1999

Ministry of Health
Sultanate of Oman

Cancer Incidence in Oman 1999

Oman National Cancer Registry
Non-Communicable Disease Control Section
Directorate General of Health Affairs

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Preface

Cancer becomes an increasingly important issue for developing and developed countries alike. The World Health Organization (WHO) estimates that 300 million new cases of cancer and 200 million deaths from this disease will occur globally in the next 25 years, with almost two-thirds of the cases arising in developing countries where resources for treatment and prevention are scarce.

As life expectancy increases in Oman (currently 74 years), the proportion of elderly population is expected to increase. Rapid socio-economic developments have resulted in changes in lifestyles such as increase prevalence of tobacco use, decrease in physical activity and rapid uptake of unhealthy food habits. This will inevitably results in raising burden of non-communicable diseases including cancer. in fact, hospital-based mortality data persistently show malignant neoplasms as the second leading cause of death among Omanis aged 15 and above.

Although the extent of cancer burden can be estimated from mortality data, such as vital statistics, population-based cancer registries provide more comprehensive, valid and detailed information on patients characteristics. Therefore the role of such registry becomes obvious in describing the extent and nature of cancer burden in any community and monitoring its trends. Recognizing this as a key issue, the Ministry of Health established the Oman National Cancer Registry (ONCR) in 1985. Since then the Registry has gone along way to improve the accuracy and validity of the data collected.

With the publication of this fourth report I would like to draw the reader's attention to two important issues. First, we would like all professionals, from different disciplines, not only to make maximum use of this report but also use the Registry's full potential as a database for the further research which will contribute and increase our understanding of cancer incidence in Oman and thus advancing prevention and control efforts which are the ultimate goal of any cancer control programme. A form for request of data from the Registry is enclosed at the end of this report.

Second, to make your contribution to the Registry and to minimize underreporting and missed cases, I would like to ask our clinical colleagues to report cases they see and diagnose as "cancer", be it clinical suspicion or proven cases by histology and or microscopy.

Finally, on behalf of the National Cancer Control Committee, I would like to express my sincere thanks and gratitude to all health professionals from the oncology satellite units throughout Oman and those who work in sister institutions for prompt notification of cases to the Registry. We are also grateful to Dr Falah Al-Khateeb from Tuwam Hospital in UAE for their continuous cooperation with the ONCR. I also would like to thank the staff of the Non-communicable Diseases Section for their dedication, commitment and devotion to the registry and hard work towards this report.

Dr. Ali Jaffer Mohammed
Chairman, National Cancer Control Committee

Table of Contents

List of Tables

List of Figures

Background of The Sultanate of Oman

Geographical Features

The Sultanate of Oman is located in the south eastern corner of the Arabian Peninsula. It has a coastal line extending almost 1,700 kilometers from the Strait of Hurmuz in the north to the borders of the Republic of Yemen, overlooking three seas; the Arabian Gulf, Gulf of Oman and the Arabia Sea. The Sultanate of Oman borders Saudi Arabia and United Arab Emirates (UAE) in the west, the Republic of Yemen in the south, the Strait of Hurmuz in the north and the Arabian Sea in the east. Besides, there are a number of scattered Omani islands in the Arabian Sea; the most important are Masirah and Al-Halaniyat.

The total area of the Sultanate of Oman is approximately 309,500 square kilometers and it is the second largest country in the Arabian Peninsula. The Sultanate is composed of varying topographic areas consisting of plains, wadis (dry river beds) and mountains. The most important area is the plain overlooking the Gulf of Oman and the Arabian Sea with an area of about 3% of the total area. The mountain ranges occupy almost 15% of the total land of Oman and is inhabited by about 5% of the population. The remaining area is mainly sand, wadis and desert (about 82% of the total area). The climate differs from one area to another; it is hot and humid in the coastal areas in summer, hot and dry in the interior with exception of higher mountains and Dhofar Governorate, which enjoy a moderate climate throughout the year.

The Sultanate of Oman is administratively divided into 8 Governorate/Regions with 59 Wilayats. These are: Muscat, Dhofar and Musandam Governorate and regions of Dakhiliya, Sharqiyah, Batinah, Dhahira, and Al-Wousta. The regions of Sharqiyah and Batinah have each been further subdivided into two, for health administration, giving a total of ten health regions.

Population Structure

The estimated mid year population in 1999 was 2,325,460 of which 1,729,330 were Omanis and 596,130 were expatriates (Table 1). The Omani population shows a sex ratio of 103 males per 100 females. About 14% of the population is under-5 years and 44% is under-15 years. Only 4.7% of the total Omani population is above the age of 60 years.

Table 2 gives the population distribution of Omanis by region and gender which was used to calculate incidence rates for different regions.

Table 1: Age Structure of the Omani Population by Gender

Age	Male		Female		Total	
Group	Number	Percentage	Number	Percentage	Number	Percentage
0 – 4	124,260	14.1	119,830	14.1	244,090	14.1
5 – 9	129,690	14.8	124,700	14.7	254,390	14.7
10 – 14	136,780	15.6	132,910	15.6	269,690	15.6
15 – 19	125,630	14.3	120,730	14.2	246,360	14.2
20 – 24	94,000	10.7	88,830	10.4	182,830	10.6
25 – 29	60,650	6.9	55,100	6.5	115,750	6.7
30 – 34	41,890	4.8	40,970	4.8	82,860	4.8
35 – 39	32,500	3.7	33,420	3.9	65,920	3.8
40 – 44	28,500	3.2	32,550	3.8	61,050	3.5
45 – 49	23,460	2.7	24,130	2.8	47,590	2.8
50 – 54	20,840	2.4	20,690	2.4	41,530	2.4
55 – 59	20,460	2.3	19,350	2.3	39,810	2.3
60 – 64	12,880	1.5	10,940	1.3	23,820	1.4
65 – 69	13,160	1.5	11,010	1.3	24,170	1.4
70 – 74	6,030	0.7	5,400	0.6	11,430	0.7
75 – 79	4,840	0.6	5,420	0.6	10,260	0.6
80 - 84	1,740	0.2	1,950	0.2	3,690	0.2
85 +	1,820	0.2	2,270	0.3	4,090	0.2
Total	879,130	100	850,200	100	1,729,330	100

Table 2: Population Distribution of Omanis by Region and Gender

Governorate / Region	No. of Males	No. of Females	Total Population
Al-Wousta	8,380	7,410	15,790
Dakhiliya	114,470	116,300	230,770
Dhahira	80,740	76,440	157,180
Dhofar	75,620	71,260	146,880
Musandam	13,530	12,480	26,010
Muscat	185,430	168,540	353,970
North Batinah	173,760	171,490	345,250
North Sharqiyah	59,040	59,250	118,290
South Batinah	100,410	99,070	199,480
South Sharqiyah	67,750	67,960	135,710
Total	879,130	850,200	1,729,330

Oman National Cancer Registry

Cancer is emerging as a major public health problem throughout the world. Of more than 9 million new cases diagnosed worldwide in 1997, 52% occurred in developing countries, At least 6 million people who already had the disease died from it. At present cancer accounts for about one-tenth of all deaths world wide. The rapid improvements in the field of health care in the Sultanate of Oman, together with the control of communicable diseases, increased life expectancy at birth, and with rapid socio-economic changes has resulted in an increased prevalence of non-communicable disease including cancer.

The Cancer Registry in Oman was established in 1985 as a hospital-based cancer registry. Only cases treated in tertiary hospitals were included. In 1996, with the establishment of the Non-communicable Diseases Section, the cancer registry was shifted and started functioning under the Directorate General of Health Affairs. New cancer notification forms were developed and distributed to all regional hospitals and sister institutions. The cancer registrar is responsible for data collection, coding and data entry.

Methods of Data Collection

1. Active Collection

Active collection involves the registry personnel visiting different sources and abstracting data on Cancer Registry Forms. Since most of the cancer cases are referred to the Oncology Department of the Royal Hospital, the cancer registrar visits the Royal Hospital twice a week and abstracts data on the notification forms. Similarly, other tertiary hospitals like Khoula Hospital and Al-Nahdah Hospital are visited once a month.

Patients diagnosed outside the health facilities in Oman are traced through the Oncology outpatient register by the Cancer Registrar and subsequently data are extracted from their case notes. Details of patients treated abroad are obtained from the Department of Treatment Abroad, Ministry of Health.

2. Passive Reporting

When cancer cases are diagnosed, the attending physician of the relevant specialty at the regional hospital completes the notification forms and send them to the registry. Similar passive reporting is done by other institutions like the Armed Forces Hospital and Sultan Qaboos University Hospital.

3. Data-Coding, Entry and Duplicate Entry Checking

All cancer cases are coded using International Classification of Diseases for Oncology (ICD-O) codes, 2nd Edition, with topography 'C' and morphology 'M' codes. Data are entered in CanReg-3 programme, supplied by the International Agency for Research on Cancer (IARC), Lyon France. This programme has a duplicate entry checking facility which avoids the same case being registered more than once.

4. Completeness of Data Reporting

Data are obtained from pathology laboratories for all cases diagnosed as cancer. Data are also obtained from the Medical Records Department of the Royal Hospital regarding discharges and hospital deaths due to cancer. The paediatric oncology department of the Royal Hospital and the paediatric department of the Sultan Qaboos University Hospital supply data on childhood cancers. These data are compared with that in the registry. Details of missing data are sought from the respective institutions. This ensures completeness of data reporting.

5. Data Entry and Analysis

Data are entered in CanReg-3 programme. This programme generates frequency distribution and incidence tables. The data are then exported to EPINFO version 6.0 (Centre for Disease control and Prevention, Georgia Atlanta), for further analysis.

Due to the "skewed" distribution of the Omani population, the **World Standard Population,** (Table 3 After Doll *et al.,* 1966) was used to adjust the crude incidence rates and hence remove the confounding effect of age. Therefore, the age-adjusted rates given in tables 8 and 9 could be used for comparison purposes with other rates where the same world standard population was used, especially those issued by the World Health Organization's agency, the International Agency for Research on Cancer (IARC), in its periodic publication Cancer Incidence in Five Continents.

Table 3: World Standard Population Used for Age-adjustment

Age Group	Population
0-4	12,000
5-9	10,000
10-14	9,000
15-19	9,000
20-24	8,000
25-29	8,000
30-34	6,000
35-39	6,000
40-44	6,000
45-49	6,000
50-54	5,000
55-59	4,000
60-64	4,000
65-69	3,000
70-74	2,000
75-79	1,000
80-84	500
85+	500
Total	100,000

Cancer among the Omani Population

Overall Results

The total number of cancer cases registered in 1999 in the Oman National Cancer Registry was 929 (Table 4). Of these, 847 (91.2%) cases were among Omanis, and 81 (8.7%) cases were expatriates. In one case (0.1%), the nationality was unknown.

Table 4: **Distribution of Cancer Cases In Oman by Nationality**

Nationality	Frequency	Percentage (%)
Omanis	847	91.2
Expatriates	81	8.7
Unknown	1	0.1
Total	929	100

Age & Sex

Of the total 847 cases, males accounted for 455 cases (53.7%), and females accounted for 392 cases (46.3%) (Table 5); the male : female ratio being 1.2 : 1. Seventy-four cases (8.7%) were reported in children aged 14 years and below. The overall mean and median age at diagnosis was 49.5 and 52 years respectively. This was higher in males (mean 51.5, median age 55 years) than in females (median 47, median 50 years).

Table 5: Distribution of Cancer Cases among Omanis by Gender

Sex	Frequency	Percentage (%)
Male	455	53.7
Female	392	46.3
Total	847	100

Tables 6 and 7 give the frequency distribution of incident cases of cancer by site and age group in Omani males and females respectively.

Incidence Rates

In 1999, the crude incidence rates for all cancers among Omanis 51.8 per 100,000 for males and 46.1 per 100,000 for females. The age standardized rates, adjusted to the world standard population, was 103.7 per 100,000 for males and 88.2 per 100,000 for females (Tables 8 and 9).

Basis of Diagnosis

Tables 10 gives the most valid basis of diagnosis of the various cancers for males and females. The majority of cases 87.4% were diagnosed by histology of the primary or metastasis including cytological and haematological investigations. clinical investigation (e.g. X-ray, Isotopes) or specific biochemical tests including Immunological assays, exploration surgery without histology and death certificate, was the second most common method of diagnosis (11.1%). Cases diagnosed clinically alone constituted only 1.5%.

Table 6: Frequency of Incident Cases among Omanis by Site and Age (Male)

NUMBER OF CASES - Male

SITE	ALL AGES	AGE UNK.	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+	% of Total	ICD (10th)
Lip	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.4%	C00
Tongue	5	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	1	1.1%	C01-C02
Salivary gland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C07-C08
Mouth	4	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	1	0.9%	C03-C06
Oropharynx	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2%	C09-C10
Nasopharynx	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0.4%	C11
Hypopharynx	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2%	C12-C13
Pharynx unspec.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C14
Oesophagus	10	0	0	0	0	0	0	0	0	0	0	1	2	0	2	2	1	2	2.2%	C15
Stomach	55	0	0	0	0	0	0	0	1	3	4	7	4	6	10	11	5	4	12.1%	C16
Small intestine	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2%	C17
Colon	6	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	2	0	1.3%	C18
Rectum	13	0	0	0	0	0	2	0	0	0	2	3	2	2	0	1	0	1	2.9%	C19-C21
Liver	33	0	0	0	0	0	0	1	0	1	1	2	4	3	12	1	5	3	7.3%	C22
Gallbladder etc.	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0.7%	C23-C24
Pancreas	5	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	1.1%	C25
Nose, sinuses etc.	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.4%	C30-C31
Larynx	6	0	0	0	0	0	0	0	0	0	1	0	1	0	3	1	0	0	1.3%	C32
Bronchus, lung	46	0	0	0	1	0	1	0	0	1	4	4	4	4	14	3	8	2	10.1%	C33-C34
Other Thoracic organs	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.4%	C37-C38
Bone	3	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0.7%	C40-C41
Connective tissue	7	0	0	0	2	1	0	1	0	0	0	0	0	0	1	1	1	0	1.5%	C47;C49
Mesothelioma	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2%	C45
Kaposi's sarcoma	5	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	2	0	1.1%	C46
Melanoma of skin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C43
Other skin	13	0	0	0	0	0	0	0	0	1	0	1	3	4	2	0	1	1	2.9%	C44
Breast	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4%	C50
Prostate	41	0	0	0	0	0	0	0	0	0	1	2	4	3	11	5	4	11	9.0%	C61
Testis	3	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0.7%	C62
Penis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C60
Other male genital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C63
Bladder	23	0	0	0	0	0	0	0	0	1	2	3	0	1	4	5	2	5	5.1%	C67
Kidney etc.	8	0	2	0	0	0	0	0	0	0	0	1	2	1	0	1	0	1	1.8%	C64-C66;C68
Eye	3	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0.7%	C69
Brain, nervous system	16	0	2	2	0	2	0	0	1	0	1	1	1	2	2	0	0	2	3.5%	C70-C72
Thyroid	8	0	0	0	0	0	0	1	0	1	2	0	0	0	1	3	0	0	1.8%	C73
Other endocrine	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4%	C74-C75
Hodgkin's disease	18	0	1	4	1	3	2	1	1	1	1	0	0	0	0	1	0	2	4.0%	C81
Non-Hodgkin lymphoma	39	0	2	2	1	0	2	3	2	5	6	1	2	1	8	1	3	0	8.6%	C82-C85;C96
Multiple myeloma	7	0	0	0	0	1	0	0	0	0	1	0	1	0	1	1	1	1	1.5%	C88;C90
Lymphoid leukaemia	17	0	3	4	3	3	0	0	0	0	0	1	1	0	0	0	1	1	3.7%	C91
Myeloid leukaemia	11	0	0	0	2	1	0	0	1	1	0	2	1	0	1	0	1	1	2.4%	C92
Monocytic leukaemia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C93
Other leukaemia	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2%	C94
Leukaemia unspec.	5	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	0	1.1%	C95
Other & unspecified	25	0	0	1	0	2	1	0	0	2	1	1	2	6	4	2	1	2	5.5%	
All sites	455	0	12	14	10	15	11	8	6	22	29	36	45	40	82	40	43	42	100.0%	

Table 7: Frequency of Incident Cases among Omanis by Site and Age (Female)

NUMBER OF CASES - Female

SITE	ALL AGES	AGE UNK.	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+	% of Total	ICD (10th)
Lip	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C00
Tongue	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0.8%	C01-C02
Salivary gland	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.5%	C07-C08
Mouth	4	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	1.0%	C03-C06
Oropharynx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C09-C10
Nasopharynx	4	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0	0	1.0%	C11
Hypopharynx	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3%	C12-C13
Pharynx unspec.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C14
Oesophagus	12	0	0	0	0	0	0	0	0	0	1	0	1	1	1	5	2	1	3.1%	C15
Stomach	26	0	0	0	1	0	0	0	0	0	1	4	5	3	2	0	7	3	6.6%	C16
Small intestine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C17
Colon	4	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1.0%	C18
Rectum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C19-C21
Liver	16	0	1	0	0	0	0	0	0	0	0	2	4	3	1	0	3	2	4.1%	C22
Gallbladder etc.	5	0	0	0	0	0	0	0	0	0	0	0	2	1	2	0	0	0	1.3%	C23-C24
Pancreas	5	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	1	1.3%	C25
Nose, sinuses etc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C30-C31
Larynx	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C32
Bronchus, lung	9	0	0	0	0	0	0	0	0	2	0	0	1	1	1	2	1	1	2.3%	C33-C34
Other Thoracic organs	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3%	C37-C38
Bone	6	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	1.5%	C40-C41
Connective tissue	5	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	1	0	1.3%	C47;C49
Mesothelioma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C45
Kaposi's sarcoma	3	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0.8%	C46
Melanoma of skin	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3%	C43
Other skin	22	0	0	1	1	1	0	0	0	1	1	2	3	1	0	3	4	4	5.6%	C44
Breast	55	0	0	0	0	0	1	2	2	2	8	9	14	7	7	0	2	1	14.0%	C50
Uterus unspec.	5	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	2	0	1.3%	C55
Cervix uteri	22	0	0	0	0	0	0	0	1	4	2	2	3	2	4	1	2	1	5.6%	C53
Placenta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C58
Corpus uteri	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3%	C54
Ovary etc.	29	0	0	0	2	4	0	1	0	0	2	3	5	1	4	1	1	5	7.4%	C56
Other female genital	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3%	C51-C52;C57
Bladder	12	0	1	0	0	0	0	0	0	1	1	2	0	0	1	2	4	0	3.1%	C67
Kidney etc.	4	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1.0%	C64-C66;C68
Eye	5	0	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1.3%	C69
Brain, nervous system	14	0	1	3	3	2	0	0	0	0	3	1	1	0	0	0	0	0	3.6%	C70-C72
Thyroid	31	0	0	0	0	5	3	4	1	7	2	6	2	0	0	1	0	0	7.9%	C73
Other endocrine	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3%	C74-C75
Hodgkin's disease	9	0	0	1	0	1	1	0	0	0	1	1	0	1	2	0	1	0	2.3%	C81
Non-Hodgkin lymphoma	18	0	1	3	0	3	1	4	0	0	1	0	1	0	3	0	1	0	4.6%	C82-C85;C96
Multiple myeloma	9	0	0	0	0	0	0	0	0	1	1	0	2	0	3	0	1	1	2.3%	C88;C90
Lymphoid leukaemia	8	0	4	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2.0%	C91
Myeloid leukaemia	9	0	0	0	0	1	0	0	2	1	0	2	1	0	0	1	1	0	2.3%	C92
Monocytic leukaemia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C93
Other leukaemia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	C94
Leukaemia unspec.	4	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0%	C95
Other & unspecified	26	0	1	0	0	0	1	1	0	1	1	1	6	0	2	3	6	3	6.6%	
All sites	392	0	14	13	11	19	10	14	9	24	31	39	52	27	39	22	43	25	100.0%	

Table 8: Age Specific Incidence Rates per 100,000 among Omanis (Male)

INCIDENCE TABLES - Male

SITE	ALL AGES	AGE UNK.	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+	CRUDE RATE	ASR WORLD	ICD (10th)
Lip	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.2	-	0.2	0.7	C00
Tongue	5	0	-	-	-	-	-	-	-	-	3.5	4.3	9.6	-	-	-	-	11.9	0.6	1.2	C01-C02
Salivary gland	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C07-C08
Mouth	4	0	-	-	-	-	-	-	-	3.1	-	8.5	-	-	-	-	-	11.9	0.5	0.9	C03-C06
Oropharynx	1	0	-	-	-	-	-	-	-	3.1	-	-	-	-	-	-	-	-	0.1	0.2	C09-C10
Nasopharynx	2	0	-	-	-	-	-	-	-	-	-	4.3	-	4.9	-	-	-	-	0.2	0.5	C11
Hypopharynx	1	0	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	C12-C13
Pharynx unspec.	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C14
Oesophagus	10	0	-	-	-	-	-	-	-	-	-	4.3	9.6	-	15.5	15.2	16.6	23.8	1.1	2.6	C15
Stomach	55	0	-	-	-	-	-	-	2.4	9.2	14.0	29.9	19.2	29.3	77.7	83.6	83.0	47.7	6.3	13.7	C16
Small intestine	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.6	-	0.1	0.3	C17
Colon	6	0	-	-	-	-	-	-	-	-	3.5	4.3	-	9.8	-	-	33.2	-	0.7	1.5	C18
Rectum	13	0	-	-	-	-	2.1	-	-	-	7.0	12.8	9.6	9.8	-	7.6	-	11.9	1.5	2.7	C19-C21
Liver	33	0	-	-	-	-	-	1.6	-	3.1	3.5	8.5	19.2	14.7	93.2	7.6	83.0	35.7	3.8	8.9	C22
Gallbladder etc.	3	0	-	-	-	-	-	-	-	3.1	-	-	4.8	-	-	-	16.6	-	0.3	0.8	C23-C24
Pancreas	5	0	-	-	-	-	-	-	-	-	-	-	-	-	31.1	7.6	-	-	0.6	1.5	C25
Nose, sinuses etc.	2	0	-	-	-	-	-	-	-	-	-	-	4.8	-	-	-	-	11.9	0.2	0.5	C30-C31
Larynx	6	0	-	-	-	-	-	-	-	-	3.5	-	4.8	-	23.3	7.6	-	-	0.7	1.6	C32
Bronchus, lung	46	0	-	-	0.7	-	1.1	-	-	3.1	14.0	17.1	19.2	19.6	108.8	22.8	132.8	23.8	5.2	12.1	C33-C34
Other Thoracic organs	2	0	-	-	-	-	-	-	-	-	-	4.3	4.8	-	-	-	-	-	0.2	0.5	C37-C38
Bone	3	0	-	-	-	-	1.1	1.6	-	-	-	-	4.8	-	-	-	-	-	0.3	0.5	C40-C41
Connective tissue	7	0	-	-	1.5	0.8	-	1.6	-	-	-	-	-	-	7.8	7.6	16.6	-	0.8	1.2	C47;C49
Mesothelioma	1	0	-	-	-	-	-	-	-	-	-	-	4.8	-	-	-	-	-	0.1	0.2	C45
Kaposi's sarcoma	5	0	-	-	-	-	-	-	-	-	-	-	9.6	4.9	-	-	33.2	-	0.6	1.3	C46
Melanoma of skin	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C43
Other skin	13	0	-	-	-	-	-	-	-	3.1	-	4.3	14.4	19.6	15.5	-	16.6	11.9	1.5	3.1	C44
Breast	2	0	-	-	-	-	-	-	-	-	-	-	4.8	4.9	-	-	-	-	0.2	0.4	C50
Prostate	41	0	-	-	-	-	-	-	-	-	3.5	8.5	19.2	14.7	85.5	38.0	66.4	131.0	4.7	10.8	C61
Testis	3	0	-	-	-	-	1.1	-	-	3.1	-	-	-	4.9	-	-	-	-	0.3	0.5	C62
Penis	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C60
Other male genital	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C63
Bladder	23	0	-	-	-	-	-	-	-	3.1	7.0	12.8	-	4.9	31.1	38.0	33.2	59.6	2.6	5.8	C67
Kidney etc.	8	0	1.6	-	-	-	-	-	-	-	-	4.3	9.6	4.9	-	7.6	-	11.9	0.9	1.6	C64-C66;C68
Eye	3	0	0.8	-	-	-	-	-	-	-	-	-	-	4.9	-	-	16.6	-	0.3	0.6	C69
Brain, nervous system	16	0	1.6	1.5	-	1.6	-	-	2.4	-	3.5	4.3	4.8	9.8	15.5	-	-	23.8	1.8	2.8	C70-C72
Thyroid	8	0	-	-	-	-	-	1.6	-	3.1	7.0	-	-	-	7.8	22.8	-	-	0.9	1.7	C73
Other endocrine	2	0	0.8	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2	C74-C75
Hodgkin's disease	18	0	0.8	3.1	0.7	2.4	2.1	1.6	2.4	3.1	3.5	-	-	-	-	7.6	-	23.8	2.0	2.2	C81
Non-Hodgkin lymphoma	39	0	1.6	1.5	0.7	-	2.1	4.9	4.8	15.4	21.1	4.3	9.6	4.9	62.2	7.6	49.8	-	4.4	8.1	C82-C85;C96
Multiple myeloma	7	0	-	-	-	0.8	-	-	-	-	3.5	-	4.8	-	7.8	7.6	16.6	11.9	0.8	1.6	C88;C90
Lymphoid leukaemia	17	0	2.4	3.1	2.2	2.4	-	-	-	-	-	4.3	4.8	-	-	-	16.6	11.9	1.9	2.1	C91
Myeloid leukaemia	11	0	-	-	1.5	0.8	-	-	2.4	3.1	-	8.5	4.8	-	7.8	-	16.6	11.9	1.3	2.2	C92
Monocytic leukaemia	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C93
Other leukaemia	1	0	-	-	-	-	-	-	-	-	-	-	-	-	7.8	-	-	-	0.1	0.3	C94
Leukaemia unspec.	5	0	-	0.8	-	-	1.1	-	-	3.1	-	-	4.8	-	7.8	-	-	-	0.6	0.9	C95
Other & unspecified	25	0	-	0.8	-	1.6	1.1	-	-	6.2	3.5	4.3	9.6	29.3	31.1	15.2	16.6	23.8	2.8	5.3	
All sites	455	0	10	11	7	12	12	13	14	68	102	154	216	196	637	304	714	500	51.8	103.7	

Table 9: Age Specific Incidence Rates per 100,000 among Omanis (Female)

INCIDENCE TABLES - Female

SITE	ALL AGES	AGE UNK.	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+	CRUDE RATE	ASR WORLD	ICD (10th)
Lip	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C00
Tongue	3	0	-	-	-	-	-	-	-	-	-	-	-	5.2	-	9.1	-	10.4	0.4	0.7	C01-C02
Salivary gland	2	0	-	-	-	-	-	-	-	3.0	3.1	-	-	-	-	-	-	-	0.2	0.4	C07-C08
Mouth	4	0	-	-	-	-	-	-	2.4	-	-	-	-	5.2	9.1	9.1	-	-	0.5	1.0	C03-C06
Oropharynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C09-C10
Nasopharynx	4	0	-	-	-	-	-	-	-	3.0	6.1	-	-	5.2	-	-	-	-	0.5	0.8	C11
Hypopharynx	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.5	-	0.1	0.4	C12-C13
Pharynx unspec.	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C14
Oesophagus	12	0	-	-	-	-	-	-	-	-	3.1	-	4.8	5.2	9.1	45.4	37.1	10.4	1.4	3.3	C15
Stomach	26	0	-	-	0.8	-	-	-	-	-	3.1	16.6	24.2	15.5	18.3	-	129.7	31.1	3.1	7.0	C16
Small intestine	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C17
Colon	4	0	-	-	-	-	-	-	-	-	-	4.1	4.8	-	9.1	-	18.5	-	0.5	1.2	C18
Rectum	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C19-C21
Liver	16	0	0.8	-	-	-	-	-	-	-	-	8.3	19.3	15.5	9.1	-	55.6	20.8	1.9	4.1	C22
Gallbladder etc.	5	0	-	-	-	-	-	-	-	-	-	-	9.7	5.2	18.3	-	-	-	0.6	1.4	C23-C24
Pancreas	5	0	-	-	-	-	1.1	-	-	-	-	-	-	5.2	9.1	-	18.5	10.4	0.6	1.2	C25
Nose, sinuses etc.	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C30-C31
Larynx	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C32
Bronchus, lung	9	0	-	-	-	-	-	-	-	6.0	-	-	4.8	5.2	9.1	18.2	18.5	10.4	1.1	2.3	C33-C34
Other Thoracic organs	1	0	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	C37-C38
Bone	6	0	-	0.8	1.5	0.8	2.3	-	-	-	-	-	-	-	-	-	-	-	0.7	0.5	C40-C41
Connective tissue	5	0	-	-	-	-	-	1.8	2.4	3.0	-	4.1	-	-	-	-	18.5	-	0.6	1.1	C47;C49
Mesothelioma	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C45
Kaposi's sarcoma	3	0	-	-	-	-	-	-	-	-	3.1	-	-	5.2	9.1	-	-	-	0.4	0.8	C46
Melanoma of skin	1	0	-	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-	-	0.1	0.1	C43
Other skin	22	0	-	0.8	0.8	0.8	-	-	-	3.0	3.1	8.3	14.5	5.2	-	27.3	74.1	41.5	2.6	5.1	C44
Breast	55	0	-	-	-	-	1.1	3.6	4.9	6.0	24.6	37.3	67.7	36.2	64.0	-	37.1	10.4	6.5	13.1	C50
Uterus unspec.	5	0	-	-	-	-	-	-	-	-	3.1	4.1	-	5.2	-	-	37.1	-	0.6	1.4	C55
Cervix uteri	22	0	-	-	-	-	-	-	2.4	12.0	6.1	8.3	14.5	10.3	36.6	9.1	37.1	10.4	2.6	5.6	C53
Placenta	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C58
Corpus uteri	1	0	-	-	-	-	-	-	-	3.0	-	-	-	-	-	-	-	-	0.1	0.2	C54
Ovary etc.	29	0	-	-	1.5	3.3	-	1.8	-	-	6.1	12.4	24.2	5.2	36.6	9.1	18.5	51.9	3.4	6.3	C56
Other female genital	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.5	-	0.1	0.4	C51-C52;C57
Bladder	12	0	0.8	-	-	-	-	-	-	3.0	3.1	8.3	-	-	9.1	18.2	74.1	-	1.4	3.4	C67
Kidney etc.	4	0	-	-	-	-	-	-	2.4	-	-	-	-	-	9.1	9.1	-	10.4	0.5	1.0	C64-C66;C68
Eye	5	0	2.5	-	-	-	-	-	-	-	3.1	-	-	-	9.1	-	-	-	0.6	0.9	C69
Brain, nervous system	14	0	0.8	2.4	2.3	1.7	-	-	-	-	9.2	4.1	4.8	-	-	-	-	-	1.6	1.7	C70-C72
Thyroid	31	0	-	-	-	4.1	3.4	7.3	2.4	21.0	6.1	24.9	9.7	-	-	9.1	-	-	3.6	5.2	C73
Other endocrine	1	0	-	-	-	-	-	-	-	-	-	4.1	-	-	-	-	-	-	0.1	0.2	C74-C75
Hodgkin's disease	9	0	-	0.8	-	0.8	1.1	-	-	-	3.1	4.1	-	5.2	18.3	-	18.5	-	1.1	2.0	C81
Non-Hodgkin lymphoma	18	0	0.8	2.4	-	2.5	1.1	7.3	-	-	3.1	-	4.8	-	27.4	-	18.5	-	2.1	3.1	C82-C85;C96
Multiple myeloma	9	0	-	-	-	-	-	-	-	3.0	3.1	-	9.7	-	27.4	-	18.5	10.4	1.1	2.5	C88;C90
Lymphoid leukaemia	8	0	3.3	2.4	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	0.9	0.7	C91
Myeloid leukaemia	9	0	-	-	-	0.8	-	-	4.9	3.0	-	8.3	4.8	-	-	9.1	18.5	-	1.1	1.9	C92
Monocytic leukaemia	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C93
Other leukaemia	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.0	C94
Leukaemia unspec.	4	0	0.8	0.8	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.3	C95
Other & unspecified	26	0	0.8	-	-	-	1.1	1.8	-	3.0	3.1	4.1	29.0	-	18.3	27.3	111.2	31.1	3.1	6.8	
All sites	392	0	12	10	8	16	11	25	22	72	95	162	252	140	357	200	797	260	46.1	88.2	

Table 10: Incident Cases by Most Valid Basis of Diagnosis among Omanis

Site	A †	B †	C †
Lip	0	2	0
Mouth	0	16	0
Salivary gland	0	1	0
Oropharynx	0	1	0
Nasopharynx	0	5	1
Hypopharynx	0	2	0
Oesophagus	0	21	1
Stomach	3	74	4
Small intestine	0	1	0
Colon	0	10	1
Rectum	0	12	1
Liver	2	25	22
Gall bladder	0	8	0
Pancreas	0	7	3
Nose, Sinuses	0	2	0
Larynx	0	6	0
Bronchus, Lung	2	42	8
Other thoracic organs	0	2	0
Bone	0	9	0
Connective Tissue	0	12	1
Melanoma of skin	0	0	1
Other skin	0	39	1
Kaposi's sarcoma	0	3	0
Mesothelioma	0	0	1
Breast	0	49	8
Other female genital	1	52	5
Prostate	3	31	7
Testis	0	3	0
Kidney	0	11	1
Bladder	0	32	3
Eye	0	7	1
Brain, Nervous system	0	25	5
Thyroid	0	38	1
Hodgkin's disease	0	27	0
Non-Hodgkin's disease	0	54	3
Multiple myeloma	0	11	5
Lymphoid leukemia	0	19	6
Myeloid leukemia	1	17	2
Leukemia unspecified	0	10	0
Other and unspecified	1	50	3
Total	13	740	94
Percentage	1.5	87.4	11.1

† **Key to Basis of Diagnosis**

A = Clinical only

B = Cytological /hematological or histology of primary/ metastasis

C = Clinical investigation (e.g. X-ray, Isotopes) or specific biochemical and / or immunological test or exploration surgery but without histology or death certificate only

Common Cancers among Omanis

Overall, the commonest cancer in the Omani population was stomach cancer followed by breast and Non-Hodgkin's lymphoma (Table 11). The most common cancer in males was cancer of the stomach followed by carcinoma of lung & bronchus and prostate (Table 12). In females, the most common cancer was breast cancer followed by thyroid and ovary (Table 13).

Table 11: Ten Most Common Cancers in Omanis (Males & Females)

Topography	Frequency	Percentage (%)
Stomach	81	9.6
Breast*	57	6.7
Non-Hodgkin's Lymphoma	57	6.7
Leukemia	55	6.5
Lung & Bronchus	55	6.5
Liver	49	5.8
Prostate	41	4.8
Thyroid	39	4.6
Urinary bladder	35	4.1
Skin	35	4.1

* Includes 2 cases of male breast cancer

Table 12: Ten Most Common Cancers in Omani Males

Topography	Frequency	Percentage (%)
Stomach	55	12.1
Lung & Bronchus	46	10.1
Prostate	41	9.0
Non-Hodgkin's Lymphoma	39	8.6
Leukemia	34	7.5
Liver	33	7.3
Bladder	23	5.1
Hodgkin's Lymphoma	18	3.9
Brain & Nervous System	16	3.5
Rectum	13	2.9

Table 13: Ten Most Common Cancers in Omani Females

Topography	Frequency	Percentage (%)
Breast	55	14.0
Thyroid	31	7.9
Ovary	29	7.4
Stomach	26	6.6
Cervix	22	5.6
Skin	22	5.6
Leukemia	21	5.4
Non-Hodgkin's Lymphoma	18	4.6
Liver	16	4.1
Brain & Nervous system	14	3.6

Regional Distribution of Cancer Cases

The incidence rates in different regions varied from 25.3 per 100,000 population (Al-Wousta) to 63.3 per 100,000 population (Dhofar). Table 14 gives the incidence rates and number of cases of cancer reported from each region. The high frequency of cancer reported from Muscat could be biased since majority of the cancer cases are referred to the Royal hospital in Muscat and people may give a local address of a relative in the capital, rather than their original place of residence.

Table 14: Regional Distribution of Cancer Cases among Omanis

Region	Frequency	Incidence rate (per 100,000)
Al-Wousta	4	25.3
Dakhiliya	106	45.9
Dhahira	63	40.1
Dhofar	93	63.3
Musandam	14	53.8
Muscat	202	57.1
North Batinah	155	44.9
North Sharqiyah	47	39.7
South Batinah	97	48.6
South Sharqiyah	60	44.2
Unknown	6	---
Total	847	---

Childhood Cancers

Of the 847 cases reported during 1999, 74 cases were among children aged 14 years and below, constituting 8.7% of the total cancers reported. Leukemia, lymphoma followed by brain and spinal neoplasms, were the commonest tumours seen in this age group. Tables 15 -17 list the common childhood cancers in Omani children. The age specific incidence rates of childhood cancer classified according to the international classification of childhood cancer is given in table 18. The age standardized rates were 93.4 per million for males and 99.3 per million for females.

Table 15: Frequency distribution of Cancers in Omani Children (Boys & Girls)

Topography	Frequency	Percentage (%)
Leukemia	24	32.4
Lymphoma	17	21.6
Brain & Spinal Neoplasm	10	13.5
Soft Tissue Sarcoma	5	6.8
Retinoblastoma	4	5.4
Germ Cell & Gonadal Neoplasm	4	5.4
Malignant Bone Tumours	3	4.1
Carcinomas & Epithelial Neoplasms	3	4.1
Renal Tumours	2	2.7
Sympathetic Nervous System Tumours	2	2.7
Total	74	---

Table 16: Frequency distribution of Cancers in Omani Children (Boys)

Topography	Frequency	Percentage (%)
Leukemia	13	36.1
Lymphoma	11	30.6
Brain & Spinal Neoplasm	4	11.1
Sympathetic Nervous System Tumours	2	5.6
Renal Tumors	2	5.6
Soft Tissue Sarcoma	2	5.6
Carcinomas & Epithelial Neoplasms	1	2.8
Retinoblastoma	1	2.8
Total	36	---

Table 17: Frequency distribution of Cancers in Omani Children (Girls)

Topography	Frequency	Percentage (%)
Leukemia	11	29.0
Brain & Spinal Neoplasm	6	15.8
Lymphoma	5	13.2
Germ Cell & Gonadal Neoplasm	4	10.5
Retinoblastoma	3	7.9
Malignant Bone Tumours	3	7.9
Soft Tissue Sarcoma	3	7.9
Carcinomas & Epithelial Neoplasms	2	5.3
Hepatic Tumours	1	2.6
Total	38	---

Table 18: Frequency Distribution & Incidence rates of Childhood Cancers in Oman by Site, Age & Gender (International Classification of Childhood Cancers)

Site	Male						Female					
	0-4	5-9	10-14	All	*CR	*ASR	0-4	5-9	10-14	All	*CR	*ASR
1. Leukaemia	3	5	5	13	33.3	32.4	5	4	2	11	29.1	30.9
Lymphoid	3	4	3	10	25.6	25.7	4	3	0	7	17.9	19.9
Acute non-lymphocytic	0	0	2	2	5.1	4.2	0	0	0	0	0.0	0.0
Chronic myeloid	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Other specified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Unspecified	0	1	0	1	2.6	2.5	1	1	2	4	10.2	9.8
2. Lymphomas	3	6	2	11	28.2	28.5	1	4	0	5	12.8	13.1
Hodgkin's disease	1	4	1	6	15.4	15.2	0	1	0	1	2.6	2.5
Non-Hodgkin lymphomas	0	0	1	1	2.6	2.1	1	2	0	3	7.7	8.1
Burkitt's lymphoma	1	2	0	3	7.7	8.1	0	1	0	1	2.6	2.5
Miscellaneous lymphoreticular Neoplasm	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Unspecified	1	0	0	1	2.6	3.1	0	0	0	0	0.0	0.0
3. Brain and Spinal Neoplasms	2	2	0	4	10.2	11.2	0	3	3	6	15.4	13.8
Ependymoma	1	0	0	1	2.6	3.1	0	1	1	2	5.1	4.6
Astrocytoma	0	1	0	1	2.6	2.5	0	0	1	1	2.6	2.1
Primitive neuroectodermal tumours	1	1	0	2	5.1	5.6	0	1	1	2	5.1	4.6
Other gliomas	0	0	0	0	0.0	0.0	0	1	0	1	2.6	2.5
Other specified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
4. Sympathetic Nervous System Tumours	1	1	0	2	5.1	5.6	0	0	0	0	0.0	0.0
Neuroblastoma	1	1	0	2	5.1	5.6	0	0	0	0	0.0	0.0
Other	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
5. Retinoblastoma	1	0	0	1	2.6	3.1	3	0	0	3	7.7	9.3
6. Renal Tumours	2	0	0	2	5.1	6.2	0	0	0	0	0.0	0.0
Wilm's tumour	2	0	0	2	5.1	6.2	0	0	0	0	0.0	0.0
Renal carcinoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
7. Hepatic Tumours	0	0	0	0	0.0	0.0	1	0	0	1	2.6	3.1
Hepatoblastoma	0	0	0	0	0.0	0.0	1	0	0	1	2.6	3.1
Hepatic carcinoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
8. Malignant Bone Tumours	0	0	0	0	0.0	0.0	0	1	2	3	7.7	6.8
Osteosarcoma	0	0	0	0	0.0	0.0	0	0	1	1	2.6	2.1
Chondrosarcoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Ewing's sarcoma	0	0	0	0	0.0	0.0	0	1	1	2	5.1	4.6
Other specified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
9. Soft Tissue Sarcomas	0	0	2	2	5.1	4.2	2	0	1	3	7.7	8.4
Rhabdomyosarcoma	0	0	0	0	0.0	0.0	1	0	0	1	2.6	3.1
Fibrosarcoma	0	0	0	0	0.0	0.0	0	0	1	1	2.6	2.1
Kaposi's sarcoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Other specified	0	0	2	2	5.1	4.2	1	0	0	1	2.6	3.1
Unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
10. Germ Cell and Gonadal Neoplasms	0	0	0	0	0.0	0.0	2	0	2	4	10.2	10.5
Intracranial and intraspinal germ cell	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Other & unspecified non-gonadal germ cell	0	0	0	0	0.0	0.0	2	0	0	2	5.1	6.2
gonadal germ cell	0	0	0	0	0.0	0.0	0	0	2	2	5.1	4.2
Gonadal carcinoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Other and unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
11. Carcinomas and Epithelial Neoplasms	0	0	1	1	2.6	2.1	0	1	1	2	5.1	4.6
Adrenocortical	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Thyroid	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Nasopharyngeal	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Melanoma	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Skin	0	0	0	0	0.0	0.0	0	1	1	2	5.1	4.6
Other and unspecified	0	0	1	1	2.6	2.1	0	0	0	0	0.0	0.0
12. Other and Unspecified Neoplasms	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Other specified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Other unspecified	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0
Total	**12**	**14**	**10**	**36**	**92.1**	**93.4**	**14**	**13**	**11**	**38**	**97.3**	**99.3**

* CR = Crude incidence rate per million; ASR = Age-Standardized Rate per Million

Lymphomas

There were 84 cases of lymphomas reported in 1999. Of these 57 cases (68.0%) were Non-Hodgkin's lymphoma (NHL) and 27 cases (32.0%) were Hodgkin's lymphoma. NHL formed the third most common cancer among the Omani population. The male : female ratio was 2.2:1 for NHL and 2:1 for Hodgkin's lymphomas.

The highest incidence rate for NHL was seen in Dhofar region (5.4 per 100,000) followed by Dhahira (4.5 per 100,000). The highest incidence rate for Hodgkin's lymphomas was seen in Musandam (3.8 per 100,000) followed by North Batinah (2.3 per 100,000). The regional distribution, sex distribution and the histology of the lymphomas reported are presented in Tables 19 - 22 respectively.

Table 19: Regional Distribution of Lymphomas

Region	Hodgkin's Lymphoma		Non-Hodgkin's Lymphoma	
	Frequency	Incidence/100,000	Frequency	Incidence/100,000
Al-Wousta	0	0.0	0	0.0
Dakhiliya	2	0.9	5	2.2
Dhahira	3	1.9	7	4.5
Dhofar	3	2.0	8	5.4
Musandam	1	3.8	0	0.0
Muscat	6	2.1	10	3.5
North Batinah	8	2.3	15	4.3
North Sharqiyah	2	1.7	2	1.7
South Batinah	2	1.0	6	3.0
South Sharqiyah	0	0.0	4	2.9
Total	27	---	57	---

Table 20: Gender Distribution of Lymphoma Cases

	Hodgkin's Lymphoma		Non-Hodgkin's Lymphoma	
Sex	Frequency	Incidence	Frequency	Incidence
Female	9	1.0	18	2.1
Male	18	2.1	39	4.6
Total	27	---	57	---

† Incidence per 100,000 per year

Table 21: Histology of Hodgkin's Disease

ICD-O Code	Histology	Percentage (%)
96503	Hodgkin's disease (NOS)*	25.9
96523	Hodgkin's disease, mixed cellularity (NOS)*	14.8
96535	Hodgkin's disease, lymphocytic depletion (NOS)*	3.7
96553	Hodgkin's disease, lymphocytic depletion reticular	3.7
96633	Hodgkin's disease, nodular sclerosis (NOS)*	37.0
96653	Hodgkin's disease, nodular sclerosis lymphocytic predominance	3.7
96663	Hodgkin's disease, nodular sclerosis, mixed cellularity	11.1

* NOS, Not otherwise specified

Table 22: Histology of Non-Hodgkin's Disease

ICD-O Code	Histology	Percentage (%)
95913	Malignant lymphoma, non-Hodgkin's (NOS)*	47.4
95903	Malignant lymphoma (NOS)*	8.8
96853	Malignant lymphoma, lymphoblastic	1.8
96803	Malignant lymphoma, large cell, diffuse (NOS)*	14.0
95953	Malignant lymphoma, diffuse (NOS)*	8.8
96703	Malignant lymphoma, small lymphocytic (NOS)*	3.5
96813	Malignant lymphoma, large cell, cleaved, diffuse	1.8
96843	Malignant lymphoma, Immunoblastic, (NOS)*	5.3
96873	Burkitt's Lymphoma, (NOS)*	7.0
96983	Malignant lymphoma, large cell, follicular (NOS)*	1.8

* NOS, Not otherwise specified

Gastric Cancer

Gastric cancer is the most common cancer among Omanis. In 1999, there were 83 cases of gastric cancer. Among these 57 were males and 26 were females, giving the male : female ratio of 2.2:1. The highest incidence rate was seen in Musandam (11.5 per 100,000) followed by Dhofar (8.2 per 100,000) and North Batinah (8.1 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 23 - 25 respectively.

Table 23: Regional Distribution of Gastric Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	5	2.2
Dhahira	0	0.0
Dhofar	12	8.2
Musandam	3	11.5
Muscat	17	6.0
North Batinah	28	8.1
North Sharqiyah	1	0.8
South Batinah	12	6.0
South Sharqiyah	4	2.9
Unknown	1	---
Total	83	---

Table 24: Sex Distribution of Gastric Cancer

Sex	Frequency	Incidence/100,000
Male	57	6.5
Female	26	3.1
Total	83	---

Table 25: Histology of Gastric Malignancies

ICD-O Code	Histology	Percentage (%)
81403	Adenocarcinoma (NOS)*	72.3
80103	Carcinoma (NOS)*	3.6
80003	Neoplasm, malignant	9.6
82113	Tubular Adenocarcinoma	1.2
84813	Mucin-producing Adenocarcinoma	6.0
84903	Signet ring cell carcinoma	2.4
88903	Leiomyosarcoma (NOS)*	1.2
81443	Adenocarcinoma intestinal type	1.2
95913	Malignant Lymphoma, non-Hodgkins, (NOS)*	1.2
95953	Malignant Lymphoma, Diffuse, (NOS)*	1.2

*(NOS), Not otherwise specified

Breast Cancer (Female)

Female breast cancer was the most common cancer among Omani females. In total there were 55 cases in 1999. The highest incidence rate was seen in Muscat (5.1 per 100,000) followed by Dakhiliya (4.8 per 100,000) and Dhofar (4.8 per 100,000) . The regional distribution and the histology of this cancer are presented in Tables 26- 27 respectively. There were two cases of male breast cancer reported to the Registry, one from Dakhiliya and the other from South Sharqiyah region.

Table 26: Regional Distribution of Breast Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	11	4.8
Dhahira	4	2.5
Dhofar	7	4.8
Musandam	0	0.0
Muscat	18	5.1
North Batinah	6	1.7
North Sharqiyah	4	3.4
South Batinah	1	0.5
South Sharqiyah	4	2.9
Total	55	---

Table 27: Histology of Breast Cancer

ICD-O Code	Histology	Percentage (%)
85003	Infiltrating ductal carcinoma	66.7
80103	Carcinoma (NOS)*	8.8
85403	Paget's Disease, mammary	1.8
85413	Paget's Disease and Infiltrating duct carcinoma	1.8
85203	Lobular carcinoma (NOS)*	5.3
85433	Paget's Disease and intraductal carcinoma	1.8
81403	Adenocarcinoma (NOS)*	1.8
80003	Malignant neoplasm (NOS)*	12.3

*(NOS), Not otherwise specified

Cancer of Lung & Bronchus

In 1999 there were 56 cases of lung & bronchus malignancies. Of these 47 were males and 9 were females, with the male : female ratio being 5.2:1. Cancer of the lung and bronchus formed the second commonest cancer among Omani males. The highest incidence rate was seen in South Sharqiyah (4.4 per 100,000) followed by North Sharqiyah (4.2 per 100,000) and Muscat (3.9 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 28-30 respectively.

Table 28: Regional Distribution of Lung & Bronchus Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	6	2.6
Dhahira	2	1.3
Dhofar	5	3.4
Musandam	1	3.8
Muscat	11	3.9
North Batinah	13	3.8
North Sharqiyah	5	4.2
South Batinah	7	3.5
South Sharqiyah	6	4.4
Total	56	---

Table 29: Sex Distribution of Lung & Bronchus Cancer

Sex	Frequency	Incidence/100,000
Male	46	5.4
Female	9	1.1
Total	56	---

Table 30: Histology of Lung & Bronchus Cancer

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	21.4
80703	Squamous cell carcinoma (NOS)*	26.8
81403	Adenocarcinoma (NOS)*	14.3
80413	Small cell carcinoma (NOS)*	7.1
80003	Neoplasm,malignant	17.9
80123	Large cell Carcinoma (NOS)*	1.8
82463	Neuroendocrine carcinoma	1.8
84813	Mucin-producing Adenocarcinoma	5.4
90853	Mixed germ cell Tumor	1.8
95903	Malignant Lymphoma (NOS)*	1.8

*(NOS), Not otherwise specified

Malignancies of the Urinary Bladder

In 1999, there were 35 cases of carcinoma of the urinary bladder. Among these there were 23 males and 12 females, with the male : female ratio being 1.9 : 1. The highest incidence rate was seen in Musandam (7.7 per 100,000) followed by Al-Wousta (6.3 per 100,000) and North Batinah (2.9 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in tables 31-33 respectively. Transitional cell carcinomas constituted 45.7% of the tumours whereas squamous cell carcinomas constituted only 17.1%.

Table 31: Regional Distribution of Malignancies of the Urinary Bladder

Region	Frequency	Incidence/100,000
Al-Wousta	1	6.3
Dakhiliya	4	1.7
Dhahira	2	1.3
Dhofar	3	2.0
Musandam	2	7.7
Muscat	6	2.1
North Batinah	10	2.9
North Sharqiyah	3	2.5
South Batinah	2	1.0
South Sharqiyah	1	0.7
Unknown	1	---
Total	35	---

Table 32: Sex Distribution of Malignancies of the Urinary Bladder

Sex	Frequency	Incidence/100,000
Male	23	2.6
Female	12	1.4
Total	35	---

Table 33: Histology of Malignancies of the Urinary Bladder

ICD-O Code	Histology	Percentage (%)
81203	Transitional cell carcinoma (NOS)*	45.7
80703	Squamous cell carcinoma (NOS)*	17.1
81303	Papillary transitional cell carcinoma	11.4
80003	Malignant Neoplasm	8.6
80503	Papillary carcinoma (NOS)*	2.9
89003	Rhabdomyosarcoma (NOS)*	2.9
80103	Carcinoma (NOS)*	11.4

*(NOS), Not otherwise specified

Carcinoma of the Prostate

Carcinoma of the prostate was the third commonest cancer among Omani males, with 42 cases being reported in 1999. The highest incidence rate was seen in South Sharqiyah (5.2 per 100,000) followed by Muscat (3.5 per 100,000) and Dakhiliya & South Batinah (3.0 per 100,000). The Regional distribution, and the histology of the cancer cases reported are presented in Tables 34 & 35 respectively.

Table 34: Regional Distribution of Carcinoma of the Prostate

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	7	3.0
Dhahira	4	2.5
Dhofar	1	0.7
Musandam	0	0.0
Muscat	10	3.5
North Batinah	6	1.7
North Sharqiyah	1	0.8
South Batinah	6	3.0
South Sharqiyah	7	5.2
Total	42	---

Table 35: Histology of carcinoma of the prostate

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	21.4
80103	Carcinoma (NOS)*	11.9
81203	Transitional cell carcinoma	7.1
81403	Adenocarcinoma (NOS)*	57.1
95913	Non-Hodgkins Lymphoma	2.4

*(NOS), Not otherwise specified

Skin Cancer

There were 42 cases of skin cancer in 1999. Among these, 17 were males and 25 were females, with the male : female ratio being 1:1.5. Skin cancer was the 7th commonest cancer among the Omani females. The highest incidence rate was seen in Al-Wousta (6.3 per 100,000) followed by North Sharqiyah (5.9 per 100,000) and Muscat (3.9 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 36-38 respectively. Basal cell carcinomas constituted 61.9%, Kaposi's sarcoma 16.7% and squamous cell carcinomas 14.3 %of the skin tumours.

Table 36: Regional Distribution of Skin Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	1	6.3
Dakhiliya	4	1.7
Dhahira	3	1.9
Dhofar	1	0.7
Musandam	0	0.0
Muscat	11	3.9
North Batinah	8	2.3
North Sharqiyah	7	5.9
South Batinah	5	2.5
South Sharqiyah	2	1.5
Total	42	---

Table 37: Sex Distribution of Skin Cancer

Sex	Frequency	Incidence/100,000
Male	17	1.9
Female	25	2.9
Total	42	---

Table 38: Histology of Skin Cancer

ICD-O Code	Histology	Percentage (%)
80703	Squamous cell carcinoma (NOS)*	14.3
80903	Basal cell carcinoma (NOS)*	61.9
80943	Basosquamous Carcinoma	2.4
88323	Dermatofibrosarcoma	4.8
91403	Kaposi's sarcoma	16.7

*(NOS), Not otherwise specified

Carcinoma of the Colon

There were 10 cases of carcinoma of the colon in 1999. Of these 6 were males and 4 were females, with the male : female ratio being 1.5 : 1. Adenocarcinomas constituted the majority of these cancers (60%). The highest incidence rate was seen in Musandam (3.8 per 100,000) followed by Muscat (1.4 per 100,000) and Dakhiliya (0.9 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 39 - 41.

Table 39: Regional Distribution of Carcinoma of the Colon

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	2	0.9
Dhahira	0	0.0
Dhofar	1	0.7
Musandam	1	3.8
Muscat	4	1.4
North Batinah	0	0.0
North Sharqiyah	1	0.8
South Batinah	1	0.5
South Sharqiyah	0	0.0
Total	10	---

Table 40: Sex Distribution of Carcinoma of the Colon

Sex	Frequency	Incidence/100,000
Male	6	0.7
Female	4	0.5
Total	10	---

Table 41: Histology of Carcinoma of the Colon

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant (NOS)*	10.0
80103	Carcinoma(NOS)*	10.0
81403	Adenocarcinoma (NOS)*	60.0
82433	Goblet cell Carcinoma	10.0
82603	Papillary Adenocarcinoma(NOS)*	10.0

*(NOS), Not otherwise specified

Carcinoma of the Rectum and Anal Canal

There were 13 cases of carcinoma of the rectum and anal canal in 1999. All 13 cases were males. Adenocarcinomas constituted the majority of these cancers (53.8%). The highest incidence rate was seen in Musandam (3.8 per 100,000) followed by Dhofar (2.0 per 100,000) and Muscat (1.1 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 42 - 44 respectively.

Table 42: Regional Distribution of Carcinoma of the Rectum and Anal Canal

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	2	0.9
Dhahira	0	0.0
Dhofar	3	2.0
Musandam	1	3.8
Muscat	3	1.1
North Batinah	2	0.6
North Sharqiyah	1	0.8
South Batinah	0	0.0
South Sharqiyah	1	0.7
Total	13	---

Table 43: Sex Distribution of Carcinoma of the Rectum and Anal Canal

Sex	Frequency	Incidence/100,000
Male	13	0.8
Female	0	0.0
Total	13	---

Table 44: Histology of Carcinoma of the Rectum and Anal Canal

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm,malignant	15.4
80103	Carcinoma (NOS)*	7.7
80703	Squamous cell Carcinoma, metastatic (NOS)	15.4
81403	Adenocarcinoma (NOS)*	53.8
84813	Mucin-producing adenocarcinoma	7.7

*(NOS), Not otherwise specified

Bone Cancer

There were 10 cases of bone cancer in 1999. Among these, there were 4 males and 6 females, with the male : female ratio being 1:1.5. Ewing's Sarcoma constituted 30%, Chondrosarcoma & Osteosarcoma contributed 20.0% each. The highest incidence rate was seen in South Batinah (1.5 per 100,000) followed by Dhahira (1.3 per 100,000) and North Batinah (0.9 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 45 - 47 respectively.

Table 45: Regional Distribution of Bone Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	1	0.4
Dhahira	2	1.3
Dhofar	1	0.7
Musandam	0	0.0
Muscat	0	0.0
North Batinah	3	0.9
North Sharqiyah	0	0.0
South Batinah	3	1.5
South Sharqiyah	0	0.0
Total	10	---

Table 46: Sex Distribution of Bone Cancer

Sex	Frequency	Incidence/100,000
Male	4	0.5
Female	6	0.7
Total	10	---

Table 47: Histology of Bone Cancer

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant (NOS)*	10.0
91803	Osteosarcoma	20.0
92203	Chondrosarcoma	20.0
92403	Mesenchymal Chondrosarcoma	10.0
92603	Ewing's sarcoma	30.0
97313	Plasmacytoma, NOS	10.0

*(NOS), Not otherwise specified

Carcinoma of the Thyroid

There were 39 cases of carcinoma of the thyroid in 1999. Among these there were 31 females and 8 males, with the male : female ratio being 1 : 3.9. Carcinoma of the thyroid formed the 2nd commonest tumour among Omani women. The highest incidence rate was seen in Muscat (3.5 per 100,000) followed by Dhofar (3.4 per 100,000) and South Sharqiyah (2.9 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 48 - 50 respectively. The commonest thyroid neoplasm was papillary carcinoma which constituted 71.8% followed by follicular carcinoma (10.3%).

Table 48: Regional Distribution of Thyroid Cancers

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	6	2.6
Dhahira	1	0.6
Dhofar	5	3.4
Musandam	0	0.0
Muscat	10	3.5
North Batinah	5	1.4
North Sharqiyah	3	2.5
South Batinah	5	2.5
South Sharqiyah	4	2.9
Total	39	2.3

Table 49: Sex Distribution of Thyroid Cancers

Sex	Frequency	Incidence/100,000
Male	8	0.9
Female	31	3.6
Total	39	---

Table 50: Histology of Thyroid Cancers

ICD-O Code	Histology	Percentage (%)
80103	Carcinoma (NOS)*	5.1
80213	Carcinoma, anaplastic (NOS)*	2.6
80503	Papillary carcinoma (NOS)*	71.8
82903	Oxyphelic Adenocarcinoma	2.6
83303	Follicular adenocarcinoma (NOS)*	10.3
83403	Papillary carcinoma follicular variant	7.7

*(NOS), Not otherwise specified

Leukemia

There were 55 cases of leukemia in 1999. Among these, 34 were males and 21 were females, with the male : female ratio being 1.6 : 1. Leukemia formed the commonest cancer in children 14 years and below. The highest incidence rate was seen in Muscat & South Batinah (6.0 per 100,000) followed by Dhahira (3.8 per 100,000). The regional distribution, sex distribution and the histology of the cases reported are presented in Tables 51 - 53 respectively.

Table 51: Regional Distribution of Leukemia

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	5	2.2
Dhahira	6	3.8
Dhofar	3	2.0
Musandam	0	0.0
Muscat	17	6.0
North Batinah	7	2.0
North Sharqiyah	3	2.5
South Batinah	12	6.0
South Sharqiyah	1	0.7
Unknown	1	---
Total	55	---

Table 52: Sex Distribution of Leukemia

Sex	Frequency	Incidence/100,000
Male	34	3.9
Female	21	2.5
Total	55	---

Table 53: Types of Leukemia

ICD-O Code	Histology	Percentage (%)
98003	Leukemia (NOS)*	9.1
98013	Acute leukemia (NOS)*	5.5
98033	Chronic Leukemia	1.8
98213	Acute lymphoblastic leukemia (NOS)*	38.2
98233	Chronic lymphocytic leukemia	7.3
98503	Lymphosarcoma Cell Leukemia	1.8
98613	Acute Myeloid Leukemia	23.6
98633	Chronic myeloid	9.1
98663	Acute promyelocytic Leukemia	1.8
98673	Acute Myelomonocytic Leukemia	1.8

*(NOS), Not otherwise specified

Tumors of Brain and Spinal Cord

There were 31 cases of brain and spinal cord tumours in 1999. They formed the 3rd commonest tumour in children aged 14 years and below. Glioblastomas constituted 19.4%, followed by Neoplasm Malignant (16.1%) Medulloblastoma (12.9%). The highest incidence rate was seen in Dhahira (4.5 per 100,000) followed by Musandam (3.8 per 100,000) and Dakhiliya (2.6 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 54- 56 respectively.

Table 54: Regional Distribution of Brain & Spinal Cord Tumors

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	6	2.6
Dhahira	7	4.5
Dhofar	1	0.7
Musandam	1	3.8
Muscat	3	1.1
North Batinah	4	1.2
North Sharqiyah	0	0.0
South Batinah	5	2.5
South Sharqiyah	3	2.2
Unknown	1	---
Total	31	---

Table 55: Sex Distribution of Brain & Spinal Cord Tumors

Sex	Frequency	Incidence/100,000
Male	17	1.9
Female	14	1.6
Total	31	---

Table 56: Histology of Brain & Spinal Cord Tumors

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, Malignant (NOS)*	16.1
80103	Carcinoma (NOS)	3.2
93643	Peripheral Neuroectodermal Tumour	3.2
93803	Glioma, malignant	6.5
93913	Ependymoma (NOS)*	9.7
93923	Ependymoma anaplastic	3.2
94003	Astrocytoma (NOS)*	6.5
94013	Astrocytoma, anaplastic	3.2
94203	Fibrillary Astrocytoma	3.2
94213	Pilocytic astrocytoma	3.2
94403	Glioblastoma (NOS)*	19.4
94703	Medulloblastoma	12.9
95303	Meningioma, malignant	6.5
96843	Malignant lymphoma (immunoblastic) (NOS)*	3.2

*(NOS), Not otherwise specified

Carcinoma of the Cervix

There were 22 cases of cervical carcinoma in 1999. Carcinoma of the cervix formed the fifth commonest cancer among Omani females. The highest incidence rate was seen in Dhahira (4.5 per 100,000) followed by Dakhiliya (2.2 per 100,000) and Dhofar & Muscat (1.4 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 57 & 58 respectively.

Table 57: Regional Distribution of Carcinoma of the Cervix

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	5	2.2
Dhahira	7	4.5
Dhofar	2	1.4
Musandam	0	0.0
Muscat	4	1.4
North Batinah	3	0.9
North Sharqiyah	0	0.0
South Batinah	1	0.5
South Sharqiyah	0	0.0
Total	22	---

Table 58: Histology of Carcinoma of the Cervix

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant (NOS)*	4.5
80703	Squamous cell carcinoma (NOS)*	59.1
80713	Squamous cell carcinoma keratinizing (NOS)*	27.3
80723	Squamous cell carcinoma, large cell, non-keratinizing	9.1

*(NOS), Not otherwise specified

Liver Cancers

There were 49 cases of liver cancer in 1999. Among these, 33 were males and 16 were females, giving the male : female ratio of 2.1:1. Hepatocellular carcinoma was the commonest cancer among liver cancers and constituted 65.3%. The highest incidence rate was seen in Al-Wousta (12.7 per 100,000) followed by Dhofar (5.4 per 100,000) and Dakhiliya (4.3 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 59- 61 respectively.

Table 59: Regional Distribution of Liver Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	2	12.7
Dakhiliya	10	4.3
Dhahira	1	0.6
Dhofar	8	5.4
Musandam	0	0.0
Muscat	12	4.2
North Batinah	5	1.4
North Sharqiyah	2	1.7
South Batinah	3	1.5
South Sharqiyah	5	3.7
Unknown	1	---
Total	49	---

Table 60: Sex Distribution of Liver Cancer

Sex	Frequency	Incidence/100,000
Male	33	3.8
Female	16	1.9
Total	49	---

Table 61: Histology of Liver Cancer

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant (NOS)*	6.1
80103	Carcinoma (NOS)*	4.1
81403	Adenocarcinoma (NOS)*	2.0
81603	Cholangiocarcinoma	16.3
81623	Klatskin's Tumor	4.1
81703	Hepatocellular carcinoma (NOS)*	65.3
89703	Hepatoblastoma	2.0

*(NOS), Not otherwise specified

Carcinoma of the Esophagus

There were 22 cases of carcinoma of the esophagus in 1999. Among these there were 10 males and 12 females, with the male : female ratio being 1:1.2. The highest incidence rate was seen in Dhofar (5.4 per 100,000) followed by North Sharqiyah (2.5 per 100,000) and North Batinah (1.4 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 62 - 64 respectively. The majority of cancers were squamous cell carcinoma (54.5%). Adenocarcinomas constituted 36.4%.

Table 62: Regional Distribution of Carcinoma of the Esophagus

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	0	0.0
Dhahira	2	1.3
Dhofar	8	5.4
Musandam	0	0.0
Muscat	1	0.4
North Batinah	5	1.4
North Sharqiyah	3	2.5
South Batinah	2	1.0
South Sharqiyah	1	0.7
Total	22	---

Table 63: Sex Distribution of Carcinoma of the Esophagus

Sex	Frequency	Incidence/100,000
Male	10	1.1
Female	12	1.4
Total	22	---

Table 64: Histology of Carcinoma of the Esophagus

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	4.5
80103	Carcinoma (NOS)*	4.5
80703	Squamous cell carcinoma (NOS)*	54.5
81403	Adenocarcinoma (NOS)*	36.4

*(NOS), Not otherwise specified

Carcinoma of the Kidney & Ureter

There were 12 cases of kidney & ureter cancers in 1999. Among these there were 8 males and 4 females with the male : female ratio being 2:1. Renal cell carcinoma constituted 75% and nephroblastomas 16.7 %. The highest incidence rate was seen in Musandam (3.8 per 100,000) followed by South Sharqiyah (2.9 per 100,000) and Muscat (1.4 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 65 - 67 respectively.

Table 65: Regional Distribution of Carcinoma of the Kidney & Ureter

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	1	0.4
Dhahira	0	0.0
Dhofar	1	0.7
Musandam	1	3.8
Muscat	4	1.4
North Batinah	1	0.3
North Sharqiyah	0	0.0
South Batinah	0	0.0
South Sharqiyah	4	2.9
Total	12	---

Table 66: Sex Distribution of Carcinoma of the Kidney & Ureter

Sex	Frequency	Incidence/100,000
Male	8	0.9
Female	4	0.5
Total	12	---

Table 67: Histology of Carcinoma of the Kidney & Ureter

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant	8.3
83123	Renal cell carcinoma	75.0
89603	Nephroblastoma (NOS)*	16.7

*(NOS), Not otherwise specified

Carcinoma of the Pancreas

There were 10 cases of pancreatic cancers in 1999 (5 in males and 5 in females). The highest incidence rate was seen in North Batinah & Dakhiliya (0.9 per 100,000) followed by North Sharqiyah (0.8 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 68- 70 respectively.

Table 68: Regional Distribution of Carcinoma of the Pancreas

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	2	0.9
Dhahira	0	0.0
Dhofar	1	0.7
Musandam	0	0.0
Muscat	1	0.4
North Batinah	3	0.9
North Sharqiyah	1	0.8
South Batinah	0	0.0
South Sharqiyah	2	1.5
Total	10	---

Table 69: Sex Distribution of Carcinoma of the Pancreas

Sex	Frequency	Incidence/100,000
Male	5	0.6
Female	5	0.6
Total	10	---

Table 70: Histology of Carcinoma of the Pancreas

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant (NOS)*	10.0
80103	Carcinoma (NOS)*	50.0
80503	Papillary Carcinoma (NOS)*	10.0
81403	Adenocarcinoma (NOS)*	20.0
84813	Mucin-Producing Adenocarcinoma	10.0

*(NOS), Not otherwise specified

Ovarian Cancer

There were 29 cases of ovarian cancers in 1999. These constituted the 3rd commonest cancer among Omani females. The highest incidence rate was seen in Dhofar (5.4 per 100,000) followed by Musandam (3.8 per 100,0000) and Muscat (3.2 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 71 & 72 respectively.

Table 71: Regional Distribution of Ovarian Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	4	1.7
Dhahira	0	0.0
Dhofar	8	5.4
Musandam	1	3.8
Muscat	9	3.2
North Batinah	2	0.6
North Sharqiyah	0	0.0
South Batinah	3	1.5
South Sharqiyah	2	1.5
Total	29	---

Table 72: Histology of Ovarian Cancer

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant (NOS)*	6.9
80103	Carcinoma (NOS)*	10.3
80703	Squamous cell carcinoma (NOS)*	3.4
81403	Adenocarcinoma (NOS)*	10.3
82603	Papillary adenocarcinoma (NOS)*	6.9
83803	Endometrioid carcinoma	6.9
84603	Papillary serous cystadenocarcinoma	6.9
84613	Serous Surface Papillary Carcinoma	3.4
84703	Mucinous cystadenocarcinoma (NOS)*	24.1
84803	Mucinous Adenocarcinoma	3.4
84813	Mucin- producing adenocarcinoma	6.9
90713	Endodermial Sinus Tumor	3.4
90803	Teratoma, malignant (NOS)*	6.9

*(NOS), Not otherwise specified

Carcinoma of the Larynx & Trachea

There were 6 cases of carcinoma of the larynx and trachea in 1999. All cases were among males. The highest incidence rate was seen in Muscat (0.7 per 100,000) followed by North Batinah (0.6 per 100,000) and South Batinah (0.5 per 100,000). The regional distribution, sex distribution and the histology of the cancer cases reported are presented in Tables 73-75 respectively. Squamous cell carcinoma was the commonest malignancy constituting 83.3% of the tumours.

Table 73: Regional Distribution of Carcinoma of the Larynx & Trachea

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	0	0.0
Dhahira	0	0.0
Dhofar	0	0.0
Musandam	0	0.0
Muscat	2	0.7
North Batinah	2	0.6
North Sharqiyah	0	0.0
South Batinah	1	0.5
South Sharqiyah	0	0.0
Unknown	1	---
Total	6	---

Table 74: Sex Distribution of Carcinoma of the Larynx & Trachea

Sex	Frequency	Incidence/100,000
Male	6	0.7
Female	0	0.0
Total	6	---

Table 75: Histology of Carcinoma of the Larynx & Trachea

ICD-O Code	Histology	Percentage (%)
80703	Squamous cell carcinoma (NOS)*	83.3
80713	Squamous cell carcinoma, Keratinizing, (NOS)	16.7

*(NOS), Not otherwise specified

Uterine Cancer

There were 6 cases of uterine cancer in 1999. The highest incidence rate was seen in Dakhiliya (1.3 per 100,000) followed by Dhofar (0.7 per 100,000) and Muscat (0.3 per 100,000). The regional distribution, and the histology of the cancer cases reported are presented in Tables 76 & 77 respectively. Choreocarcinomas constituted 50% of the uterine tumours.

Table 76: Regional Distribution of Uterine Cancer

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	3	1.3
Dhahira	0	0.0
Dhofar	1	0.7
Musandam	0	0.0
Muscat	1	0.4
North Batinah	1	0.3
North Sharqiyah	0	0.0
South Batinah	0	0.0
South Sharqiyah	0	0.0
Total	6	---

Table 77: Histology of Uterine Cancer

ICD-O Code	Histology	Percentage (%)
80003	Neoplasm, malignant (NOS)*	16.7
83103	Clear cell adenocarcinoma	16.7
89303	Endometrial Stromal Sarcoma	16.7
91003	Choriocarcinoma (NOS)*	50.0

*(NOS), Not otherwise specified

Cancer among Expatriates

Expatriates constitute 25.6% of the total population of Oman. In 1999 there were 81 cases of cancer among the expatriate population giving a crude incidence rate of 13.6 per 100,000 population. The low rate does not reflect the incidence rates of the respective countries since the expatriate population is a highly selected population, with the majority being adult males. This is also confounded by a detection bias since the majority of the expatriates return to their homeland for major medical problems such as cancer, once suspected or diagnosed.

The commonest cancer among the expatriates was breast cancer followed by carcinoma of the thyroid and . The sex distribution, the common cancers among the expatriates (males and females), the common cancers among the expatriate males, the common cancers among expatriate females, the regional distribution, and the distribution by nationality are given in Tables 78 - 83.

Table 78: Sex Distribution of Cancer Cases among Expatriates

Sex	Frequency
Female	43
Male	38
Total	81

Table 79: Ten Most Common Cancers among Expatriates (Males & Females)

Topography	Frequency	Percentage (%)
Breast	22	27.2
Thyroid	6	7.4
Non – Hodgkin's Lymphoma	4	4.9
Myeloid Leukemia	4	4.9
Stomach	4	4.9
Colon	4	4.9
Connective Tissue	4	4.9
Lung	3	3.7
Other Thoracic organs	2	2.5
Lymphoid Leukemia	2	2.5

Cancer among Expatriates

Table 80: Ten Most Common Cancers among Expatriates (Males)

Topography	Frequency	Percentage (%)
Colon	4	10.5
Skin	4	10.5
Brain	3	7.9
Thyroid	3	7.9
Non-Hodgkins Lymphoma	3	7.9
Myeloid Leukemia	3	7.9
Lung	2	5.3
Bone	2	5.3
Connective Tissue	2	5.3
Mouth	2	5.3

Table 81: Ten Most Common Cancers among Expatriates (Females)

Topography	Frequency	Percentage (%)
Breast	22	51.2
Thyroid	3	6.9
Stomach	3	6.9
Connective Tissue	2	4.7
Ovary	2	4.7
Cervix	1	2.3
Non-Hodgkin’s lymphoma	1	2.3
Lymphoid Leukemia	1	2.3
Myeloid Leukemia	1	2.3
Lung	1	2.3

Table 82: Regional Distribution of Cancer Cases among Expatriates

Region	Frequency	Incidence/100,000
Al-Wousta	0	0.0
Dakhiliya	4	1.7
Dhahira	0	0.0
Dhofar	14	9.5
Musandam	1	3.8
Muscat	44	15.6
North Batinah	6	1.7
North Sharqiyah	1	0.8
South Batinah	6	3.0
South Sharqiyah	5	3.7
Unknown	0	---
Total	81	---

Table 83: Distribution of Cancer Cases among Expatriates by Country of Origin

Country	Frequency
India	30
Egypt	10
Philippines	7
United Kingdom	6
Pakistan	5
Bangladesh	4
Sri Lanka	4
Yemen	4
Sudan	2
Iraq	2
Morocco	1
Saudi Arabia	1
United Arab Emirates	1
Tunisia	1
Somalia	1
Lebanon	1
Syria	1
Total	81

Members of the National Cancer Control Committee

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3	Ms Najla Al-Riyami	Director of International Relations	Member
4	Dr. Ibrahim Abdul Rahim	WHO Representative, Oman	Member
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