3%) and 31 (1.1%) cases in women (Appendix Table I).

FACTORS TO CONSIDER IN INTERPRETING OBSERVATIONS

For the period presented in this report, one should consider the effect on the calculated rates of the uncertainty concerning the population at risk. Although the estimated total population (by sex) will be as accurate as the census data of 2002 and 2014, the precise distribution by age has involved various assumptions. In addition, although the percentage of cases with unknown age is small, it is clear that the exact age in estimated for many cancer patients, with excessive numbers resulted as having age equal to 50, or 60, or 70. These factors will have some impact on the values of the calculated age-specific rates.

Although cases were not interviewed to determine precise place (and duration) of residence (see methods), studies involving patient follow up at home have not suggested that a significant number of non-residents have been included in the registry database.

COMPARISON OF RATES WITH SAME REGISTRY OVER TIME (EARLIER PERIOD(S))

Figs 7a and 7b show a comparison between the cumulative incidence rates for the 10 most common cancers of males (7a) and females (7b) in 2010-2012 (the present report) with those in the previous report , as for the years 2007-2009.

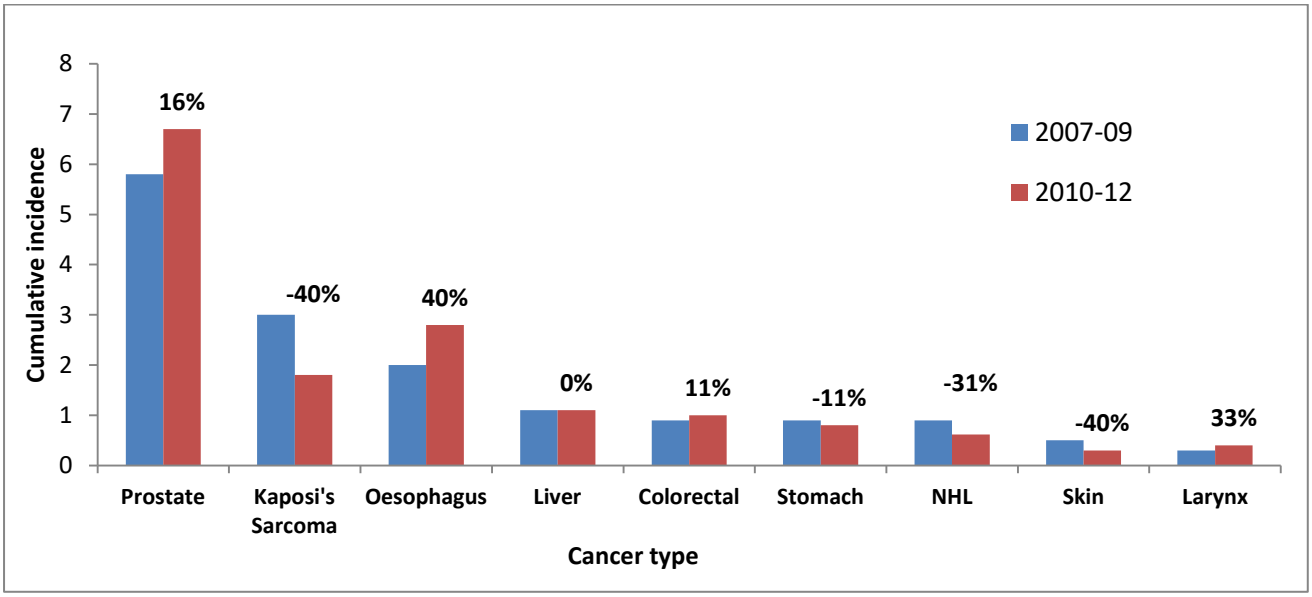
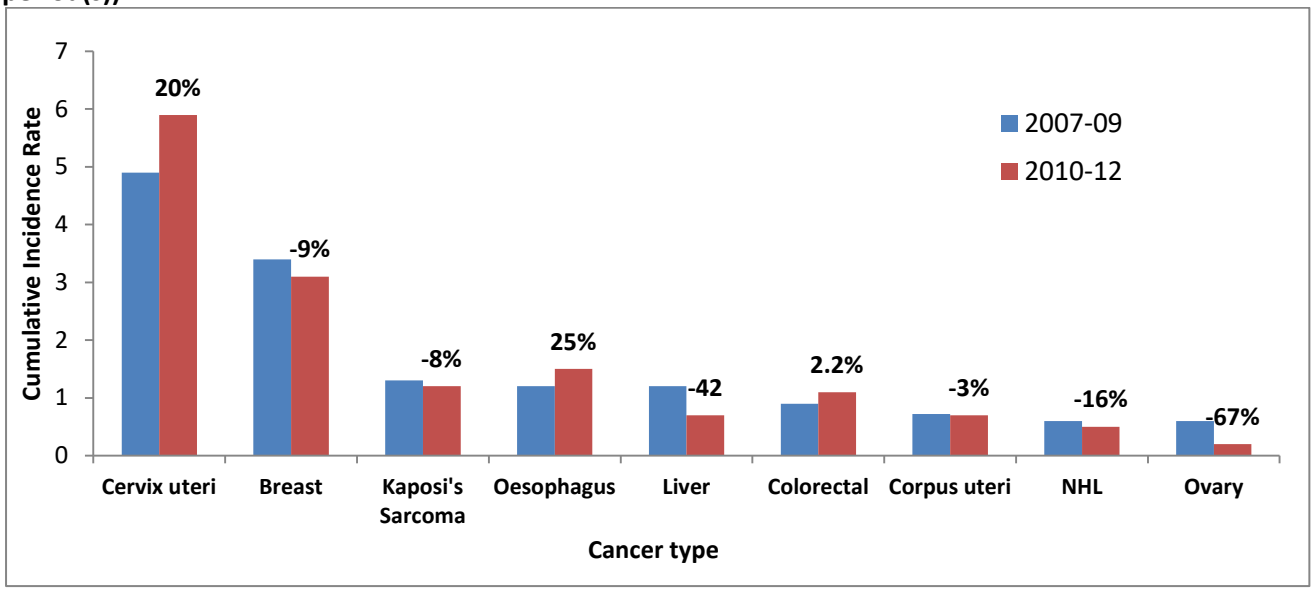


Figure 7a: Comparison of cumulative incidence rates in males in the same registry over time (earlier period(s))

Figure 7b: Comparison of cumulative incidence rates among females in the same registry over time (earlier period(s))



In men, there have been increases in incidence of several cancers, notably cancer of the prostate (16% higher in 2010-12 than in 2007-9). In women, cancer of the ovary (67% higher in 2007-9 than in 2010-12, while the incidence of cancer of the cervix increase by 20%. Oesophagus cancer has increased in both men (+40%) and women (-25%). The incidence of Kaposi sarcoma has fallen in both groups, though the reduction was more pronounced among males at 40% than females at 8%. The cumulative rates for non-Hodgkin lymphoma also reduced slightly with a percentage change of -16 in females and -31% in males.

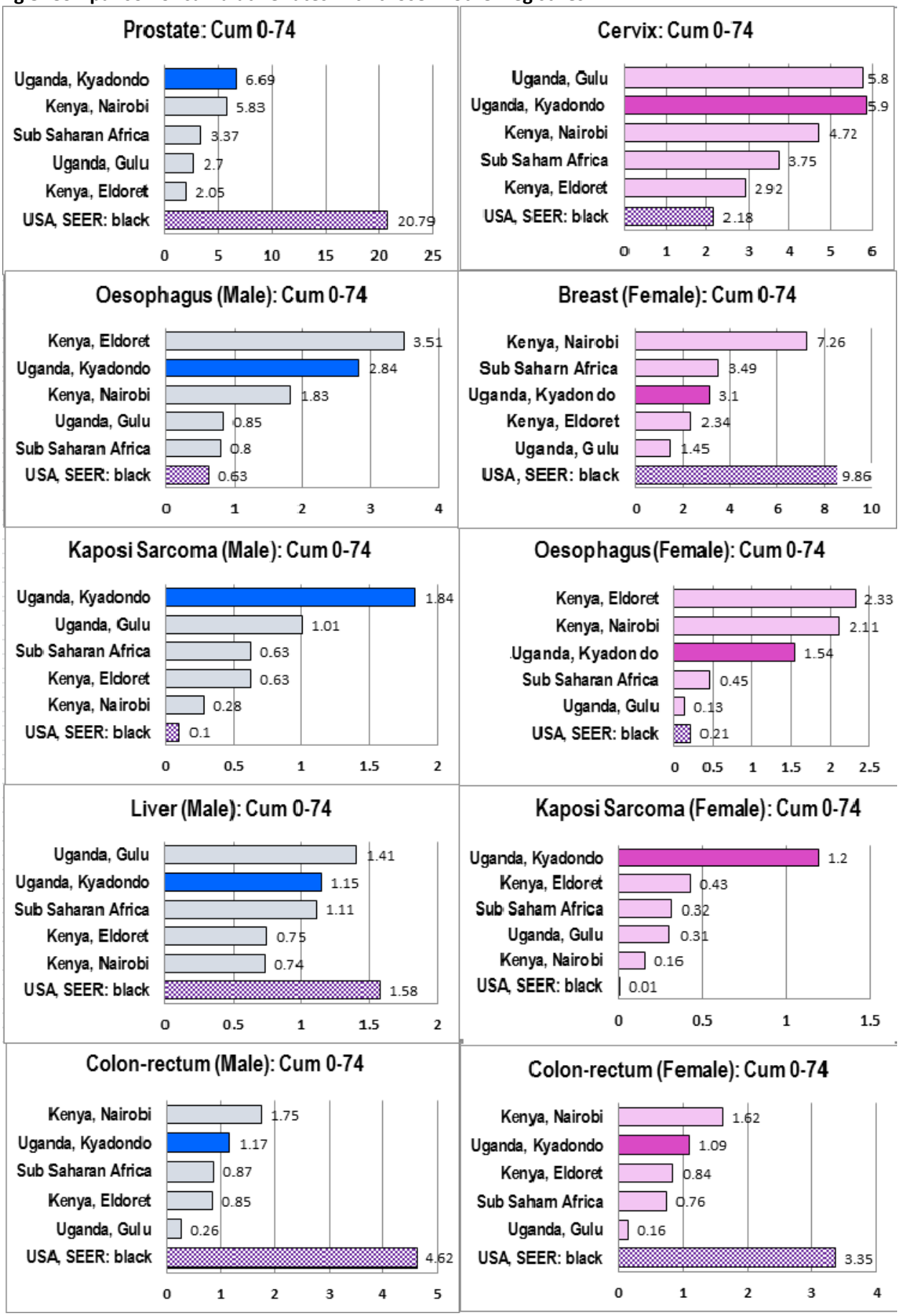
COMPARISON OF SUMMARY RATES WITH OTHER REGISTRIES

Figure 8 shows a comparison of the cumulative incidence rates (ages 0-74) in Kyadondo (2010-2012) with those observed in Gulu in northern Uganda (2013-2016) (Okongo et al, 2018, in press), Nairobi (2008-2012) (Bray et al, 2017) and Eldoret (2008-2011) (Parkin et al, 2018) in Kenya, and the US black population covered by the SEER program registries (2008-2012) (Bray et al, 2017), and the estimated rates for sub Saharan Africa in 2012 from Globocan (Ferlay et al, 2013).

Results for the five most common cancers of men in Kyadondo (left) and in women (right) are presented.

The relatively high incidence of oesophageal cancer, cervix cancer, and Kaposi sarcoma is of note.

Fig 8. Comparison of cumulative rates with those in other registries



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Kampala Cancer Registry, Uganda (2010-2012)

2010 Pop Estimates

Incidence per 100,000 by age group (Period) - Male

SITE	ALL AGES	AGE UNK	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	CRUDE RATE	(%)	CUM 0-64	CUM 0-74	ASR	*ICD (10th)*
Lip	2	1	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	0.00	**0.0**	*C00*
Tongue	12	1	-	-	-	-	-	0.3	0.4	1.2	0.8	-	3.8	-	-	-	26.8	4.8	0.4	0.6	0.03	0.18	**1.1**	*C01-02*
Mouth	28	0	-	-	-	0.3	0.5	-	0.7	2.3	2.3	5.3	9.5	7.1	12.3	7.2	-	4.8	0.8	1.4	0.20	0.24	**2.3**	*C03-06*
Salivary glands	12	0	0.2	0.2	0.3	-	0.2	0.5	0.4	0.6	-	-	1.9	3.6	-	7.2	-	4.8	0.4	0.6	0.04	0.08	**0.7**	*C07-08*
Tonsil	4	0	-	-	-	-	-	-	-	0.6	-	-	1.9	7.1	-	-	-	-	0.1	0.2	0.05	0.05	**0.4**	*C09*
Other oropharynx	4	0	-	-	-	-	0.2	-	-	-	-	1.3	3.8	-	-	-	-	-	0.1	0.2	0.03	0.03	**0.3**	*C10*
Nasopharynx	38	0	-	-	0.3	0.3	1.2	0.8	1.1	2.3	3.1	2.7	11.4	3.6	12.3	21.6	-	9.6	1.2	1.8	0.19	0.30	**2.8**	*C11*
Hypopharynx	6	0	-	-	-	-	-	-	-	-	1.6	-	-	3.6	8.2	-	-	4.8	0.2	0.3	0.07	0.07	**0.7**	*C12-13*
Pharynx unspecified	1	0	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-	-	0.0	0.0	0.01	0.01	**0.1**	*C14*
Oesophagus	184	2	-	-	-	-	-	-	-	2.9	10.1	33.3	64.5	78.4	119.2	93.6	160.8	110.1	5.6	8.9	1.56	2.84	**22.4**	*C15*
Stomach	44	0	-	-	-	-	-	0.3	1.1	0.6	3.1	9.3	11.4	14.3	16.4	28.8	80.4	4.8	1.3	2.1	0.28	0.83	**5.2**	*C16*
Small intestine	2	0	-	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	4.8	0.1	0.1	0.00	0.00	**0.1**	*C17*
Colon	45	0	-	-	-	0.5	0.5	0.5	1.1	1.2	5.4	4.0	7.6	17.8	16.4	57.6	8.9	9.6	1.4	2.2	0.28	0.61	**4.7**	*C18*
Rectum	35	0	-	-	-	0.5	-	-	0.7	0.6	2.3	2.7	7.6	21.4	20.6	28.8	26.8	14.4	1.1	1.7	0.28	0.56	**4.2**	*C19-20*
Anus	2	0	-	-	-	-	-	0.3	-	-	-	-	-	3.6	-	-	-	-	0.1	0.1	0.02	0.02	**0.2**	*C21*
Liver	131	2	0.2	-	0.3	0.5	2.1	4.5	4.7	8.2	9.3	14.6	19.0	39.2	20.6	50.4	53.6	47.9	4.0	6.3	0.63	1.15	**9.9**	*C22*
Gallbladder etc.	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	0.0	0.0	0.00	0.00	**0.1**	*C23-24*
Pancreas	22	0	-	-	-	-	-	-	1.1	1.2	2.3	4.0	3.8	7.1	12.3	7.2	-	14.4	0.7	1.1	0.16	0.20	**2.0**	*C25*
Nose, sinuses etc.	8	0	-	-	0.5	0.3	0.2	-	-	0.6	1.6	-	-	3.6	-	-	-	-	0.2	0.4	0.03	0.03	**0.4**	*C30-31*
Larynx	22	0	-	-	-	-	-	-	0.4	0.6	-	1.3	9.5	3.6	24.7	14.4	8.9	19.2	0.7	1.1	0.20	0.32	**2.7**	*C32*
Trachea, bronchus and lung	29	0	0.2	-	-	-	0.2	-	1.1	0.6	0.8	6.7	5.7	14.3	12.3	21.6	35.7	-	0.9	1.4	0.21	0.50	**3.3**	*C33-34*
Other thoracic organs	3	1	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	8.9	-	0.1	0.1	0.00	0.07	**0.3**	*C37-38*
Bone	32	0	-	0.5	1.3	1.4	1.4	1.1	0.7	1.2	2.3	1.3	1.9	-	-	-	8.9	-	1.0	1.5	0.07	0.11	**1.1**	*C40-41*
Melanoma of skin	8	0	-	0.2	-	-	-	-	-	0.6	-	2.7	-	-	8.2	7.2	-	4.8	0.2	0.4	0.06	0.09	**0.9**	*C43*
Other skin	*36*	*0*	*0.2*	*0.5*	*0.8*	-	*0.9*	*1.1*	*0.4*	*0.6*	*3.9*	*2.7*	*3.8*	*17.8*	*4.1*	-	*17.9*	*14.4*	*1.1*	*1.7*	*0.18*	*0.27*	**2.5**	*C44*
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C45*
Kaposi sarcoma	470	11	1.4	0.9	0.5	2.7	5.6	23.8	34.1	54.0	44.4	39.9	32.3	39.2	24.7	28.8	26.8	33.5	14.2	22.7	1.55	1.84	**19.9**	*C46*
Connective and soft tissue	43	0	0.4	0.7	0.8	1.1	1.2	0.8	2.5	4.1	2.3	-	-	3.6	-	14.4	-	14.4	1.3	2.1	0.09	0.16	**1.8**	*C47,C49*
Breast	20	0	-	-	-	-	0.2	-	0.7	-	1.6	1.3	3.8	7.1	20.6	21.6	8.9	4.8	0.6	1.0	0.18	0.33	**2.5**	*C50*
Penis	30	0	0.2	-	-	-	-	0.3	0.4	1.8	3.1	4.0	9.5	-	4.1	21.6	26.8	23.9	0.9	1.4	0.12	0.36	**2.9**	*C60*
Prostate	338	6	-	-	-	-	-	0.3	0.4	1.2	2.3	4.0	36.1	57.0	259.0	302.3	652.1	521.9	10.2	16.3	1.83	6.69	**48.3**	*C61*
Testis	7	0	-	-	-	0.3	0.2	0.3	0.4	0.6	-	1.3	1.9	-	-	-	-	-	0.2	0.3	0.02	0.02	**0.3**	*C62*
Other male genital organs	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C63*
Kidney	27	0	2.2	0.7	0.5	-	-	-	1.4	-	2.3	-	1.9	7.1	-	-	-	4.8	0.8	1.3	0.08	0.08	**1.1**	*C64*
Renal pelvis	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C65*
Ureter	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	0.0	0.0	0.00	0.00	**0.1**	*C66*
Bladder	*22*	*0*	-	-	-	-	*0.5*	-	*0.4*	*0.6*	-	-	-	*24.9*	*20.6*	-	*8.9*	*23.9*	*0.7*	*1.1*	*0.23*	*0.28*	**2.6**	*C67*
Other urinary organs	1	0	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C68*
Eye	63	3	1.8	0.7	0.5	0.3	0.2	1.3	2.9	4.7	8.6	6.7	1.9	7.1	-	14.4	-	9.6	1.9	3.0	0.19	0.27	**3.0**	*C69*
Brain, nervous system	*35*	*0*	*0.4*	-	*0.3*	*0.8*	*1.2*	*0.5*	*1.8*	*1.2*	*1.6*	*2.7*	*7.6*	-	*12.3*	-	*8.9*	*14.4*	*1.1*	*1.7*	*0.15*	*0.20*	**2.1**	*C70-72*
Thyroid	13	0	-	0.2	-	-	0.5	-	-	0.6	1.6	1.3	1.9	3.6	4.1	14.4	8.9	-	0.4	0.6	0.07	0.19	**1.3**	*C73*
Adrenal gland	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C74*
Other endocrine	2	0	-	-	-	-	-	-	-	-	0.8	-	-	-	4.1	-	-	-	0.1	0.1	0.02	0.02	**0.2**	*C75*
Hodgkin disease	43	0	0.2	0.9	1.6	2.4	1.4	-	0.7	3.5	1.6	1.3	-	3.6	4.1	21.6	8.9	-	1.3	2.1	0.11	0.26	**2.1**	*C81*
Non-Hodgkin lymphoma	127	0	2.6	4.1	3.9	1.6	2.6	2.9	2.9	5.3	5.4	10.6	17.1	7.1	4.1	36.0	17.9	9.6	3.8	6.1	0.35	0.62	**6.0**	*C82-85,C96*
Immunoproliferative diseases	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C88*
Multiple myeloma	12	0	-	-	-	-	-	-	-	-	0.8	2.7	1.9	3.6	16.4	7.2	8.9	4.8	0.4	0.6	0.13	0.21	**1.6**	*C90*
Lymphoid leukaemia	21	0	0.6	1.6	-	0.3	0.5	0.5	-	0.6	-	1.3	3.8	-	-	7.2	8.9	-	0.6	1.0	0.05	0.13	**1.0**	*C91*
Myeloid leukaemia	18	0	-	1.1	-	-	-	1.3	0.7	0.6	1.6	-	-	-	4.1	14.4	-	-	0.5	0.9	0.05	0.12	**1.0**	*C92-94*
Leukaemia unspecified	19	0	0.4	-	1.0	1.1	0.5	0.3	0.7	-	-	4.0	-	-	-	7.2	-	-	0.6	0.9	0.04	0.08	**0.8**	*C95*
Myeloproliferative disorders	*0*	*0*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*0.0*	*0.0*	*0.00*	*0.00*	***0.0***	*MPD*
Myelodysplastic syndromes	*0*	*0*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*0.0*	*0.0*	*0.00*	*0.00*	***0.0***	*MDS*
Other and unspecified	87	1	0.4	-	0.5	0.5	0.9	1.6	2.9	6.5	10.1	6.7	15.2	14.3	28.8	36.0	26.8	28.7	2.6	4.2	0.45	0.76	**6.7**	*O&U*
All sites	2110	28	11.3	12.3	13.1	15.2	22.9	43.1	66.7	111.6	137.8	181.0	301.8	424.0	694.7	892.5	1250.6	976.8	63.9		10.31	21.17	**173.7**	*ALL*
All sites but C44	2074	28	11.1	11.8	12.3	15.2	22.0	42.0	66.3	111.0	133.9	178.4	298.0	406.2	690.6	892.5	1232.7	962.5	62.8	100.0	10.13	20.90	**171.2**	*ALLbC44*

Kampala Cancer Registry, Uganda (2010-2012)

2010 Pop Estimates

Incidence per 100,000 by age group (Period) - Female

SITE	ALL AGES	AGE UNK	0-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75+	CRUDE RATE	(%)	CUM 0-64	CUM 0-74	ASR	ICD (10th)
Lip	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C00*
Tongue	10	0	-	-	-	-	0.2	0.2	-	0.6	-	1.4	1.9	3.5	6.9	-	-	6.4	0.3	0.4	0.07	0.07	**0.8**	*C01-02*
Mouth	6	0	-	-	-	-	-	0.7	-	-	0.8	-	1.9	-	-	6.3	-	-	0.2	0.2	0.02	0.05	**0.4**	*C03-06*
Salivary glands	8	0	-	-	-	0.2	0.2	0.5	-	0.6	0.8	-	1.9	-	3.4	-	-	-	0.2	0.3	0.04	0.04	**0.4**	*C07-08*
Tonsil	2	0	-	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	3.2	0.1	0.1	0.00	0.00	**0.1**	*C09*
Other oropharynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C10*
Nasopharynx	28	0	0.2	-	0.2	0.8	0.3	-	0.8	1.8	1.7	2.9	3.7	10.6	10.3	6.3	5.8	3.2	0.8	1.0	0.17	0.23	**2.0**	*C11*
Hypopharynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C12-13*
Pharynx unspecified	2	0	-	-	-	-	-	0.2	0.4	-	-	-	-	-	-	-	-	-	0.1	0.1	0.00	0.00	**0.0**	*C14*
Oesophagus	116	2	-	-	-	0.2	-	0.7	0.8	0.6	5.0	11.4	16.9	56.7	54.8	69.4	86.4	83.0	3.2	4.3	0.75	1.54	**12.1**	*C15*
Stomach	29	0	-	-	-	-	-	0.2	-	-	1.7	2.9	7.5	3.5	20.6	25.3	34.5	9.6	0.8	1.1	0.18	0.48	**3.3**	*C16*
Small intestine	1	0	-	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C17*
Colon	41	0	-	-	-	-	0.3	0.2	-	1.2	1.7	7.2	1.9	10.6	41.1	37.9	28.8	6.4	1.1	1.5	0.32	0.65	**4.7**	*C18*
Rectum	42	0	-	-	0.2	-	-	0.5	2.0	2.5	3.3	8.6	9.4	7.1	13.7	12.6	28.8	6.4	1.1	1.6	0.24	0.44	**3.4**	*C19-20*
Anus	4	0	-	-	-	-	-	-	-	1.2	-	-	1.9	-	-	-	-	3.2	0.1	0.1	0.02	0.02	**0.2**	*C21*
Liver	93	0	0.2	-	-	-	0.3	2.7	4.0	4.3	5.0	18.6	15.0	17.7	34.3	25.3	23.0	38.3	2.5	3.4	0.51	0.75	**7.0**	*C22*
Gallbladder etc.	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.2	0.0	0.0	0.00	0.00	**0.1**	*C23-24*
Pancreas	20	0	-	-	-	-	-	-	-	-	4.2	1.4	3.7	7.1	6.9	-	23.0	12.8	0.5	0.7	0.12	0.23	**1.8**	*C25*
Nose, sinuses etc.	4	0	-	-	-	-	-	-	0.4	0.6	-	-	1.9	3.5	-	-	-	-	0.1	0.1	0.03	0.03	**0.3**	*C30-31*
Larynx	5	0	-	-	-	-	0.2	-	-	-	-	1.4	-	-	-	6.3	5.8	3.2	0.1	0.2	0.01	0.07	**0.5**	*C32*
Trachea, bronchus and lung	24	0	-	-	-	0.2	-	-	0.8	0.6	1.7	2.9	3.7	14.2	10.3	12.6	11.5	9.6	0.7	0.9	0.17	0.29	**2.3**	*C33-34*
Other thoracic organs	4	0	0.2	-	-	-	-	-	-	-	-	-	-	7.1	-	6.3	-	-	0.1	0.1	0.04	0.07	**0.5**	*C37-38*
Bone	32	0	-	0.4	2.0	1.0	0.9	1.2	0.8	1.2	-	1.4	-	3.5	-	-	-	-	0.9	1.2	0.06	0.06	**0.8**	*C40-41*
Melanoma of skin	18	2	-	-	-	-	0.2	-	0.4	-	-	1.4	7.5	7.1	10.3	6.3	-	9.6	0.5	0.7	0.15	0.19	**1.8**	*C43*
Other skin	*38*	*2*	*0.4*	*-*	*-*	*0.4*	*0.7*	*1.4*	*0.8*	*3.1*	*3.3*	*7.2*	*3.7*	*7.1*	*6.9*	*-*	*-*	*-*	*1.0*	*1.4*	*0.18*	*0.18*	*2.0*	*C44*
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C45*
Kaposi sarcoma	359	2	0.8	0.4	1.3	2.8	10.0	20.3	28.9	25.2	23.4	32.9	15.0	21.2	20.6	25.3	11.5	-	9.8	13.3	1.02	1.20	**13.0**	*C46*
Connective and soft tissue	41	1	0.2	1.3	0.4	0.6	0.9	1.0	2.0	3.7	0.8	1.4	9.4	3.5	-	-	-	-	1.1	1.5	0.13	0.13	**1.5**	*C47,C49*
Breast	396	4	-	-	-	-	1.9	8.0	17.2	35.0	33.5	84.4	108.7	88.5	96.0	88.4	51.8	47.9	10.8	14.7	2.39	3.10	**28.7**	*C50*
Vulva	20	1	-	-	-	0.2	-	0.5	0.8	0.6	3.3	1.4	5.6	-	10.3	-	11.5	-	0.5	0.7	0.12	0.18	**1.4**	*C51*
Vagina	4	0	-	-	-	-	-	-	-	-	1.7	2.9	-	-	-	-	-	-	0.1	0.1	0.02	0.02	**0.3**	*C52*
Cervix uteri	708	5	-	-	-	0.2	1.4	9.9	27.7	72.4	99.6	130.2	151.8	141.6	164.5	183.1	190.0	79.8	19.3	26.2	4.03	5.90	**51.8**	*C53*
Corpus uteri	55	0	-	-	-	-	-	0.2	1.2	3.7	4.2	10.0	13.1	14.2	20.6	31.6	40.3	12.8	1.5	2.0	0.34	0.70	**5.2**	*C54*
Uterus unspecified	13	0	-	-	-	0.2	-	-	0.4	1.2	0.8	1.4	5.6	-	6.9	12.6	-	-	0.4	0.5	0.08	0.15	**1.2**	*C55*
Ovary	*105*	*3*	*-*	*-*	*0.4*	*0.4*	*1.2*	*1.4*	*4.0*	*7.4*	*5.9*	*11.4*	*30.0*	*14.2*	*37.7*	*12.6*	*63.3*	*12.8*	*2.9*	*3.9*	*0.59*	*0.98*	*7.7*	*C56*
Other female genital organs	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C57*
Placenta	16	0	-	-	-	0.4	0.7	1.4	0.8	1.2	-	-	-	-	-	-	-	-	0.4	0.6	0.02	0.02	**0.3**	*C58*
Kidney	30	0	2.0	0.7	-	0.2	0.2	0.7	0.8	0.6	1.7	1.4	1.9	7.1	3.4	-	-	6.4	0.8	1.1	0.10	0.10	**1.3**	*C64*
Renal pelvis	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C65*
Ureter	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C66*
Bladder	*20*	*0*	*-*	*-*	*-*	*0.2*	*0.2*	*-*	*0.4*	*-*	*-*	*2.9*	*5.6*	*-*	*10.3*	*12.6*	*5.8*	*19.1*	*0.5*	*0.7*	*0.10*	*0.19*	*1.8*	*C67*
Other urinary organs	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	6.3	-	-	0.0	0.0	0.00	0.03	**0.2**	*C68*
Eye	78	4	2.6	0.7	0.7	0.6	1.4	1.0	2.8	9.8	7.5	5.7	3.7	-	6.9	-	-	-	2.1	2.9	0.23	0.23	**2.8**	*C69*
Brain, nervous system	*36*	*1*	*0.8*	*-*	*0.7*	*0.4*	*0.3*	*0.5*	*0.4*	*-*	*4.2*	*4.3*	*3.7*	*7.1*	*10.3*	*-*	*11.5*	*12.8*	*1.0*	*1.3*	*0.17*	*0.23*	*2.2*	*C70-72*
Thyroid	27	0	0.2	-	-	-	0.2	0.5	1.2	3.1	1.7	5.7	-	17.7	6.9	-	5.8	3.2	0.7	1.0	0.19	0.21	**1.9**	*C73*
Adrenal gland	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C74*
Other endocrine	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C75*
Hodgkin disease	38	1	0.6	0.2	0.4	0.2	0.9	1.9	2.0	2.5	1.7	-	-	7.1	-	12.6	5.8	3.2	1.0	1.4	0.09	0.18	**1.6**	*C81*
Non-Hodgkin lymphoma	115	2	2.2	1.8	2.4	0.8	1.7	3.1	5.6	4.3	7.5	5.7	11.2	10.6	10.3	18.9	11.5	16.0	3.1	4.3	0.34	0.50	**5.1**	*C82-85,C96*
Immunoproliferative diseases	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0.00	0.00	**0.0**	*C88*
Multiple myeloma	16	0	-	0.2	-	-	-	-	0.4	-	1.7	4.3	-	7.1	6.9	18.9	5.8	3.2	0.4	0.6	0.10	0.23	**1.7**	*C90*
Lymphoid leukaemia	19	0	0.6	-	0.4	0.2	0.5	0.7	-	-	-	-	-	7.1	3.4	6.3	17.3	-	0.5	0.7	0.07	0.18	**1.2**	*C91*
Myeloid leukaemia	22	0	0.2	-	0.2	0.4	0.7	0.2	0.8	0.6	1.7	2.9	3.7	3.5	-	-	5.8	6.4	0.6	0.8	0.07	0.10	**1.1**	*C92-94*
Leukaemia unspecified	14	0	-	-	-	0.6	-	0.2	0.8	1.2	-	1.4	3.7	3.5	-	-	-	6.4	0.4	0.5	0.06	0.06	**0.7**	*C95*
Myeloproliferative disorders	*0*	*0*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*0.0*	*0.0*	*0.00*	*0.00*	*0.0*	*MPD*
Myelodysplastic syndromes	*0*	*0*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*	*0.0*	*0.0*	*0.00*	*0.00*	*0.0*	*MDS*
Other and unspecified	78	1	0.2	0.4	0.2	0.2	1.0	0.7	3.6	3.7	6.7	2.9	20.6	21.2	13.7	44.2	17.3	22.3	2.1	2.9	0.38	0.69	**5.9**	*O&U*
All sites	2739	31	11.5	6.2	9.6	11.3	26.6	61.0	113.8	194.6	237.0	382.1	475.9	534.7	647.9	688.2	702.3	449.8	74.6		13.72	20.75	**183.4**	*ALL*
All sites but C44	2701	29	11.1	6.2	9.6	10.9	25.9	59.5	113.0	191.5	233.6	374.9	472.2	527.6	641.0	688.2	702.3	449.8	73.6	100.0	13.53	20.56	**181.4**	*ALLbC44*

APPENDIX 1 Registration Form

CONFIDENTIAL **CANCER REGISTRATION**

In order to update the Kampala Cancer Registry, I would appreciate your completing the information concerning resident of Kyadondo county requested below:-

REGISTRY CODES

Date--/--/--

Family name _____

Other name _____

Maiden name (if married) _____

Other nick name or your child's name _____

Age _____ ☐☐

Sex (M/F) ___ ☐

Tribe _____ ☐

Occupation _____

Usual stay Address:-

Have you stayed in this place for more than a year **Yes/No** (tick) appropriate

Village _____Zone _____

Sub-county_____

Are you a Tenant or Owner of a house: **Yes/No** (Tick) appropriate

If No, Namo of Landlord_____

Date of incidence --/--/----

Diagnosis

Site of primary _____ **C** ☐☐.☐

Basis of diagnosis _____ ☐

If Breast state **Stage:** I_____ IIA_____ IIB_____ IIIA_____ IIIB_____ IV_____

If Cervix FIGO **Stage:** I_____ IIA_____ IIB _____ III_____ IV_____

Biopsy no. _____Histology _____ ☐☐☐☐

Hospital _____Unit _____ ☐☐☐

Hospital No. _____ ☐☐☐☐☐☐☐

Date of death or last seen _____

Status: Dead _____ or Alive _____

Referred elsewhere?_____

Prof. H. R. Wabinga

Director, Kampala Cancer Registry