ACKNOWLEDGEMENTS

CONTRIBUTING PATHOLOGY LABORATORIES, 2000-2002

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University of Kwa Zulu Natal, Medical School
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National Cancer Association, Congella

Introduction

The National Cancer Registry (NCR), which was first established in 1986, falls under the executive management of the National Institute for Occupational Health. The NCR is a surveillance unit whose major function is to collate and analyse newly diagnosed cancer cases and report annual cancer incidence rates. The NCR is a pathology based cancer registry whose source of data is public and private histopathology, cytology and haematology laboratories nationwide.

Cancer is one of the major killers throughout both the developed and developing world, including South Africa. Indeed the 2002 data in this report shows that South African males have an overall age standardized incidence rate (ASR) of cancer of 135.89 per 100,000, and a lifetime risk (LR) of 1 in 7 of developing cancer, while South African females have an ASR of 115.53 per 100,000 and an LR of 1 in 8 of developing cancer.

This report covers the years 2000-2002. Although this Registry is pathology based, resulting in under-reporting of certain malignancies, some more than others, many critical decisions need to be made based on its data. This report shows fascinating trends about cancer reporting in South Africa, when compared to its predecessors, although there has been a slight drop in overall numbers due to the lack of reporting by a few private laboratories.

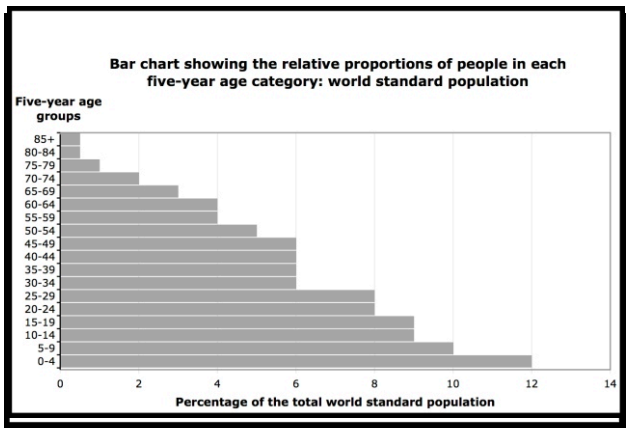
In 2002 a total of 28,126 males developed cancer with a lifetime risk of 1 in 7. Cancers of the prostate (1 in 23), unknown primary site (1 in 64), lung (1 in 71), oesophagus (1 in 91), colon/rectum (1 in 99) and bladder (1 in 109) predominated. Prostate cancer therefore remains the most common major cancer diagnosed in men, with lung, oesophagus and colorectal cancer following closely behind.

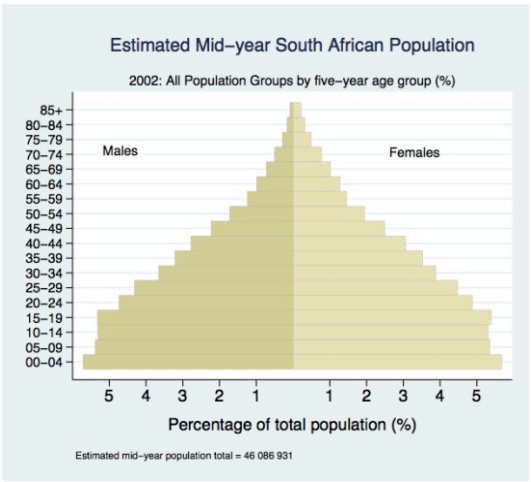
In 2002 a total of 28,430 women were diagnosed with cancer with a lifetime risk of getting cancer of 1 in 8. Cancer of the breast (1 in 29) and cancer of the uterine cervix (1 in 36) predominate. Cancer of unknown primary site (1 in 91), corpus uteri (1 in 148), colorectal (1 in 158) and oesophageal (1 in 199) cancers follow, as was the case in the past.

Lung cancer remains a growing health problem in both sexes. Although males (LR 1 in 71) far exceed females (LR 1 in 233), the long term effects of smoking will result in an increasing incidence of lung cancer in females, as well as males, for many years to come. It will be decades before recent anti-smoking drives and legislation reduce these figures.

As previously mentioned, the reporting of some cancers is suboptimal due to a lack of tissue diagnoses. An important example is hepatocellular carcinoma which is under-reported, as it is usually diagnosed clinically and by blood tests, namely serum α-fetoprotein, without a tissue diagnosis, but still remains in the top 15 cancers. Over 700,000 new cases per year are diagnosed throughout the world, especially in southern Africa and the Far East, which are endemic areas for the hepatitis B virus, the major causative agent of this disease. Future population based registry as well as better cancer diagnoses, especially in rural areas, will give us a more accurate picture of this usually fatal malignancy, as well as other pathologically under-diagnosed cancers.

Figure 1: South Africa's Population, 2002



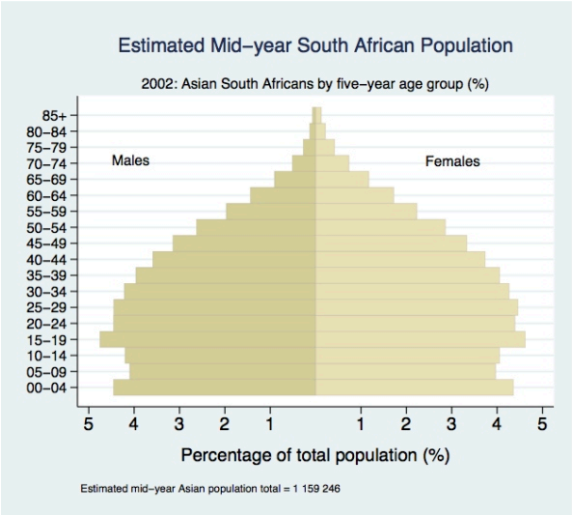


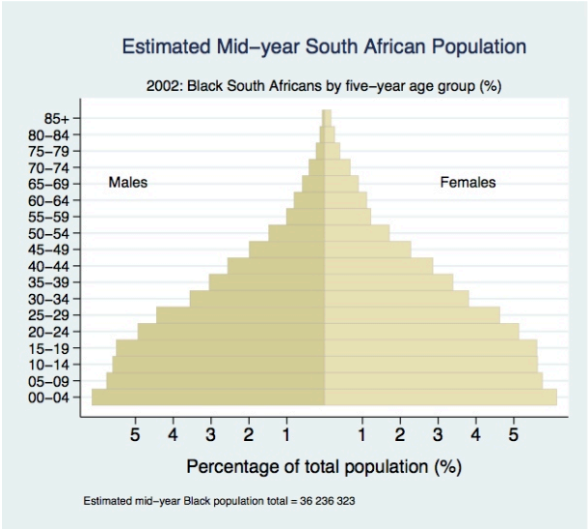
World Standard Population. Source: Doll, R., Payne, P., Waterhouse J.A.H. (1966) Cancer Incidence in Five Continents, Volume 1, Geneva, UICC; Berlin, Springer

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
TOTALS	12000	10000	9000	9000	8000	8000	6000	6000	6000	6000	5000	4000	4000	3000	2000	1000	500	500

Estimated mid-year population for South Africa, 2002. Source: Dorrington RE, Johnson L, Bradshaw D, Daniels T. The Demographic Impact of HIV/AIDS in South Africa: National and Provincial Indicators for 2006. Cape Town: Centre for Actuarial Research, South African Medical Research Council, Actuarial Society of South Africa; 2006.

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
MALES	2634107	2480946	2448929	2455435	2182740	1989343	1685838	1482999	1281941	1027388	796105	575086	456815	334333	232841	133610	75439	39914
FEMALES	2617797	2468162	2446967	2484438	2250979	2063380	1789710	1626430	1410919	1150171	898767	670798	588623	468999	359638	226633	149666	101046
TOTALS	5251904	4949108	4895896	4939873	4433719	4052723	3475548	3109429	2692860	2177559	1694872	1245884	1045438	803332	592479	360243	225105	140960





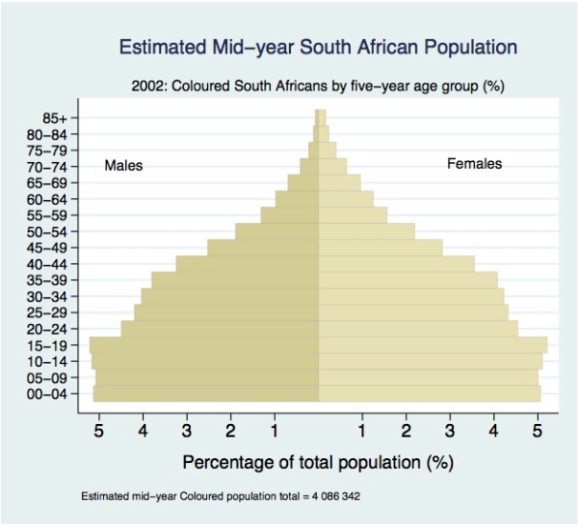
Estimated mid-year population (Asians and Blacks) for South Africa, 2002. Source: Dorrington RE, Johnson L, Bradshaw D, Daniels T. The Demographic Impact of HIV/AIDS in South Africa: National and Provincial Indicators for 2006. Cape Town: Centre for Actuarial Research, South African Medical Rese arch Council, Actuarial Society of South Africa; 2006.

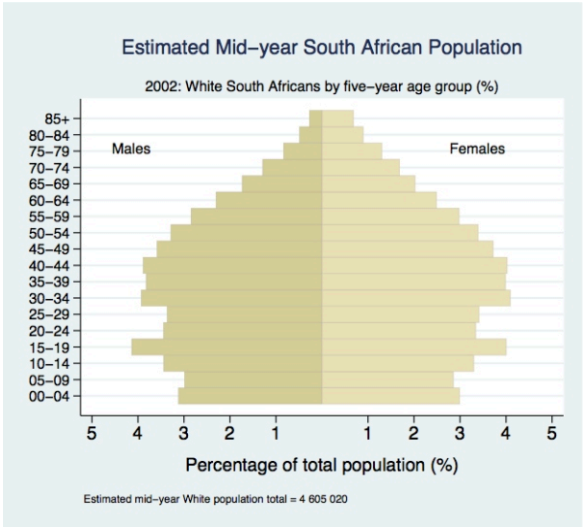
Asians

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
MALES	51644	47508	48704	55105	51643	51577	48889	45928	41630	36456	30450	22839	16677	10521	5960	3158	1532	823
FEMALES	50544	46004	47004	53582	50934	51712	49432	47039	43314	38681	33159	25875	19955	13587	8527	4881	2536	1437
TOTALS	102188	93512	95708	108687	102577	103288	98321	92967	84944	75136	63609	48714	36633	24108	14487	8039	4069	2260

Blacks

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
MALES	2228939	2088127	2030427	1996380	1788636	1611063	1290867	1105553	928307	722321	536882	367404	293945	215285	150206	82522	46367	23231
FEMALES	2222625	2086054	2039538	2033459	1860327	1677754	1379135	1228979	1037139	824972	619421	443784	403124	323201	247013	145629	96314	61393
TOTALS	4451564	4174181	4069965	4029840	3648964	3288817	2670002	2334532	1965445	1547292	1156303	811187	697069	538486	397219	228151	142681	84624





Estimated mid-year population (Coloureds and Whites) for South Africa, 2002. Source: Dorrington RE, Johnson L, Bradshaw D, Daniels T. The Demographic Impact of HIV/AIDS in South Africa: National and Provincial Indicators for 2006. Cape Town: Centre for Actuarial Research, South African Medical Research Council, Actuarial Society of South Africa; 2006.

Coloureds

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
MALES	209805	207594	211285	213423	183817	171625	165065	155497	132885	103358	77372	53660	40027	28590	17217	9337	4890	3150
FEMALES	206764	204597	208484	213005	185832	176577	172700	166739	145193	115180	89789	63915	50905	39130	26338	16322	9554	6722
TOTALS	416569	412191	419769	426428	369649	348202	337764	322236	278078	218538	167161	117575	90933	67720	43555	25659	14444	9872

Whites

	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
MALES	143719	137717	158513	190526	158644	155079	181017	176021	179120	165253	151401	131183	106166	79937	59457	38593	22649	12710
FEMALES	137864	131507	151941	184391	153886	157338	188443	183674	185273	171340	156397	137225	114638	93081	77761	59801	41261	31494
TOTALS	281583	269225	310453	374917	312530	312416	369460	359695	364393	336593	307798	268408	220804	173018	137218	98394	63911	44204

METHODOLOGY

The NCR methodology follows that recommended by the WHO/IARC.

1.1 Data collection and data flow

The National Cancer Registry (NCR) is a passive pathology-based surveillance system. Copies of pathology reports confirming a cancer diagnosis are submitted voluntarily by both public and private laboratories throughout South Africa.

The South African total population (Dorrington RE, Johnson L, Bradshaw D, Daniels T. The Demographic Impact of HIV/AIDS in South Africa: National and Provincial Indicators for 2006. Cape Town: Centre for Actuarial Research, South African Medical Research Council, Actuarial Society of South Africa; 2006.) is used as the denominator in calculating incidence rates; therefore all cancer cases in individuals who are clearly not resident in South Africa, for example results of specimens sent to South African laboratories by other countries, are excluded.

Data items are abstracted from the pathology reports: demographic information about the patient and tumour information (topography, morphology and date of diagnosis).

The voluntary nature of cancer surveillance in South Africa can delay data publishing, as data receipt from some of the laboratories is sporadic. Some laboratories submit only summary reports which may lead to cases of incorrect reporting as cross checks cannot be done.

1.2 Reporting of cancer

Only incident cases of primary invasive cancer diagnosed by histology, cytology or haematology are recorded each year. Doubtful, in-situ or borderline cancers are excluded. Each multiple primary cancer is recorded as an additional case, using the guidelines set out by IARC (1994). Duplicate entries are deleted. Duplicate cancers include cancers that have been diagnosed in previous years that already exist on the registry database.

Cancers are classified by anatomical site/topography using the coding convention of each laboratory, usually a Systematic Nomenclature of Medicine Topography code SNOMED-2 (Côté et al., 1979) or SNOMED-3 (Côté et al., 1993), and a five digit Morphology code (morphological type and behaviour, WHO 1976 and WHO 1992). Metastatic cancers are either coded to primary site of origin, if this information is available and/or is known or to primary site unknown.

From the registry's inception in 1986 to 1991, data were reported in a format compatible with the International Classification of Diseases, 1975 revision (ICD-9), (WHO 1975). Data were reported in ICD-10 format from 1992, in line with the South African Department of Health (DOH) requirements. In 1996 and 1997 incoming data were coded and checked in SNOMED-2 (Côté et al., 1979), although some laboratories were coding in SNOMED-3, which is more compatible with International Classification of Diseases for Oncology, second edition (ICD-O2) and International Statistical Classification of Diseases and Related Health Problems, tenth edition (ICD-10). In 2001, the Cancer Registry followed the international registries' practice and commenced coding in ICD-O3. The ICD-O3 represents an extension of chapter II (Neoplasms) of the tenth revision of the International Statistical Classification of Diseases and Related Health Problems (Percy, Van Holten and Muir, 1990).

1.3 Data quality and quality assurance

The quality of the cancer registry data has been discussed extensively elsewhere (Mqoqi, Sitas and Halkett, 2003)

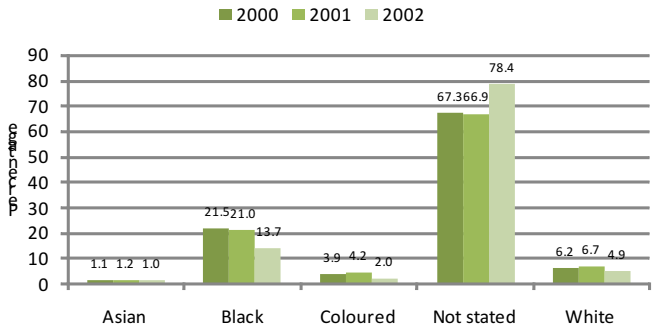
1.3.1 Completeness of data

In an attempt to ensure completeness of data on collected items, query letters on missing and/or seemingly inaccurate data are sent out. Queries include requests for clarification on all cases with unknown age, or sex, as well as unspecified site of origin of cancer, and cases with unlikely/impossible combinations of primary site and sex (e.g. male with cancer of the cervix).

Data analysis is stratified by sex, population group, and age group in order to get a clearer picture of disease patterns and indications of possible risk factors. Exposure to lifestyle factors including dietary choices, socio-economic status, sexual and reproductive health behaviour, tobacco smoking and alcohol consumption among others, are all known to impact on the risk of developing a cancer. These factors often vary by population group.

Misuse of population grouping for political ends in the past has led to overshadowing its epidemiological significance; from 1992 increasing numbers of reports were received without race group information (see Mqoqi, Kellett et al, 2003). The proportion with this information missing was approximately 71% for 2000-2002.
In consultation with the Data Management and Statistical Analysis Unit (DMSA) of Witwatersrand University, a hot-deck imputation

Figure 2: Percentage distribution of cancers by population group received



method (Little and Rubin, 1990) was used to allocate population group to cases without this information. This method replaces missing values by suitable estimates; it correlates cancer cases with missing population group values against a reference database containing surnames with known group. This method has proved to be reasonably accurate and its results compare well with the previous registry statistics. Surnames which do not appear on the database remain in the group with population group unknown.

1.3.2 Unique identification and use of names

Patient information can mainly be used at two levels:

1. At a primary or clinical level where health providers use patient information for patient management. This level is important for the individual.
2.At a secondary level at which patient information is collated, analysed and extrapolated to make general statements about the health status of the communities or groups of individuals. This level is important for public health purposes and informs policy decision-making and the planning of health services.

At both levels, confidentiality of information is critical. The benefits to communities must be weighed against possible harm to individuals. Usually the secondary level does not require collection of patient names. Unique identification (ID) numbers, where available, are used for surveillance purposes in an effort to protect patient confidentiality. Systems can be put in place to make patient information available beyond the level of care without jeopardising and/or infringing on the ethical rights of the patients. Health promotion programs need to educate both health providers and communities about the importance of, need for, and use of patient information for surveillance and public health purposes.

In the absence of ID numbers being supplied on all reports, use of names cannot be avoided in the NCR for the following reasons:

A. To eliminate the ~20,000 duplicate entries where an individual has several laboratory tests for the same cancer or where a cancer has recurred. The registry reports only the earliest occurrence.
B. To be able to identify individuals with multiple primary cancers. Epidemiology of multiple primaries could be important in identifying associations between diseases, treatment regimens, etc.
C. In the absence of or poor reporting of a descriptive variable like population group, names remain the solution to devised methods such as hot-deck imputation which are used to circumvent the lack of data (see section 1.3.1).

1.4 Analysis

Crude incidence rates per 100 000 and the percentage contribution of each cancer site to total number of cancers were calculated. To allow comparison between populations and internationally, age standardised incidence rates (ASR) per 100 000 for each cancer were calculated using the 'direct method' and the 'World population' as standard (Doll, Payne and Waterhouse 1966). Ninety five percent confidence intervals (95% CIs) for the ASR are presented and were calculated using the Poisson approximation for the standard error of the ASR. This approximation method sometimes results in lower limit values that are less than zero. The cumulative lifetime incidence risk, the likelihood of developing a cancer in one's lifetime if one lives to age 74 (Cumrisk74), expressed as a percentage or as 1 in X number of people ("Lifetime risk", LR74), is also calculated using standard methods (Jensen et al., 1991). The ASR, Cumrisk74 and the LR74 are adjusted for the proportion of cases in the unknown age category. The rate calculations for getting any cancer exclude BCC and SCC of skin cancers. Examples of all the rate calculations are given in Table 1 below:

Crude rates

Using data for cancer of the cervix for 2001 in Table 1 above, the crude rate is calculated by dividing the total number of cervical cancer cases by the population at risk (4 001.89/18 442 577) and

Age group	Observed cases	Allocated cases	Adjusted cases	Person-years	Age-specific ate	Std. world population	Expected cases	Variance for expected cases	Cumulative rate % (5-yr)
A	B	C	D	E	F	G	H	I	J
00-04	0.00	0.00	0.00	2231934	0.00	12000	0.00	0	0.00
05-09	0.00	0.00	0.00	2048377	0.00	10000	0.00	0	0.00
10-14	1.00	0.00	1.00	2035303	0.05	9000	0.00	209491	0.00
15-19	5.00	0.00	5.00	2014265	0.25	9000	0.02	1069447	0.00
20-24	22.00	0.81	22.81	1819867	1.25	8000	0.10	4723405	0.01
25-29	82.00	5.57	87.57	1652676	5.30	8000	0.42	21984249	0.03
30-34	191.00	6.16	197.16	1350657	14.60	6000	0.88	41684234	0.08
35-39	340.00	14.07	354.07	1221366	28.99	6000	1.74	91545366	0.16
40-44	423.00	15.78	438.78	1006106	43.61	6000	2.62	167187299	0.23
45-49	508.00	12.51	520.51	792276	65.70	6000	3.94	319829237	0.35
50-54	497.00	17.69	514.69	587537	87.60	5000	4.38	399349109	0.47
55-59	359.00	17.99	376.99	430145	87.64	4000	3.51	349267849	0.47
60-64	439.00	23.38	462.38	404930	114.19	4000	4.57	483386829	0.61
65-69	311.00	15.38	326.38	314401	103.81	3000	3.11	318372499	0.56
70-74	230.00	9.58	239.58	241324	99.28	2000	1.99	176300181	0.53
75-79	96.00	3.37	99.37	138155	71.93	1000	0.72	55777063	
80-84	68.00	3.28	71.28	98074	72.68	500	0.36	19848018	
85+	17.00	0.74	17.74	55184	32.15	500	0.16	15602128	
Sub-total	3589.00	146.32	3735.32	18442577	21.70	100000.00	28.52	2466136403	
UNK	251.00	15.57	266.57						
TOTALS	3840.00	161.89	4001.89						

Expected cases adjusted for age unknown	30.56
Variance	0.247
Standard error	0.497
95% LCL	29.58
95% UCL	31.53
Cumulative incidence rate (%)	
0-74	3.49
Cumulative risk 0-74	3.43
Lifetime risk 0-74	29

expressing this per 100 000 women (100 000) = 21.70 per 100 000. Note that the calculation of this rate includes those cancers that had missing information about population group, sex or age.
Age-specific incidence rate (ASIR)

Age-specific rates are calculated by dividing the number of cancers in each age category by the population at risk in that age group (column D/E) and multiplying by 100 000. For example, in 60-64 year old women the age-specific rate is:
462.38/404 930 = 114.19 per 100 000 women. Note that the estimation of these age-specific rates included only those cases for which the age was known.

Age standardised rate (ASR)

Any two or more populations will differ somewhat in age structure. If a disease like cancer is related to old age then a comparison of crude rates may be misleading because an older population will show elevated crude cancer rates because of its age structure. To take age differences between populations into account, a standard population of fixed age structure and the 'direct' method of standardisation are commonly used. Several possible populations can be used but, for international comparisons, the World population (Column G) is the commonly used standard for cancers. The direct method involves calculating from each of the age specific rates (Column F, 0-4, 5-9, ...) the expected number of cases that would occur in this World population (e.g. in the 60-64 year age group 114.19 4 000/100 000 = 4.57 in Column H). Because the World population adds up to 100 000, the sum of the expected cases (0.01 + 0.01 + 0.01 + 0.02 + ... + 2.08) is the age-standardised rate of this population (28.52 per 100 000).

Adjustment for age unknown

Because the age standardised rate only uses data from those with a known age, a small adjustment has to be made for the proportion of people in the age unknown category. The formula is:

ASR (total cases / cases with known age)

= 28.52 4001.89/3735.32

= 30.56 per 100 000.

Standard error (s. e.) for ASR and 95% confidence interval

An age-standardised incidence rate calculated from real data is taken to be an estimate of some true value, which could be known only if the units of observation were infinitely large.

A standard error (s.e) gives a measure of precision of the estimated rate and is also used to calculate a confidence interval. The 95% confidence interval represents a range of values within which it is 95% certain that the true value of the incidence rate lies (Kirkwood 1988, Jensen et al., 1991).

The first step is to calculate the variances for each age-specific expected number of cases based on the world standard population. The adjusted numbers of cases (including the cases with age unknown, allocated to age categories pro rata) were used. This was carried out using the following formula for women aged 60-64:

$$Var_{60\text{-}64} = \frac{\left(IR_{60\text{-}64} \cdot W_{60\text{-}64}{}^{2} \cdot 100000\right)}{N_{60\text{-}64}}$$

Where Var60-64 is the variance of the estimated number of cases; IR60-64 is the age-specific incidence rate per 100 000 for the cancer; W60-64 is the world standard population for the age category 60-64 and N60-64 is the mid year population at risk in that age group.

For cancer of the cervix in black women aged 60-64 during 2001 the age-specific incidence rate was found to be 122.34. This is higher than the value of 114.19 given in column F because that (column F) age-specific rate did not include an allocation of cases from the age unknown group. W was 4000, N was 404 930, and so the variance was calculated as 483 386 829.

The second step is to sum all the age-specific variances presented in column I to obtain a total of 2 466 136 403.

The variance for the age-adjusted rate for cancer of the cervix (World standard population) is then determined as 2 466 136 403/(100 000*100 000) = 0.247.

The Standard Error is simply √0.247 = 0.4966.
The upper and lower 95%CIs are obtained by adding and subtracting (1.96*0.4966), and were calculated to be 31.53 and 29.58 respectively for cancer of the cervix in black women during 2001.

Cumulative rate and cumulative risk

The cumulative cancer incidence rate can be used to calculate the cumulative lifetime risk (LR), that is, the probability of developing a cancer in one's lifetime (here defined as 0-74 years). The cumulative rate is:

$$\text{Cum. rate} = \sum_{i=1}^{A} a_i\, t_i$$

where A = age class, i = indicator of an age class, a = age specific incidence rate in that age class and t = number of years in each age class (Jensen et al., 1991). If data are presented in five-year age groups the cumulative rate is the sum of five times the incidence rate of each age-specific group of interest (in this case between 0-74 years). So the cumulative incidence (Column J) is 0.00 + ... + 0.61 + 0.56 + 0.53 = 3.49%. Note that the values in column J were calculated using the adjusted numbers of cases including allocations from the age unknown group, and so they are not directly calculated from the data in Table 1.
A small adjustment is now needed to take account of the sequential removal from the population at risk of people who developed cancer of the cervix. This is achieved by using the following formula:

Cumulative risk0-74 (CUMRISK74) = 100 [1 - exp (- cum. rate/100)]

= 100 [1 - exp (- 3.49/100)]

= 3.430%

The Lifetime risk expressed as risk over the years 0-74 is calculated as 100/CUMRISK74, or 1 in 29.

The assumptions made in calculating lifetime risks are that no other causes of death or disease are in operation, and that no significant changes in exposure occur over time. The interpretation of the lifetime risk is that (because of under-reporting), at least 1 in 29 black women have a lifetime risk of developing cancer of the

cervix.

1.5 Presentation of cancer incidence report

This report presents statistics of cancer cases that were newly diagnosed in 2000 to 2002 only. Cancer cases that are already on the registry database and with the same type of cancer are regarded as duplicates and are not reported. Cases already existing in the registry database but presenting with a new and different type of cancer are regarded as new cancers and are classified as multiple primary cancer cases. Cancer incidence rates are at times confused with cancer prevalence which is the number of existing cancer cases at a point in time, irrespective of the diagnosis date. It is important for the cancer report users to differentiate between these two disease measures. Health providers in a clinical setting are likely to see both new cases and those previously diagnosed elsewhere and therefore already on our database.

BCC and SCC of skin are excluded in determining the total rates and risks for all cancers combined.

Details about the cases with missing information about age, sex or population group are presented as appendices.

Results

The distribution of the cancer burden in 2000-2002 is presented by age groups, sex and population group. Detailed frequency distribution tables and cancer site incidence rates are attached at the back of the report. Only the five leading cancers with the highest incidence rates (ASR) in males and females are discussed in detail, together with a chapter on HIV related cancers.

Data reported in 2000-2002

A total of 172 351 new cancers were reported to the NCR in 2000-2002 (56 271 in 2000, 59 507 in 2001 and 56 573 in 2002).

Frequency of new cancers in 2000-2002

Figure 3: Percentage distribution of cancers by calculated population group

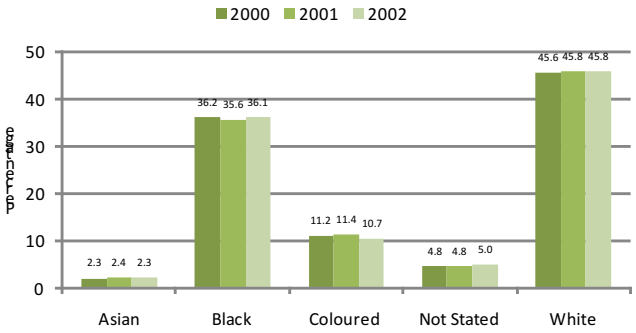
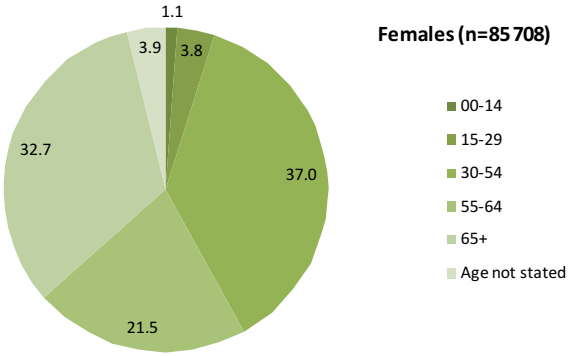


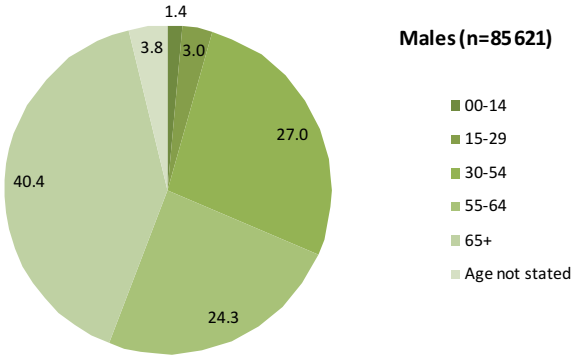
Table 2: Frequency distribution of cancers by calculated population group and sex (% of the total in parentheses)

	2000		2001		2002	
			Males			
Population	**No.of cases**	**%**	**No.of cases**	**%**	**No.of cases**	**%**
Asian	568	2.03	585	1.97	547	1.95
Black	8662	31.01	8941	30.13	8595	30.68
Coloured	3147	11.27	3353	11.30	3012	10.75
White	14226	50.93	15335	51.68	14387	51.35
Unknown	1330	4.76	1460	4.92	1474	5.26
All males	**27933**	**(50.10)**	**29674**	**(50.11)**	**28015**	**(49.70)**
			Females			
Asian	694	2.49	848	2.87	760	2.68
Black	11384	40.92	12063	40.84	11735	41.39
Coloured	3108	11.17	3412	11.55	3021	10.66
White	11347	40.79	11871	40.19	11496	40.55
Unknown	1286	4.62	1345	4.55	1340	4.73
All females	**27819**	**(49.90)**	**29539**	**(49.89)**	**28352**	**(50.30)**

Age distribution of cancer cases

Figure 4: Percentage distribution of new cancer cases from 2000-2002 by age group and sex (includes BCC and SCC of skin)





Distribution of cancer sites by age group

Figure 5: Percentage distribution of 10 most common cancers by sex, 2000-2002, All ages

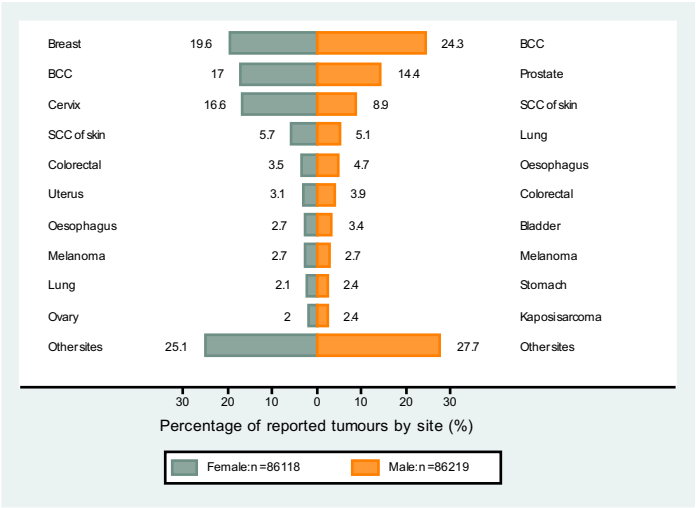


Figure 6: Percentage distribution of 10 most common cancers by sex, 2000-2002, 0-14 years

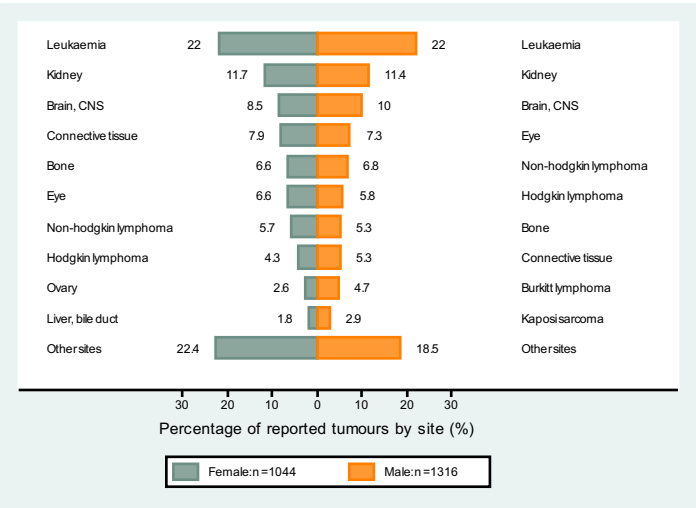


Figure 7: Percentage distribution of 10 most common cancers by sex, 2000-2002, 15-29 years

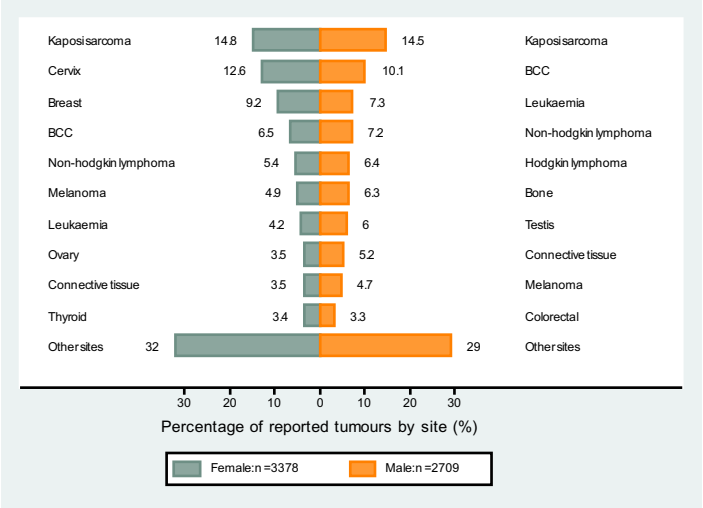


Figure 8: Percentage distribution of 10 most common cancers by sex, 2000-2002, 30-54 years

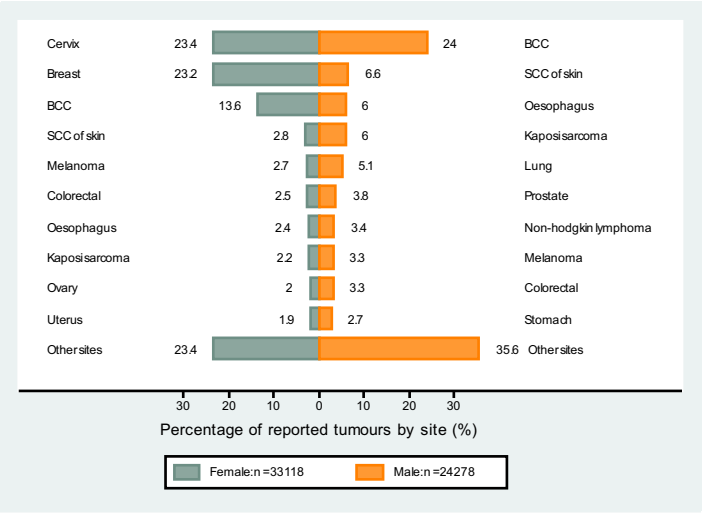


Figure 9: Percentage distribution of 10 most common cancers by sex, 2000-2002, 55-64 years

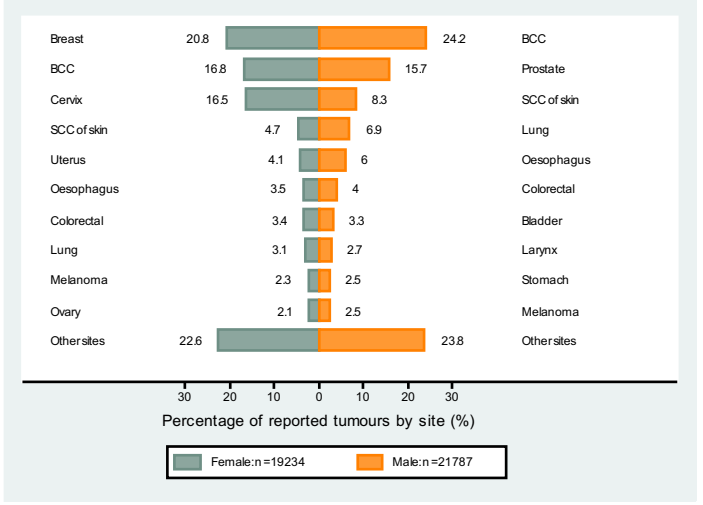
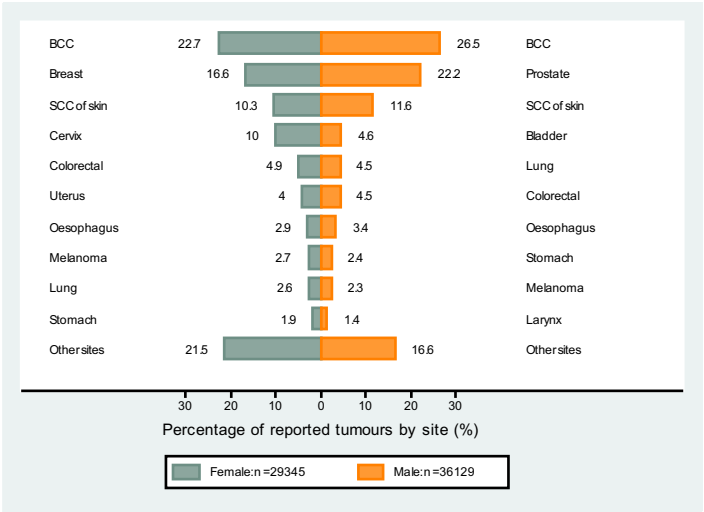


Figure 10: percentage distribution of 10 most common cancers by sex, 2000-2002, 65+



Incidence of cancer in 2000-2002

Table 3 presents the ranking of the five leading cancers for each population group in males and females. This ranking is based on age standardised rates rather than the actual number or proportions of cancers. Basal cell carcinoma and SCC of skin are excluded from the ranking as these occur most commonly with very high incidence rates, particularly in Whites, and therefore tend to overshadow all other cancers. Since the NCR reports cancers by site, cancers whose primary site is not known or for which there is no indication of the primary site particularly in the case of cancers that have metastasized to other sites are classified as PSU (i.e. Primary site unknown). These are also excluded from the ranking.

Table 3: Summary rates for the leading five cancers by race group and sex, 2000-2002

	2000			2001			2002		
Pop/Sex	**Cancer**	**ASR**	**LR**	**Cancer**	**ASR**	**LR**	**Cancer**	**ASR**	**LR**
Asian Male	Prostate	23.03	38	Prostate	22.94	34	Prostate	22.16	44
	Lung	15.85	44	Lung	12.06	59	Stomach	8.97	84
	Colorectal	16.49	48	Colorectal	13.39	65	Lung	9.68	91
	Bladder	10.06	60	Bladder	9.7	77	Bladder	9.15	100
	Stomach	8.69	91	Stomach	10	93	Colorectal	7.48	102
	All	**130.83**	**6**	**All**	**132.97**	**7**	**All**	**116.68**	**8**
Asian Female	Breast	42.73	19	Breast	47.55	18	Breast	48.22	18
	Cervix	9.06	91	Uterus	10.52	75	Uterus	9.54	77
	Uterus	7.86	93	Colorectal	11.72	80	Cervix	9.86	85
	Ovary	7.13	102	Cervix	10	97	Colorectal	9.29	90
	Colorectal	7.76	111	Stomach	6.11	125	Stomach	5.56	138
	All	**130.12**	**7**	**All**	**152.22**	**6**	**All**	**134.46**	**7**
Black Male	Prostate	17.59	47	Prostate	17.22	48	Prostate	18.47	46
	Oesophagus	13.63	60	Oesophagus	12.08	69	Oesophagus	10.53	78
	Lung	7.85	106	Lung	7.69	107	Lung	7.65	107
	Larynx	3.73	217	Larynx	3.69	210	Larynx	3.44	243
	Stomach	3.26	257	Kaposi Sarcoma	4.46	253	Kaposi Sarcoma	4.5	251
	All	**91.86**	**10**	**All**	**90.18**	**10**	**All**	**86.86**	**11**
Black Female	Cervix	30.16	29	Cervix	30.56	29	Cervix	29.5	30
	Breast	14.77	62	Breast	16.29	56	Breast	16.97	53
	Oesophagus	6.01	136	Oesophagus	5.14	160	Oesophagus	5.06	165
	Uterus	3.87	200	Uterus	4.23	173	Uterus	4.35	179
	Ovary	2.28	392	Colorectal	1.86	480	Colorectal	1.95	427
	All	**89.06**	**10**	**All**	**90.67**	**10**	**All**	**86.56**	**11**
Coloured Male	Prostate	54.37	15	Prostate	56.11	14	Prostate	55.14	15
	Lung	23.67	34	Lung	22.93	34	Lung	21.26	37
	Stomach	14.69	54	Colorectal	16.15	52	Colorectal	14.23	66
	Colorectal	15.92	55	Stomach	14.87	60	Oesophagus	11.57	68
	Bladder	14.07	59	Bladder	13.59	60	Bladder	13.53	69
	All	**223.78**	**4**	**All**	**228.66**	**4**	**All**	**204.69**	**5**
Coloured Female	Breast	49.34	18	Breast	56.21	16	Breast	49.26	18
	Cervix	25.71	36	Cervix	21.58	43	Cervix	20.61	43
	Colorectal	10.06	81	Lung	10.67	74	Lung	8.82	93
	Lung	9.05	86	Colorectal	9.37	97	Colorectal	9.05	98
	Stomach	5.9	129	Uterus	7.84	100	Uterus	7.81	113
	All	**168.33**	**6**	**All**	**177.93**	**5**	**All**	**153.61**	**6**
White Male	Prostate	70.41	11	Prostate	73.38	11	Prostate	74.65	11
	Colorectal	21.71	37	Colorectal	20.7	38	Bladder	21.46	38
	Melanoma	20.83	43	Bladder	22.17	39	Colorectal	21.96	38
	Bladder	21.04	44	Melanoma	22.52	42	Lung	16.78	44
	Lung	15.47	48	Lung	17.14	44	Melanoma	19.46	48
	All	**254.55**	**4**	**All**	**261.5**	**4**	**All**	**255.55**	**4**
White Female	Breast	70.74	13	Breast	69.35	13	Breast	73.17	12
	Colorectal	14.49	59	Colorectal	14.89	57	Colorectal	15.11	56
	Melanoma	15.8	63	Melanoma	17.37	59	Melanoma	16.21	60
	Cervix	11.37	90	Cervix	11.78	83	Cervix	12.85	79
	Lung	8.19	94	Lung	8.23	91	Lung	7.68	100
	All	**201.24**	**5**	**All**	**206.29**	**5**	**All**	**205.61**	**5**
All Males	Prostate	33.47	24	Prostate	34.32	23	Prostate	35.29	23
	Lung	11.3	70	Lung	11.46	69	Lung	11.06	71
	Oesophagus	10.92	75	Oesophagus	10.01	82	Oesophagus	9.03	91
	Colorectal	8.66	97	Colorectal	8.5	97	Colorectal	8.72	99
	Bladder	7.73	116	Bladder	7.93	108	Bladder	7.61	109
	All	**141.23**	**6**	**All**	**142.33**	**6**	**All**	**135.89**	**7**
All Females	Breast	29.22	31	Breast	30.61	29	Breast	31.16	29
	Cervix	25.45	35	Cervix	25.53	35	Cervix	24.8	36
	Colorectal	5.24	166	Uterus	5.28	144	Uterus	5.42	148
	Oesophagus	4.81	170	Colorectal	5.45	162	Colorectal	5.48	158
	Uterus	4.3	181	Oesophagus	4.23	196	Oesophagus	4.16	199
	All	**117.96**	**8**	**All**	**121.43**	**8**	**All**	**115.53**	**8**

ASR Age standardised incidence rate per 100 000 (World standard population)

The ASR calculation incorporates an adjustment for the proportion of cases with age unknown

LR Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people

Please note Ranking excludes BCC, SCC of the skin, PSU and ill defined

Cancer by site

Bladder Cancer

Cigarette smoking is the main known contributor of bladder cancer with a strong correlation between the number of pack-years and the risk of developing bladder cancer (Boffetta. 2008). The transitional cell carcinomas are related to cigarette smoking and most prevalent in Western and industrialized countries. Alpha- and beta-naphthylamine found in cigarette smoke and secreted into the urine of smokers are thought to be causative agents. Approximately 30% of bladder cancers are due to occupational exposures (Matanoski et al., 1981). Workers in the chemical, dye, rubber, petroleum, leather, and printing industries are at increased risk. Studies suggest that auto mechanics have an elevated risk of bladder cancer due to their frequent exposure to hydrocarbons and petroleum-based chemicals (Silverman et al., 1989). Squamous cell carcinomas which are more frequently seen in some Middle Eastern and African countries are due to chronic urinary infection caused by Schistosoma haematobium (schistosomiasis or bilharzia) endemic to these regions (Parkin., et al., 2005).

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Figure 11: Age specific incidence rates for bladder cancer by population group, 2002

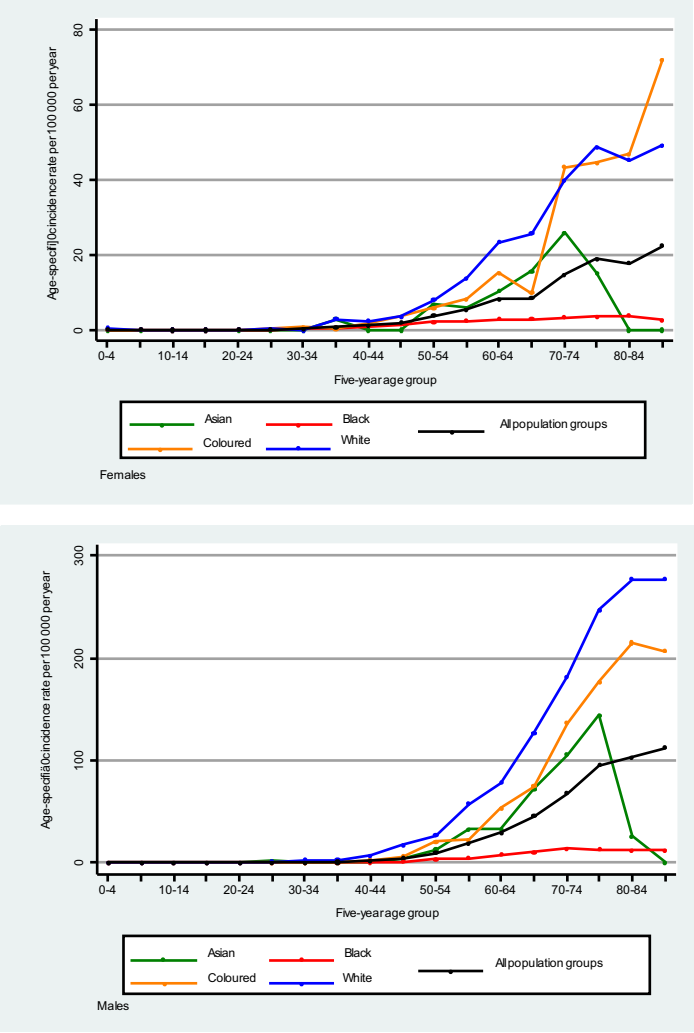
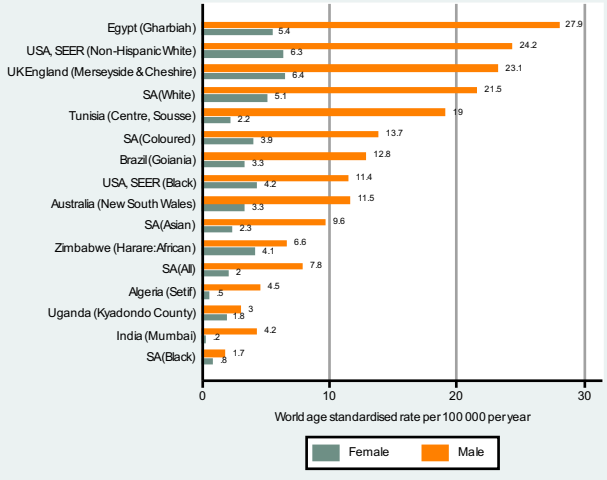


Figure 12: Bladder cancer ASR per 100 000 for selected populations



Female Breast Cancer

Breast cancer is the most common cause of female cancers worldwide and the primary cause of deaths among women (Ferlay J, 2000). Reproductive, hormonal and nutritional factors can account for the underlying risks of acquiring breast cancer. Non-modifiable risk factors include age, sex, genetic predisposition, early menarche, late menopause, and high breast tissue density. Other risk factors include obesity, hormone replacement therapy, hormonal contraceptive use, drinking alcohol, conceiving after 35 years of age and nulliparity (American Cancer Society, 2007-2008). Environmental determinants are now observed to influence the risk of breast cancer as evidenced by patterns of migrant Asian-American women (Ziegler et al, 1993). As a consequence of changing exposures and as a result of 'westernisation of lifestyles' with changes in childbearing age, dietary habits and exposure to exogenous oestrogen, incidence of breast cancer is increasing worldwide (Parkin, Ferlay et al 2003). Consequently the most rapid rises are seen in middle and low income countries.

Figure 13: Age specific incidence rates for female breast cancer by population group, 2002

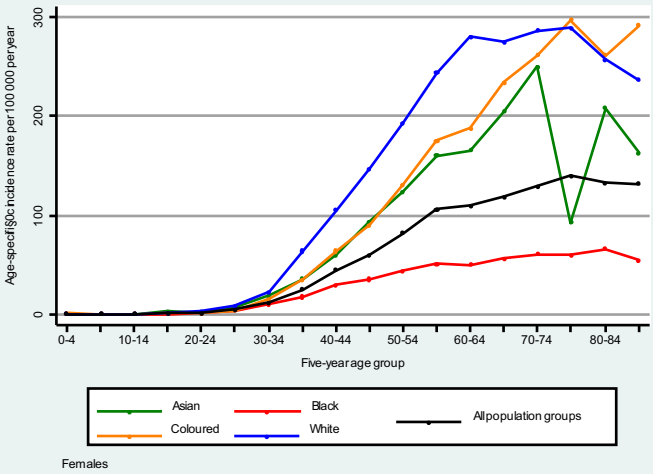


Figure 14: Female breast cancer ASR per 100 000 for selected populations

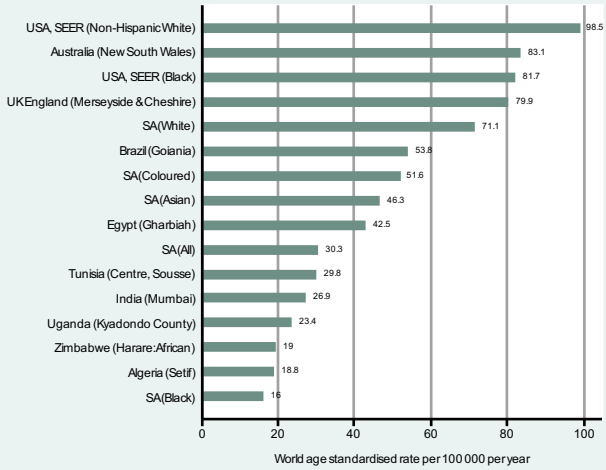


Table 5: Summary statistics for female breast cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Females, 2000									
Asian	222	233	31.9	40.29	42.73	37.07	48.39	5.22	19
Black	1853	1944	16.17	10.73	14.77	14.1	15.45	1.61	62
Coloured	739	774	23.66	37.81	49.34	45.76	52.92	5.57	18
White	2229	2329	19.4	97.58	70.74	67.8	73.69	7.75	13
Total	5280	5280	18.84	22.82	29.22	28.41	30.02	3.25	31
Females, 2001									
Asian	257	268	30.17	45.9	47.55	41.71	53.39	5.59	18
Black	2091	2182	17.25	11.83	16.29	15.59	16.99	1.78	56
Coloured	876	913	25.48	44.06	56.21	52.46	59.96	6.29	16
White	2212	2308	18.41	97.35	69.35	66.45	72.25	7.65	13
Total	5668	5670	19.12	24.16	30.61	29.8	31.42	3.42	29
Females, 2002									
Asian	266	280	35.01	47.59	48.22	42.42	54.01	5.52	18
Black	2235	2330	18.93	12.44	16.97	16.26	17.68	1.87	53
Coloured	790	823	25.92	39.25	49.26	45.8	52.72	5.58	18
White	2380	2486	20.47	105.46	73.17	70.22	76.12	8.05	12
Total	5910	5920	20.82	24.9	31.16	30.35	31.97	3.49	29

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Cancer of the Uterine Cervix

Cervical cancer is the second most common type of cancer in women worldwide, and remains a leading cause of cancer-related deaths for women in developing countries (Anorlu. 2008; Thun et al., 2010; Canavan et al., 2000). HIV-infected women are at a significantly higher risk than HIV-negative women for cancer of the cervix (Ellerbrock et al., 2000; Serraino et al., 1999). In 1993 cancer of the cervix was declared AIDS- defining due to its association with HIV and AIDS (Serraino et al., 1999). HIV-infected women with CD4 count < 200 cells/µL seem to be vulnerable to infection with, and persistence of the high-risk HPV types that can lead to cancer (Denny et al., 2008). Persistent infection with 1 of about 15 genotypes of carcinogenic human papillomavirus (HPV) causes almost all cases of cervical cancer (Schiffman et al., 2007). Types 16 and 18 are generally acknowledged to cause about 70% of cervical cancer cases (Walboomers et al., 1999). Together with type 31, they are the prime risk factors for cervical cancer (Walboomers et al., 1999). HPV infection occurs in a high percentage of sexually active women. Other risk factors include advancing age, mulitpararity, early sexual debut, multiple sexual partners, chronic smoking and low socio-economic status (Green et al., 2003). Countries with organised cervical cancer screening with cytology (eg, Papanicolaou [Pap] testing) have been reported to reduce the risk of cervical cancer (Matthew et al., 2009). However in resource-poor settings, screening and treatment for cervical cancer is limited, evidenced by cervical screening coverage in sub-Saharan Africa ranging from 2% to 20.2% in urban areas and 0.4% to 14% in rural areas (Louis et al., 2009)

Figure 15: Age specific incidence rates for cervical cancer by population group, 2002

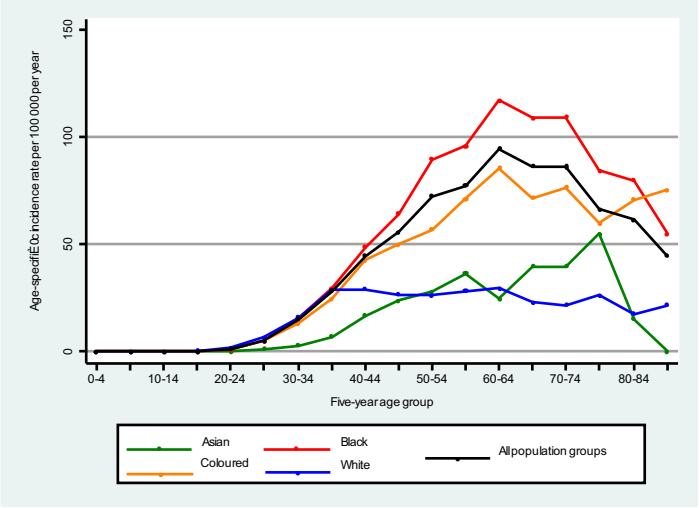


Figure 16: Cervical cancer ASR per 100 000 for selected populations

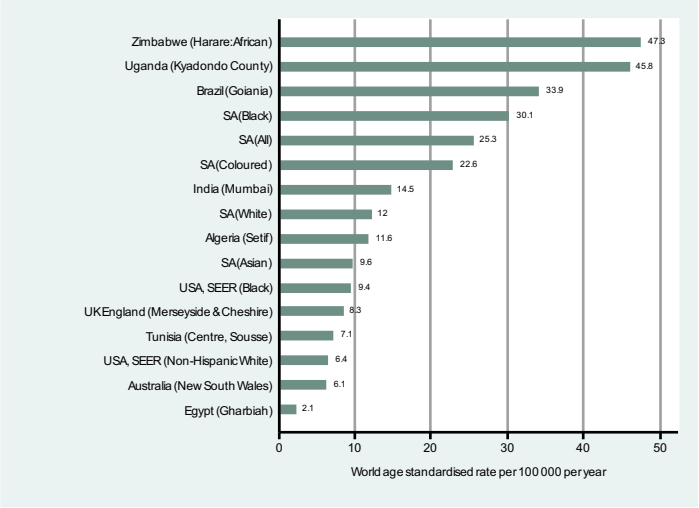


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Table 6: Summary statistics for cervical cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Females, 2000									
Asian	48	50	6.84	8.64	9.06	6.48	11.64	1.1	91
Black	3693	3845	31.97	21.21	30.16	29.18	31.14	3.4	29
Coloured	413	430	13.14	20.99	25.71	23.19	28.22	2.74	36
White	342	356	2.96	14.91	11.37	10.17	12.58	1.1	90
Total	4680	4680	16.7	20.23	25.45	24.7	26.19	2.83	35
Females, 2001									
Asian	56	58	6.57	10	10	7.39	12.61	1.03	97
Black	3840	4002	31.63	21.7	30.56	29.58	31.53	3.43	29
Coloured	375	390	10.89	18.83	21.58	19.35	23.8	2.35	43
White	352	367	2.93	15.47	11.78	10.55	13.01	1.2	83
Total	4817	4817	16.24	20.53	25.53	24.79	26.26	2.84	35
Females, 2002									
Asian	57	59	7.44	10.11	9.86	7.31	12.41	1.17	85
Black	3792	3967	32.22	21.18	29.5	28.55	30.44	3.3	30
Coloured	348	364	11.45	17.34	20.61	18.41	22.8	2.34	43
White	389	406	3.34	17.22	12.85	11.58	14.12	1.26	79
Total	4796	4796	16.87	20.17	24.8	24.08	25.51	2.75	36

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Colorectal Cancer

Environmental, genetic and dietary risk factors are believed to be associated with 85 to 90% of all colorectal cancer cases (Brotzman et al., 2006). Lack of exercise, excess body weight and central adiposity are major lifestyle threats for colorectal cancer (Parkin et al., 2005; Harriss et al., 2009). Diets high in fat, red and processed meat, and low in fresh fruit, fibre, vegetables, poultry and fish increase the risk of colorectal cancer (Chao et al., 2005). Smokers have a 30-40% greater risk of dying from colorectal cancer than non-smokers and heavy alcohol consumption is associated with an increased risk (Brotzman et al., 2008; Anderson et al., 2005). The incidence of colorectal cancer rises sharply after the age of 45 years, and 90% of cases occur in persons over the age of 50 years (Brotzmen et al.,2008). Family history of colon cancer especially in close relatives and developing CRC before the age of 55 increases ones risk. Familial adenomatous polyposis carries a near 100% risk of developing colorectal cancer by the age of 40 if untreated (Strate et al., 2005). Crohn's disease and ulcerative colitis are known risk factors. Patients with Crohn's disease have a more than average risk for colorectal cancer, but less than that of patients with ulcerative colitis (Hamilton, 1985).

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Figure 17: Age specific incidence rates for colorectal cancer by population group, 2002

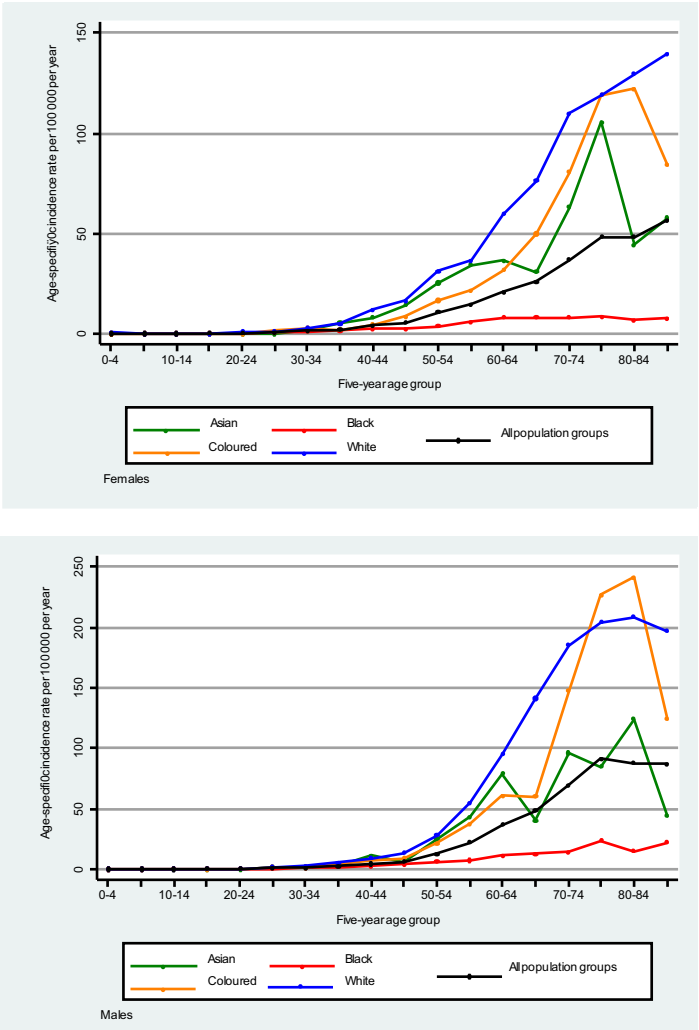

Figure 18: Colorectal cancer ASR per 100 000 for selected populations

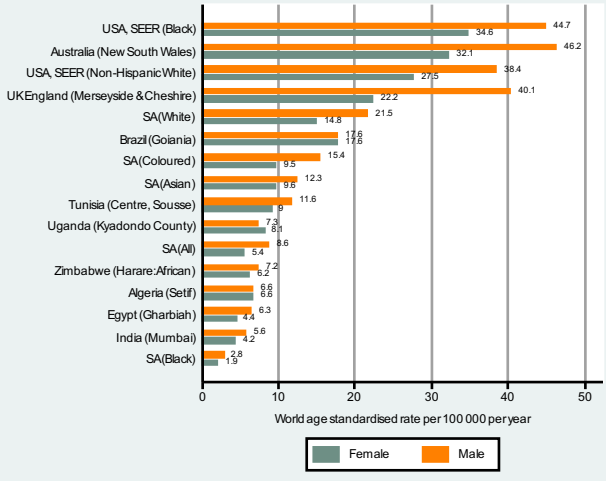

Table 7: Summary statistics for colorectal cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	62	66	11.01	11.71	16.49	12.32	20.67	2.09	48
Black	238	251	2.71	1.48	2.55	2.21	2.88	0.28	362
Coloured	158	166	5.01	8.56	15.92	13.4	18.44	1.83	55
White	591	623	4.14	27.28	21.71	19.99	23.44	2.7	37
Total	1099	1106	3.92	5.09	8.66	8.13	9.18	1.03	97
Females, 2000									
Asian	36	39	5.37	6.78	7.76	5.27	10.24	0.9	111
Black	213	228	1.9	1.26	1.78	1.55	2.02	0.2	500
Coloured	138	147	4.5	7.19	10.06	8.4	11.73	1.23	81
White	489	524	4.36	21.95	14.49	13.19	15.8	1.7	59
Total	933	939	3.35	4.06	5.24	4.89	5.58	0.6	166
Males, 2001									
Asian	54	58	9.33	10.25	13.39	9.69	17.1	1.53	65
Black	257	271	2.85	1.57	2.67	2.33	3.01	0.3	337
Coloured	172	183	5.16	9.29	16.15	13.69	18.62	1.91	52
White	579	614	3.79	27.12	20.7	19.04	22.35	2.62	38
Total	1120	1125	3.77	5.11	8.5	7.99	9.01	1.03	97
Females, 2001									
Asian	60	64	7.24	11.01	11.72	8.77	14.67	1.25	80
Black	233	247	1.96	1.34	1.86	1.62	2.1	0.21	480
Coloured	132	143	3.99	6.9	9.37	7.81	10.94	1.04	97
White	516	553	4.41	23.34	14.89	13.59	16.19	1.76	57
Total	1004	1008	3.4	4.29	5.45	5.1	5.79	0.62	162
Males, 2002									
Asian	33	35	6.06	6.13	7.48	4.9	10.06	0.98	102
Black	287	307	3.36	1.75	3.19	2.81	3.57	0.36	279
Coloured	145	155	4.87	7.81	14.23	11.89	16.56	1.52	66
White	623	667	4.38	29.68	21.96	20.27	23.65	2.64	38
Total	1161	1164	4.14	5.22	8.72	8.21	9.24	1.02	99
Females, 2002									
Asian	49	52	6.45	8.77	9.29	6.69	11.9	1.11	90
Black	248	262	2.13	1.4	1.95	1.71	2.2	0.23	427
Coloured	136	143	4.5	6.82	9.05	7.53	10.56	1.02	98
White	547	578	4.76	24.52	15.11	13.83	16.4	1.78	56
Total	1032	1035	3.64	4.35	5.48	5.14	5.82	0.63	158

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Kaposi Sarcoma

Kaposi Sarcoma (KS) has been causally associated with human herpesvirus-8 (Bubman et al.,2003). Kaposi Sarcoma is classified into four types; classic (which typically presents in middle or old age), endemic (described in Sub-Saharan indigenous Africans prior to the AIDS epidemic), iatrogenic (associated with immunosuppressive drug therapy, typically seen in renal allograft recipients), and AIDS-associated (epidemic KS). Solid-organ transplantation is associated with a 400- to 500-fold increased incidence of KS while HIV infection increases ones risk over a thousand-fold in European populations (Del Maso et al., 2001). Kaposi Sarcoma is an AIDS-defining illness and typically occurs in patients with low CD4 counts (<150 cells/mm3) and high viral loads (>10,000 copies/mL)(Maurer T et al.,2007). Kaposi Sarcoma risk increases with the number of sexual partners and classical KS affects men more often than women; the reported male to female ratio is approximately 3:1 (Kaldor et al.,1994). In Asian populations KS is rare, even in those with a high prevalence of HIV infection. This is probably due to the role of (HHV-8) in the etiology of KS, as subjects infected by both HHV-8 and HIV are at particularly high risk of KS (Parkin et al.,2005; Sitas et al.,2000).

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Figure 19: Age specific incidence rates for Kaposi Sarcoma by population group, 2002

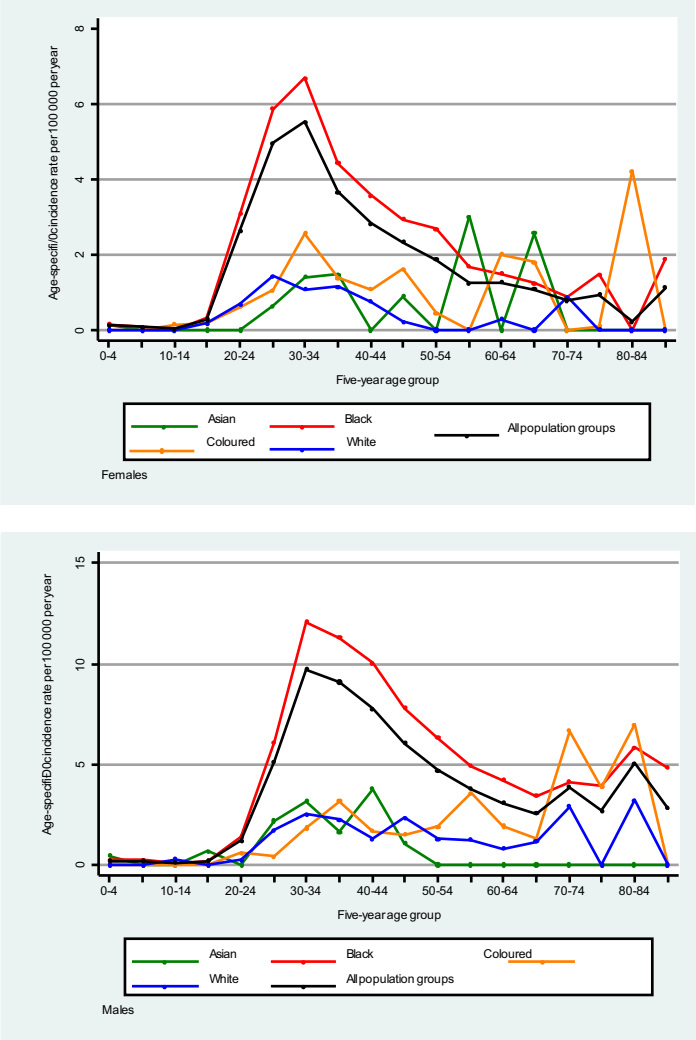

Figure 20: Kaposi Sarcoma ASR per 100 000 for selected populations

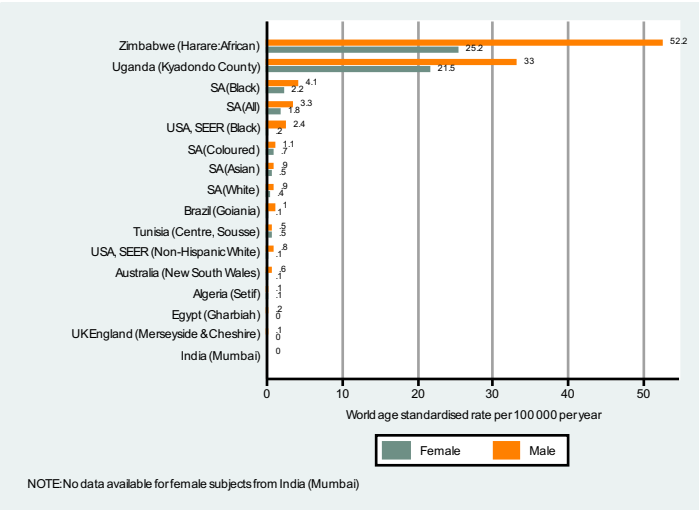

Table 8: Summary statistics for Kaposi sarcoma, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	3	4	0.67	0.71	0.67	0	1.34	0.05	2196
Black	466	503	5.43	2.97	3.36	3.05	3.68	0.29	345
Coloured	15	16	0.48	0.82	1.06	0.5	1.61	0.12	865
White	13	14	0.09	0.62	0.56	0.27	0.86	0.06	1549
Total	522	537	1.9	2.47	2.63	2.4	2.86	0.23	435
Females, 2000									
Asian	1	1	0.17	0.22	0.22	-0.17	0.62	0.02	4317
Black	292	314	2.62	1.74	1.73	1.53	1.93	0.14	697
Coloured	13	14	0.42	0.67	0.59	0.27	0.91	0.04	2431
White	7	7	0.06	0.31	0.26	0.07	0.46	0.02	4200
Total	327	337	1.2	1.46	1.4	1.25	1.56	0.12	868
Males, 2001									
Asian	10	12	1.89	2.07	1.69	0.72	2.65	0.13	782
Black	642	700	7.38	4.06	4.46	4.11	4.81	0.4	253
Coloured	17	18	0.52	0.93	0.88	0.45	1.31	0.08	1200
White	27	29	0.18	1.28	1	0.63	1.36	0.09	1077
Total	746	759	2.54	3.45	3.54	3.28	3.8	0.31	322
Females, 2001									
Asian	2	2	0.26	0.39	0.33	-0.1	0.76	0.04	2789
Black	389	416	3.28	2.25	2.21	1.99	2.43	0.18	568
Coloured	11	11	0.32	0.55	0.58	0.23	0.94	0.06	1700
White	13	13	0.11	0.57	0.54	0.25	0.84	0.04	2238
Total	435	443	1.49	1.89	1.81	1.64	1.98	0.14	690
Males, 2002									
Asian	2	2	0.37	0.38	0.26	-0.09	0.62	0.02	4535
Black	680	723	7.93	4.13	4.5	4.15	4.85	0.4	251
Coloured	23	24	0.76	1.22	1.46	0.82	2.1	0.17	594
White	33	35	0.23	1.56	1.27	0.84	1.69	0.11	881
Total	780	785	2.79	3.52	3.61	3.34	3.87	0.32	312
Females, 2002									
Asian	6	6	0.76	1.04	0.92	0.17	1.67	0.09	1088
Black	480	493	4	2.63	2.57	2.34	2.8	0.21	483
Coloured	23	23	0.74	1.12	1.04	0.61	1.48	0.09	1076
White	11	11	0.09	0.48	0.42	0.17	0.67	0.03	3140
Total	531	533	1.88	2.24	2.13	1.94	2.31	0.17	586

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Lung Cancer

Lung Cancer is the world's leading cause of preventable deaths but accounts for the highest number of cancer mortalities worldwide. Cigarette smoke is the leading etiological agent resulting in 90% of lung cancer cases in countries were cigarette smoke is common. Repeated studies indicate the risk of lung cancer increases with the duration and number of cigarettes smoked. Other risk factors include occupational exposure, radon and air pollution. Dietary factors have been hypothesized to account for 20% of the lung cancer burden. A constellation of these interacting determinants of lung cancer risk, is associated with socio-economic status affecting lower- income countries unfavourably. (Alberg AJ. 2003)

References:

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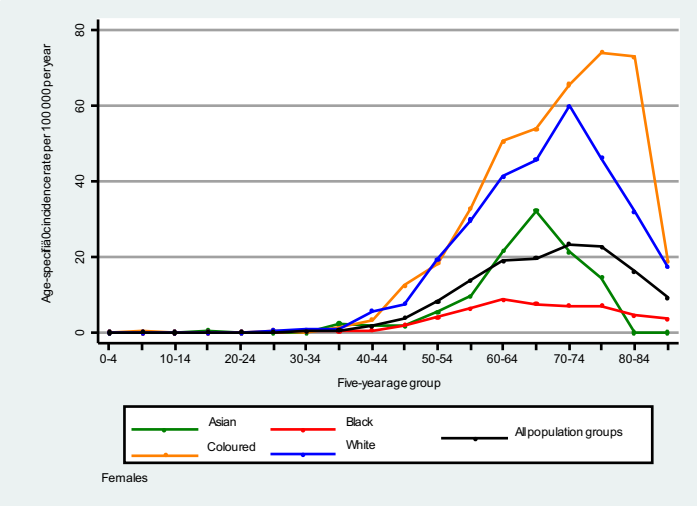
Figure 21: Age specific incidence rates for lung cancer by population group, 2002



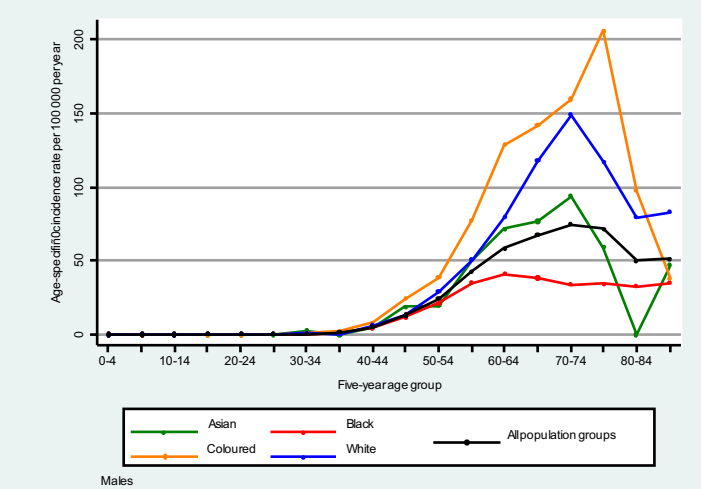


Figure 22: Lung cancer ASR per 100 000 for selected populations

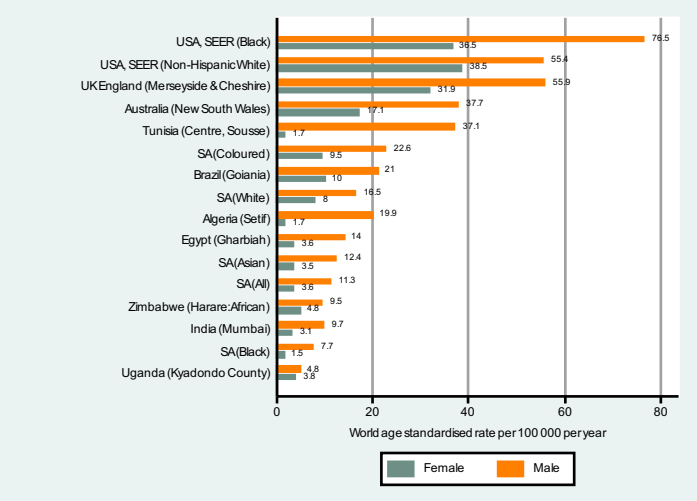


Table 9: Summary statistics for lung cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	63	65	10.9	11.59	15.85	11.8	19.91	2.3	44
Black	660	691	7.46	4.07	7.85	7.24	8.45	0.94	106
Coloured	248	260	7.82	13.36	23.67	20.69	26.66	2.97	34
White	422	439	2.92	19.23	15.47	14.01	16.93	2.08	48
Total	1439	1454	5.15	6.69	11.3	10.71	11.89	1.43	70
Females, 2000									
Asian	18	19	2.57	3.25	3.93	2.13	5.73	0.49	203
Black	176	186	1.54	1.02	1.6	1.37	1.83	0.2	512
Coloured	121	128	3.91	6.25	9.05	7.46	10.64	1.16	86
White	267	277	2.31	11.61	8.19	7.2	9.18	1.07	94
Total	604	610	2.17	2.63	3.62	3.33	3.91	0.46	218
Males, 2001									
Asian	47	50	8.06	8.85	12.06	8.6	15.51	1.7	59
Black	647	685	7.21	3.97	7.69	7.1	8.29	0.93	107
Coloured	248	260	7.34	13.2	22.93	20.04	25.82	2.94	34
White	474	499	3.08	22.04	17.14	15.62	18.66	2.29	44
Total	1479	1493	5	6.78	11.46	10.87	12.05	1.46	69
Females, 2001									
Asian	19	20	2.24	3.41	3.97	2.19	5.75	0.6	166
Black	165	175	1.39	0.95	1.46	1.24	1.68	0.18	545
Coloured	151	158	4.4	7.62	10.67	8.98	12.36	1.35	74
White	265	277	2.21	11.68	8.23	7.24	9.22	1.09	91
Total	625	630	2.12	2.68	3.66	3.37	3.95	0.48	210
Males, 2002									
Asian	42	45	7.79	7.87	9.68	6.66	12.69	1.1	91
Black	650	686	7.52	3.92	7.65	7.06	8.24	0.93	107
Coloured	222	234	7.33	11.74	21.26	18.46	24.06	2.71	37
White	473	498	3.27	22.17	16.78	15.29	18.27	2.26	44
Total	1453	1463	5.2	6.56	11.06	10.48	11.63	1.41	71
Females, 2002									
Asian	14	15	1.83	2.49	2.6	1.24	3.95	0.36	275
Black	175	184	1.5	0.98	1.51	1.29	1.73	0.19	540
Coloured	129	136	4.28	6.48	8.82	7.31	10.32	1.07	93
White	262	276	2.27	11.71	7.68	6.74	8.62	1	100
Total	609	611	2.15	2.57	3.4	3.13	3.68	0.43	233

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Melanoma

Melanoma is a tumour of the melanocytes particularly common in White populations living in sunny climates (Parkin et al 2005). Sunburns and short sharp bursts of sun exposure in childhood are more associated with melanoma risk than cumulative lifetime exposure (Gandini S et al., 2005). Tanning devices are carcinogenic and increase ones risk of developing melanoma by 75% if used regularly before the age of 30 (Ghissasi F et al.,2009; IARC. 2009; WHO, 2010). Significant premature photoageing also occurs with regular use of sunbeds. The use of tanning devices should be discouraged in people with fair skin and hair, family history of melanoma and high numbers of nevi. Nevi are the strongest risk factors for melanoma, greater than risks associated with sun exposure (Gandini S et al., 2005). In non-Caucasians, melanoma affects the palms and soles, and is a much less prevalent tumour (Rouhani P et al., 2008).

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Figure 23: Age specific incidence rates for melanoma by population group, 2002

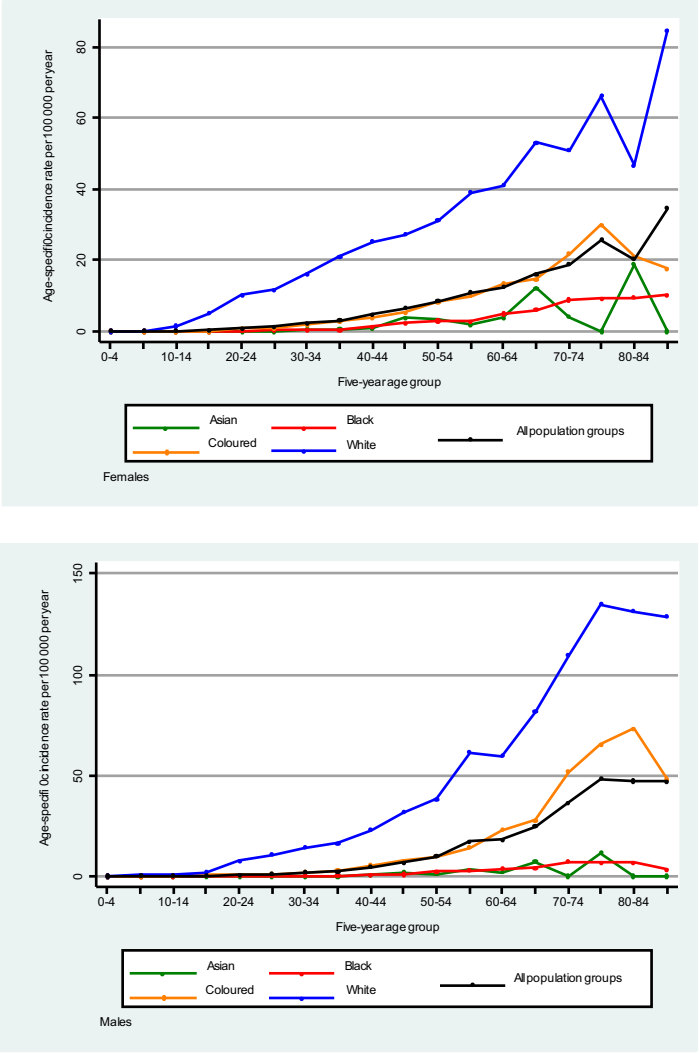

Figure 24: Melanoma ASR per 100 000 for selected populations

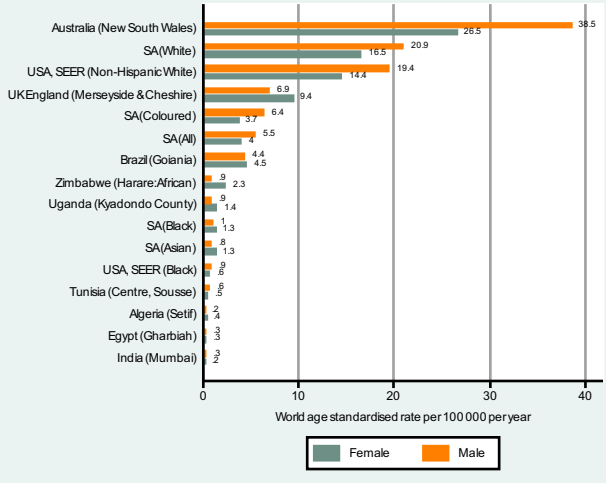

Table 10: Summary statistics for melanoma, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	4	4	0.71	0.76	1	0.02	1.98	0.13	746
Black	92	100	1.08	0.59	1.08	0.86	1.31	0.13	758
Coloured	72	77	2.33	3.98	6.69	5.09	8.29	0.71	142
White	552	591	3.92	25.88	20.83	19.13	22.54	2.33	43
Total	765	773	2.74	3.55	5.62	5.21	6.03	0.66	153
Females, 2000									
Asian	9	10	1.31	1.65	1.7	0.59	2.81	0.21	470
Black	155	169	1.41	0.93	1.34	1.13	1.55	0.15	673
Coloured	66	71	2.16	3.45	4.35	3.31	5.4	0.47	214
White	476	504	4.2	21.12	15.8	14.37	17.23	1.59	63
Total	744	753	2.69	3.26	4.02	3.73	4.32	0.43	235
Males, 2001									
Asian	3	3	0.52	0.57	0.69	-0.12	1.5	0.03	3565
Black	96	102	1.08	0.59	1.05	0.84	1.26	0.13	766
Coloured	87	92	2.61	4.69	7.65	5.98	9.32	0.91	109
White	612	649	4.01	28.68	22.52	20.76	24.28	2.36	42
Total	843	847	2.84	3.84	5.91	5.49	6.32	0.66	152
Females, 2001									
Asian	6	7	0.73	1.12	1.16	0.25	2.07	0.14	723
Black	181	194	1.54	1.05	1.52	1.3	1.74	0.18	548
Coloured	63	67	1.88	3.24	3.96	2.98	4.93	0.43	234
White	518	553	4.41	23.33	17.37	15.86	18.88	1.7	59
Total	817	821	2.77	3.5	4.26	3.96	4.55	0.46	220
Males, 2002									
Asian	3	3	0.55	0.56	0.66	-0.09	1.42	0.09	1132
Black	65	71	0.77	0.4	0.73	0.55	0.91	0.09	1148
Coloured	60	64	2.02	3.23	4.97	3.67	6.26	0.59	170
White	536	574	3.77	25.53	19.46	17.84	21.08	2.09	48
Total	710	712	2.53	3.19	4.9	4.53	5.27	0.55	181
Females, 2002									
Asian	5	5	0.67	0.91	1.06	0.15	1.97	0.12	810
Black	140	149	1.21	0.79	1.14	0.95	1.33	0.13	760
Coloured	44	46	1.46	2.21	2.86	2.01	3.71	0.36	274
White	496	523	4.31	22.18	16.21	14.76	17.66	1.68	60
Total	720	723	2.54	3.04	3.71	3.44	3.99	0.41	241

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Non Hodgkin Lymphoma

The non Hodgkin Lymphomas (NHL) comprise an extremely heterogeneous group of malignancies that arise primarily from the lymph nodes, with distinct clinical and biological features. NHL is divided into B-cell and T-cell lymphomas. There is a strong positive association between HIV/AIDS and NHL (Goedert J et al.,1998). Approximately 5% - 10% of HIV-infected persons will develop a lymphoma (Biggar et al., 1992). NHL has been reported as an AIDS-defining disease in approximately 23% of persons with AIDS (Parkin et al., 2002). The introduction of highly active antiretroviral therapy (HAART) has changed the epidemiology of lymphomas resulting in a decline in incidence and risk (Grulich et al., 2001). Human herpes virus 8 (HHV8) and Epstein Barr Virus (EBV) are generally accepted to be associated with development of primary effusion lymphoma (PEL), a rare B-cell lymphoma that almost exclusively affects HIV-positive patients (Chiu BC et al., 2003).

References:
1. Goedert JJ, Cote TR, Virgo P, Scoppa SM, Kingma DW, Gail MH, Jaffe ES, Biggar RJ. Spectrum of AIDS-associated malignant disorders. Lancet 1998;351:18339
2. Biggar RJ, Rabkin CS. The epidemiology of acquired immunodeficiency syndrome-related lymphomas. Curr Opin Oncol 1992;4:88393
3. Grulich AE, Li Y, McDonald AM, Correll PK, Law MG, Kaldor JM. Decreasing rates of Kaposi's sarcoma and non-Hodgkin's lymphoma in the era of potent combination anti-retroviral therapy. AIDS 2001;15:62933
4. Chiu BC, Weisenburger DD. An update of the epidemiology of non- Hodgkin's lymphoma. Clin Lymphoma 2003;4:1618.

Figure 25: Age specific incidence rates for Non-Hodgkin Lymphoma by population group, 2002

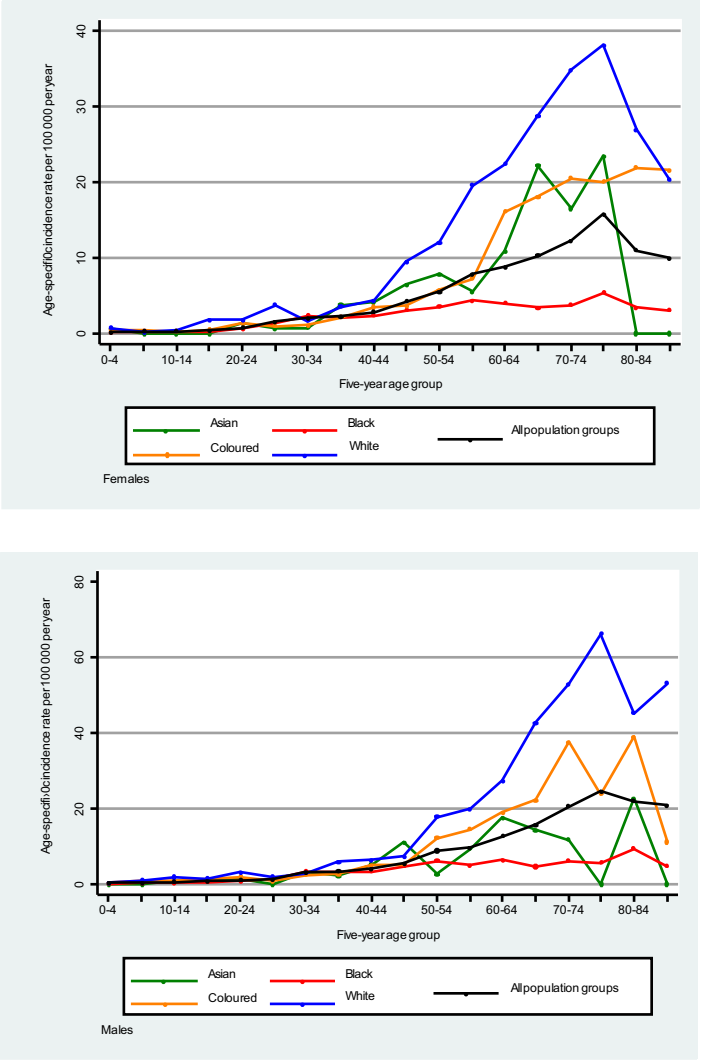

Figure 26: Non-Hodgkin Lymphoma ASR per 100 000 for selected populations

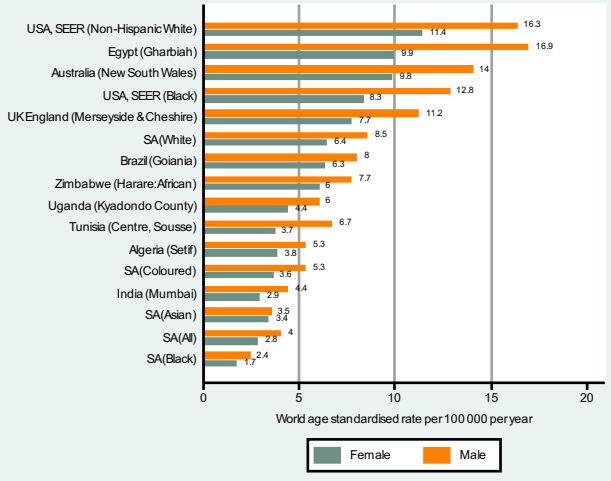

Table 11: Summary statistics for Non-Hodgkin lymphoma, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	14	15	2.5	2.66	2.78	1.34	4.23	0.29	343
Black	284	306	3.31	1.81	2.49	2.19	2.79	0.25	400
Coloured	71	75	2.27	3.87	5.49	4.16	6.81	0.59	170
White	229	244	1.62	10.7	8.62	7.52	9.72	1	100
Total	633	641	2.27	2.95	4.14	3.81	4.48	0.45	220
Females, 2000									
Asian	18	19	2.55	3.22	3.48	1.85	5.11	0.49	203
Black	231	244	2.03	1.35	1.68	1.46	1.9	0.17	605
Coloured	66	69	2.12	3.38	4.51	3.41	5.61	0.55	182
White	176	183	1.53	7.68	5.68	4.82	6.54	0.61	163
Total	509	515	1.84	2.23	2.71	2.47	2.95	0.29	344
Males, 2001									
Asian	14	15	2.36	2.59	2.44	1.15	3.74	0.23	437
Black	264	279	2.94	1.62	2.12	1.85	2.39	0.21	476
Coloured	70	74	2.09	3.76	5.45	4.12	6.78	0.64	157
White	241	251	1.55	11.1	8.82	7.71	9.94	1.02	98
Total	615	619	2.07	2.81	3.86	3.54	4.18	0.43	233
Females, 2001									
Asian	21	22	2.47	3.76	3.88	2.23	5.54	0.35	286
Black	218	228	1.8	1.24	1.49	1.29	1.69	0.15	670
Coloured	53	55	1.53	2.64	3.31	2.4	4.22	0.36	281
White	224	231	1.84	9.75	7.06	6.1	8.01	0.85	118
Total	533	536	1.81	2.28	2.77	2.52	3.01	0.31	323
Males, 2002									
Asian	24	25	4.35	4.39	5.27	3.1	7.44	0.66	151
Black	310	330	3.62	1.89	2.47	2.18	2.76	0.24	413
Coloured	67	70	2.2	3.52	5.11	3.81	6.41	0.67	148
White	225	234	1.54	10.43	8.2	7.12	9.27	0.88	114
Total	656	660	2.35	2.96	4.06	3.74	4.39	0.43	230
Females, 2002									
Asian	16	17	2.07	2.81	2.97	1.5	4.44	0.37	267
Black	275	287	2.33	1.53	1.78	1.56	1.99	0.17	588
Coloured	49	50	1.59	2.41	2.96	2.12	3.8	0.33	300
White	212	220	1.81	9.31	6.39	5.5	7.29	0.72	139
Total	570	573	2.02	2.41	2.8	2.56	3.03	0.3	338

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Oesophageal Cancer

The incidence of oesophageal cancer is ranked eight worldwide and remains an important public health concern. [1] The histological subtypes of oesophageal cancer include adenocarcinoma (ACC) and squamous cell (SCC) carcinoma, for which the etiological factors and underlying patterns of incidence differ considerably. The incidence of oesophageal ACC is increasing more than any other cancer in the Western world while the predominant sub-type in the developing world is SCC . [2] Gastroesophageal reflux disease (GERD) is associated with the increased risk of ACC.[2] Both cigarette smoking and alcohol consumption are established risk factors of oesophageal SCC.[3] Other risk factors common to both subtypes include aging, gender (more common in men), obesity, reflux symptoms and diet. [2] Diets with a high intake of fruits and vegetables are associated with a reduced incidence of oesophageal cancer and non-steroidal anti-inflammatory drugs may protect against development of oesophageal cancer.[1]

References:

1. Holmes RS, Vaughan TL. Epidemiology and pathogenesis of oesophageal cancer. *Semin Radiat Oncol;* 2007 Jan;17(1):2-9.
2. Falk GW. Risk factors for esophageal cancer development. *Surg Oncol Clin N Am.* 2009 Jul; 18(3):469-85.
3. Morita M, et al. Alcohol drinking, cigarette smoking, and the development of squamous cell carcinoma of the esophagus: epidemiology, clinical findings, and prevention. *Int J Clin Oncol.* 2010 Apr; 15(2):126-34.

Figure 27: Age specific incidence rates for oesophageal cancer by population group, 2002

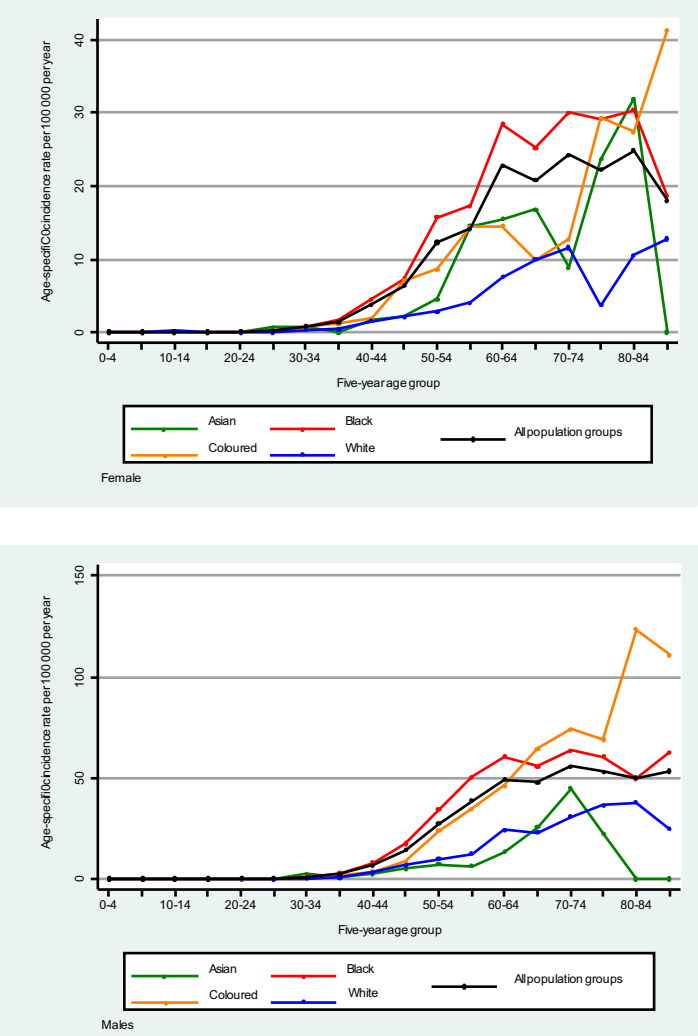

Figure 28: Oesophageal cancer ASR per 100 000 for selected populations

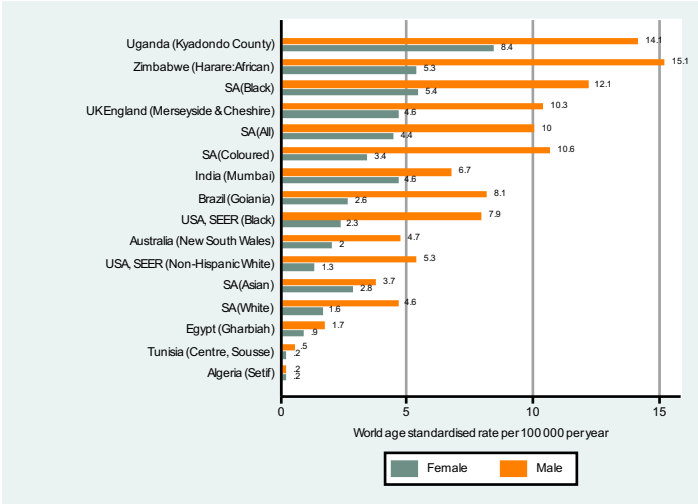

Table 12: Summary statistics for oesophageal cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	10	11	1.77	1.88	2.47	0.88	4.06	0.38	264
Black	1079	1193	12.88	7.04	13.63	12.83	14.43	1.66	60
Coloured	101	109	3.29	5.63	9.94	8.01	11.87	1.06	95
White	126	136	0.9	5.97	4.73	3.93	5.53	0.59	169
Total	1391	1449	5.13	6.67	10.92	10.35	11.5	1.33	75
Females, 2000									
Asian	15	16	2.17	2.74	3.09	1.54	4.64	0.3	329
Black	639	704	5.85	3.88	6.01	5.56	6.46	0.74	136
Coloured	42	45	1.38	2.2	2.89	2.03	3.75	0.32	317
White	56	59	0.49	2.47	1.66	1.22	2.1	0.21	472
Total	789	824	2.94	3.56	4.81	4.47	5.14	0.59	170
Males, 2001									
Asian	22	23	3.72	4.09	5.15	2.94	7.36	0.76	131
Black	1020	1086	11.44	6.3	12.08	11.34	12.82	1.46	69
Coloured	104	109	3.08	5.54	10.14	8.14	12.13	1.29	77
White	126	135	0.83	5.97	4.52	3.75	5.29	0.55	181
Total	1333	1353	4.53	6.14	10.01	9.46	10.56	1.21	82
Females, 2001									
Asian	19	20	2.21	3.37	3.59	1.98	5.2	0.4	253
Black	602	628	4.97	3.41	5.14	4.73	5.55	0.62	160
Coloured	62	64	1.79	3.09	4.09	3.07	5.11	0.41	247
White	40	42	0.33	1.77	1.21	0.83	1.6	0.16	627
Total	744	754	2.54	3.21	4.23	3.93	4.54	0.51	196
Males, 2002									
Asian	13	14	2.36	2.39	3.39	1.51	5.28	0.47	213
Black	892	954	10.45	5.45	10.53	9.84	11.22	1.28	78
Coloured	122	130	4.07	6.52	11.57	9.51	13.63	1.47	68
White	130	138	0.9	6.13	4.63	3.85	5.42	0.53	188
Total	1220	1235	4.39	5.53	9.03	8.51	9.54	1.09	91
Females, 2002									
Asian	9	10	1.19	1.62	1.86	0.66	3.05	0.28	360
Black	583	628	5.1	3.35	5.06	4.66	5.47	0.61	165
Coloured	48	52	1.63	2.46	3.26	2.35	4.17	0.34	293
White	59	63	0.52	2.66	1.83	1.37	2.3	0.23	426
Total	742	751	2.64	3.16	4.16	3.85	4.46	0.5	199

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Prostate Cancer

Carcinoma of the prostate is the second most common cancer (after lung cancer) diagnosed among men worldwide. As with many other cancers, the aetiology of prostate cancer is unknown. However various factors are associated with an increased risk of developing prostate cancer. The most established risk factors include age, family history and ethnicity (Sakr W.A, et al. 1996). Autopsy studies indicate that cancer cells increase with age so that by the age of 80, 80% of men will have cancerous cells in their prostate (Haas, G.P., et al. 2008). Diet has also been associated with the development and progression of the disease as there is a direct correlation between mortality from prostate cancer and dietary fat intake.

References:
1. Haas GP, Delongchamps N et al (2008). The worldwide epidemiology of prostate cancer: perspectives from autopsy studies. Can J Urology 15(1): 3866 71.
2. Sakr WA, Grignon DJ et al. (1996). Age and racial distribution of prostatic intraepithelial neoplasia. Eur Urol. 30 (2): 138 44.

Figure 29: Age specific incidence rates for prostate cancer by population group, 2002

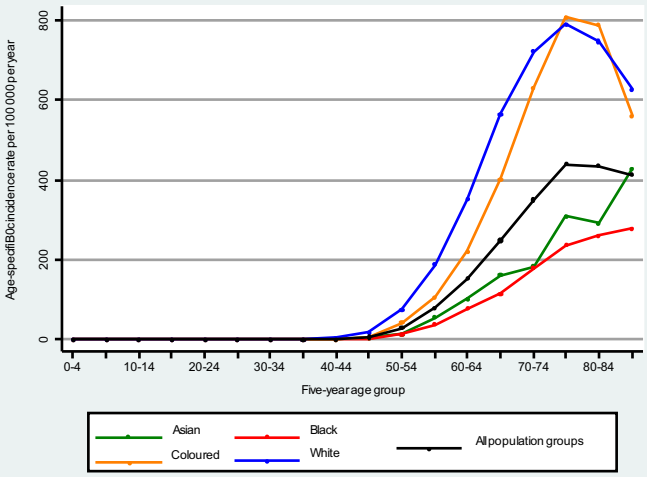

Figure 30: Prostate cancer ASR per 100 000 for selected populations

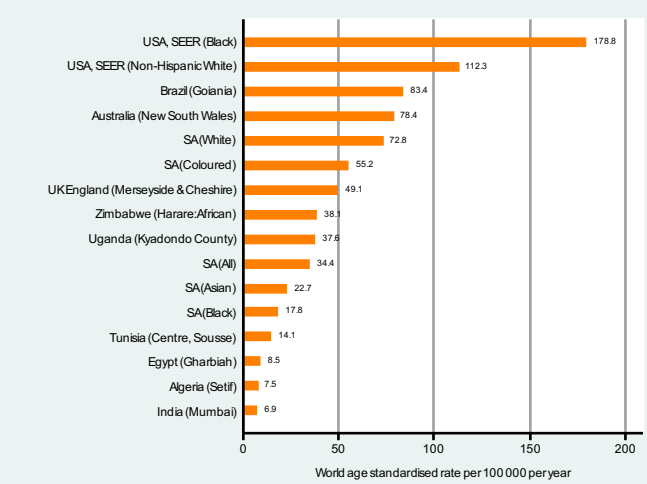

Table 13: Summary statistics for prostate cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	68	72	12.01	12.77	23.03	17.3	28.77	2.64	38
Black	1268	1339	14.45	7.9	17.59	16.62	18.56	2.12	47
Coloured	471	497	14.96	25.55	54.37	49.49	59.25	6.61	15
White	1945	2051	13.62	89.81	70.41	67.32	73.5	8.94	11
Total	3958	3958	14.01	18.21	33.47	32.42	34.53	4.17	24
Males, 2001									
Asian	78	83	13.27	14.59	22.94	17.87	28.01	2.91	34
Black	1254	1325	13.97	7.69	17.22	16.28	18.17	2.09	48
Coloured	507	537	15.17	27.31	56.11	51.29	60.93	7.21	14
White	2054	2173	13.41	95.98	73.38	70.26	76.5	9.23	11
Total	4118	4118	13.8	18.69	34.32	33.25	35.38	4.3	23
Males 2002									
Asian	78	83	14.3	14.46	22.16	17.06	27.25	2.26	44
Black	1348	1432	15.7	8.18	18.47	17.49	19.44	2.16	46
Coloured	510	541	16.98	27.2	55.14	50.41	59.86	6.62	15
White	2135	2263	14.85	100.68	74.65	71.53	77.76	9.31	11
Total	4318	4318	15.35	19.35	35.29	34.23	36.36	4.29	23

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Stomach Cancer

Stomach cancer is a major health concern as it the fourth most common form of cancer globally, responsible for 800 230 deaths in 2007 with the majority of cases and deaths reported in developing countries (Thun et al., 2010). A major risk factor for acquiring cancer of the stomach is chronic or persistent infection with H. pylori which is strongly associated with an increased risk of noncardia stomach cancer and a reduced risk of gastric cardia cancer (Kamanga et al., 2006). The decreasing prevalence of H. pylori in developed countries during the past century may have contributed to lower rates of noncardia cancer and higher rates of cardia cancer in Western countries (Kamangar et al.,2006) Compared to non-smokers, smokers have a higher risk of developing gastric carcinoma (Freedman et al., 2007). Diets high in smoked and salted foods, such as smoked fish, meat, and pickled vegetables and low in vitamin C and carotenoids have been shown to increase a person's chances of developing stomach cancer. Eating fresh fruits and vegetables that contain antioxidant vitamins (such as A and C) appears to lower the risk of stomach cancer (Sriamporn et al., 2002).

References:
1. Thun M J, DeLancy J O, M.Center M, Jemal A and M.Ward E (2010). The global burden of cancer: priorities for prevention. Carcinogensis 31(1): 100-110
2. Helicobacter and Cancer Collaborative Group. Gastric cancer and Helicobacter pylori: a combined analysis of 12 case control studies nested within prospective cohorts. Gut, 2001, 49:347353
3. Huang JQ, Sridhar S, Hunt RH. Role of Helicobacter pylori infection and non-steroidal anti-inflammatory drugs in peptic-ulcer disease: a meta-analysis. Lancet, 2002, 359:1422.
4. Kamangar F, Dawsey SM, Blaser MJ et al. Opposing risks of gastric cardia and noncardia gastric adenocarcinomas associated with Helicobacter pylori seropositivity. J Natl Cancer Inst 2006;98:14451452)
5. Freedman ND, Abnet CC, Leitzmann MF et al. A prospective study of tobacco, alcohol, and the risk of esophageal and gastric cancer subtypes. Am J Epidemiol 2007;165:14241433
6. Sriamporn S, Setiawan V, Pisani P et al (2002).Gastric Cancer: the Roles of Diet, Alcohol Drinking, Smoking and Helicobacter pylori in Northeastern Thailand. Asian Pac J Cancer Prev. 2002; 3(4):345-352.

Figure 31: Age specific incidence rates for stomach cancer by population group, 2002

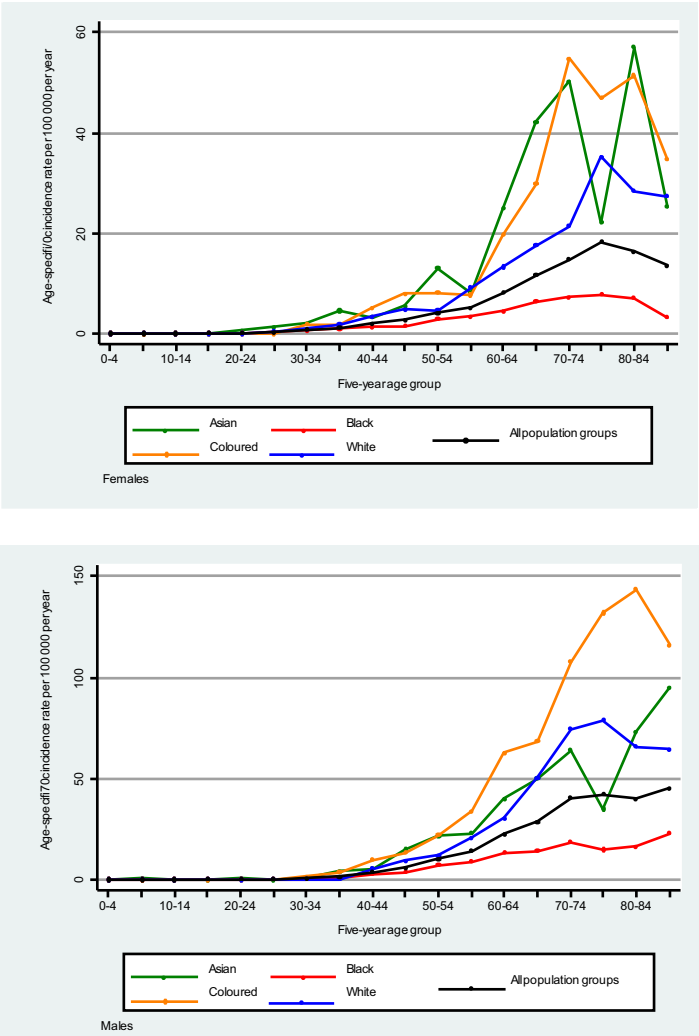

Figure 32: Stomach cancer ASR per 100 000 for selected populations

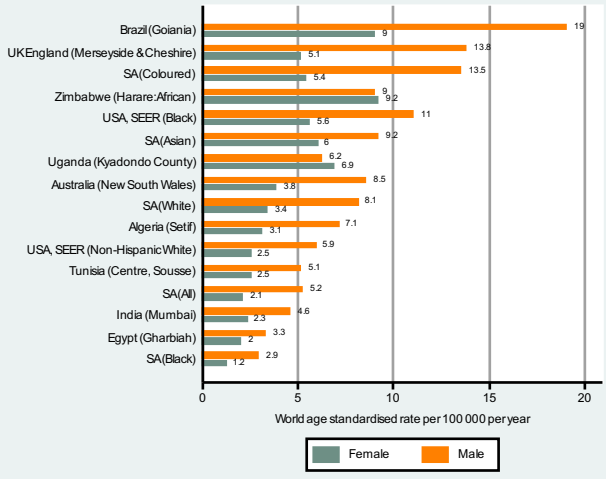

Table 14: Summary statistics for stomach cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Males, 2000									
Asian	37	39	6.47	6.88	8.69	5.79	11.59	1.09	91
Black	274	289	3.12	1.71	3.26	2.87	3.66	0.39	257
Coloured	155	162	4.88	8.33	14.69	12.34	17.05	1.86	54
White	254	265	1.76	11.61	9.1	7.99	10.21	1.2	83
Total	749	755	2.67	3.47	5.85	5.42	6.28	0.73	137
Females, 2000									
Asian	31	33	4.47	5.64	6.31	4.07	8.55	0.81	123
Black	174	183	1.52	1.01	1.48	1.26	1.7	0.18	571
Coloured	84	87	2.66	4.25	5.9	4.63	7.18	0.77	129
White	137	142	1.19	5.97	3.9	3.23	4.57	0.48	209
Total	441	445	1.59	1.92	2.47	2.24	2.71	0.3	332
Males, 2001									
Asian	38	41	6.52	7.17	10	6.69	13.31	1.07	93
Black	242	258	2.72	1.5	2.75	2.4	3.1	0.34	293
Coloured	156	165	4.66	8.39	14.87	12.47	17.27	1.67	60
White	218	232	1.43	10.24	7.77	6.76	8.79	0.95	105
Total	688	695	2.33	3.15	5.2	4.8	5.6	0.62	161
Females, 2001									
Asian	29	30	3.35	5.09	6.11	3.85	8.37	0.8	125
Black	157	165	1.31	0.9	1.26	1.06	1.46	0.16	637
Coloured	91	94	2.63	4.55	6.23	4.95	7.52	0.73	136
White	128	132	1.06	5.58	3.52	2.89	4.16	0.38	263
Total	416	422	1.42	1.8	2.26	2.04	2.48	0.27	377
Males, 2002									
Asian	39	40	6.99	7.07	8.97	5.98	11.96	1.19	84
Black	243	253	2.77	1.44	2.72	2.37	3.07	0.33	304
Coloured	124	129	4.05	6.48	11.09	9.08	13.1	1.3	77
White	213	219	1.44	9.75	7.36	6.37	8.34	0.89	112
Total	638	641	2.28	2.87	4.71	4.34	5.08	0.57	176
Females, 2002									
Asian	29	30	3.81	5.19	5.56	3.55	7.56	0.73	138
Black	112	118	0.96	0.63	0.88	0.72	1.04	0.1	980
Coloured	65	68	2.14	3.24	4.12	3.11	5.12	0.55	183
White	103	109	0.9	4.62	2.84	2.28	3.4	0.31	326
Total	324	325	1.14	1.37	1.72	1.53	1.91	0.2	505

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Cancer of the Uterus

Adenocarcinomas arising from the endometrial lining of the uterus account for 95% of uterine cancers. Endometrial stromal sarcomas and leiomyosarcomas comprise the remaining 5% (Bokhman.1983). Age is an important risk factor for uterine adenocarcinomas. A history of unopposed oestrogen exposure and/or endometrial hyperplasia increases risk. The reasons for chronic unopposed oestrogen exposure are multifactorial and often due to various conditions such as anovulation, polycystic ovarian syndrome, obesity, oestrogen-only hormone replacement therapy, and prolonged tamoxifen use (Creaseman, 1997). Although the majority of uterine cancers occur in the 55-74 age group, a percentage of younger women <40 years are diagnosed due to an increase in risk factors such as marked obesity, diabetes mellitus, and hypertension (Gallup et al.,1984). Nulliparity, infertility, early menarche, late menopause, ovarian and breast cancer are possible risk factors. Progesterone is a key hormone in the endometrium that opposes oestrogen-driven growth and therefore decreases the risk of uterine cancer. Pregnancy and oral contraceptives increase progesterone levels and therefore decrease the risk of uterine cancer (Kim J et al.,2010).

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Figure 33: Age specific incidence rates for uterine cancer by population group, 2002

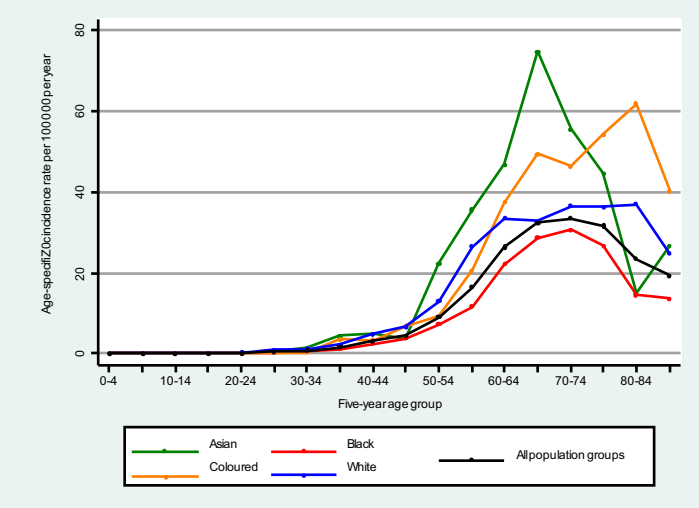

Figure 34: Uterine cancer ASR per 100 000 for selected populations

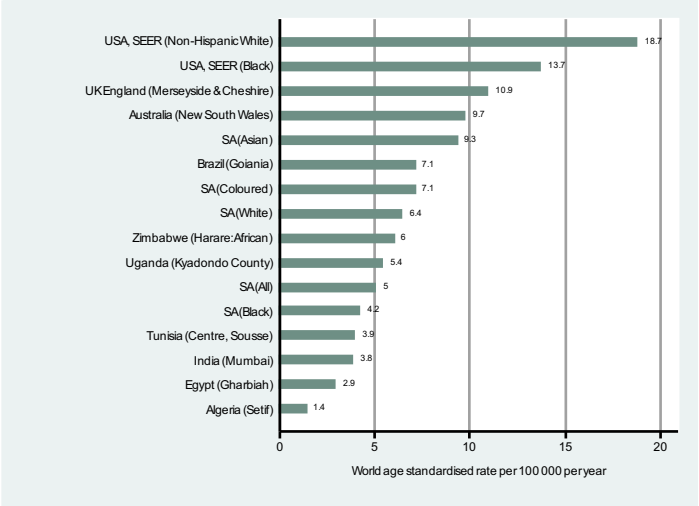

Table 15: Summary statistics for uterine cancer, 2000-2002

Population Group	N(OBS)	N(ADJ)	%	CRUDE	ASR	95% LCL	95% UCL	CUMRISK 0-74	LR 0-74
Females, 2000									
Asian	37	39	5.32	6.72	7.86	5.34	10.38	1.07	93
Black	435	455	3.79	2.51	3.87	3.51	4.24	0.5	200
Coloured	77	81	2.47	3.94	5.65	4.39	6.91	0.77	131
White	157	164	1.37	6.88	4.83	4.06	5.59	0.58	171
Total	739	739	2.64	3.19	4.3	3.99	4.62	0.55	181
Females, 2001									
Asian	55	57	6.46	9.83	10.52	7.74	13.3	1.34	75
Black	490	513	4.05	2.78	4.23	3.86	4.6	0.58	173
Coloured	111	116	3.25	5.61	7.84	6.38	9.3	1	100
White	230	241	1.93	10.18	6.96	6.05	7.87	0.87	115
Total	928	928	3.13	3.95	5.28	4.93	5.62	0.69	144
Females, 2002									
Asian	47	50	6.19	8.42	9.54	6.82	12.26	1.31	77
Black	503	528	4.29	2.82	4.35	3.98	4.73	0.56	179
Coloured	115	121	3.81	5.76	7.81	6.39	9.23	0.89	113
White	253	267	2.2	11.31	7.49	6.56	8.42	0.91	110
Total	965	965	3.39	4.06	5.42	5.07	5.77	0.68	148

N(OBS)	Number of new cases with sex known
N(ADJ)	Number of new cases adjusted for those with sex unknown
%	Percentage of all cancers
CRUDE	Adjusted cases per 100 000/year
ASR	Age standardised incidence rate per 100 000 (World standard population)
	The ASR calculation incorporates an adjustment for the proportion of cases with age unknown
95% L/UCL	Lower/Upper 95% confidence intervals for the ASR
CUMRISK 0-74	Cumulative lifetime incidence risk (0-74 years)
LR 0-74	Lifetime (0-74) risk of developing a cancer expressed as 1 in X number of people
*TOTALS	The rates calculated for the total exclude BCC and SCC of the skin

Cancer and HIV

South Africa has one of the largest HIV epidemics in the world by proportion infected with 20 to 25% of the adult population (18 64) infected. An estimated 106 732 people in South Africa were HIV-positive in 1991 and 6 461 372 in 2002 (Dorrington RE et al 2002).

HIV infection is a well-documented risk factor for some cancers. Early in the HIV epidemic three cancers were recognised as "AIDS-defining" by the US Centers for Disease Control (CDC): Kaposi sarcoma (KS), cancer of the cervix (CaCx) and non Hodgkin lymphoma (NHL). As the epidemic evolved it has been observed that HIV positive persons have higher overall risks for both these 'AIDS-defining' cancers and some other cancers (non AIDS-defining cancers or NADCs) which vary from region to region (Pantanowitz L & Dezube BJ 2009) and may, in some cases, be increased by lifestyle behaviours such as tobacco and alcohol use, multiple sexual partners. Occurrence, presentation, and progression of some cancers can be affected by HIV infection itself due to immune suppression, immune reconstitution and/or chronic inflammation (Engels EA 2009).

Many of the cancers seen at increased frequencies in HIV positive persons have an infection as a contributing cause e.g. human herpesvirus 8 (HHV8) for KS and human papillomaviruses (HPVs) for CaCx, anal and other squamous cell skin cancers and conjunctival cancer. KS responds well to anti-retroviral therapy (ART); however the latest data indicate that a decrease in HPV-related cancers may not be seen in HIV positive persons on ART compared to those not taking ART (Palefsky J et al 2009).

The table gives numbers reported to the NCR in the most affected race and age groups for some of the cancers known to be HIV-related in at least some settings. It reflects all cases of those cancers, in both HIV positive and HIV negative individuals.

In 2002 KS ranked as the eighth most common cancer reported (1318 cases), even though it is often diagnosed without laboratory tests; by comparison it was ranked 34th in 1991 with only 122 cases (NCR 1996). KS was the most common cancer recorded in black African females aged 20 29 and in black African males aged 20 44 in 2002. In South Africa KS was previously a rare cancer of mainly elderly males.

Reported eye cancers increased from 184 in 1991 to 305 overall in 2002 and from 138 to 254 respectively in black Africans. Of the 2002 total 169 were cancers of the conjunctiva and 62 eye cancers of unspecified sub-site. In the age group 15 54 the increase was approximately fourfold for this previously rare cancer (see Table 16). Nine out of 12 conjunctival cancers seen in the Johannesburg Cancer Case Control Study (JCCCS) were in HIV positive individuals (Urban MI unpublished). Known additional risk factors for squamous cell cancer of the conjunctiva are HPV infection and solar ultraviolet (UV) radiation (Sasco AJ et al 2010).

The JCCCS predicted an increase in cervical cancer cases in HIV positive women (Stein L et al 2008) although other studies in different populations and provinces of South Africa (Moodley JR et al 2006) and elsewhere did not. The numbers reported to the NCR do not show an increase; in relation to population growth they rather show a decrease which may in part reflect competing morbidities and/or lack of access to diagnostic facilities. What has been confirmed by several local (Moodley JR et al 2006; Firnhaber C et al 2010) and other studies is a significant increase in pre-cancerous cervical lesions in positive women who need regular monitoring for progression to cancer.

Given the scale of the HIV epidemic in South Africa it is imperative to conduct further well designed scientific research in order to confirm which types of cancer are seen with differing clinical presentations and/or in increased frequency in HIV infected persons both with and without ART. Cancer registry data can only give an overall measure of the burden of cancer; it cannot distinguish between HIV positive and negative individuals. Cancer awareness, diagnosis and treatment need to be incorporated into HIV programmes. HIV diagnosis and treatment structures should be used for cancer prevention (e g smoking cessation), screening (e g Pap smears), and early detection, as well as research.

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Table 16: Microscopically verified cases of potentially HIV-associated cancers in Black (African) South Africans age 15 - 54 2002 and 1991[NCR 1996]

Black Females:	15 - 34		35 - 54	
	2002	1991	2002	1991
KS[a,b]	n=280	n=5	n=150	n=4
Cervix[a,b]	286	433	1745	1888
NHL[a,b]	90	51	107	43
SCC of skin[b]	23	22	62	54
HL[b]	24	23	26	15
Eye[c]	52	12	50	7

Black Males:	15 - 34		35 - 54	
	2002	1991	2002	1991
KS[a,b]	n=273	n=8	n=315	n=19
NHL[a,b]	77	73	147	95
HL[b]	49	37	38	25
SCC of skin[b]	23	25	87	67
Eye[c]	20	12	54	12

[a] AIDS-defining cancers (CDC)

[b] Increased risk found for HIV+ persons in Johannesburg Cancer Case Control Study (Stein et al 2008)

[c] Cancer of conjunctiva strongly associated with HIV infection in tropical Africa (Waddell KM et al 1996)